

INTERACTIONS BETWEEN AN INTEGRATED DEAF CHILD OF HEARING  
PARENTS AND HIS HEARING PARTNERS IN THE SCHOOL SETTING:  
A VYGOTSKIAN PERSPECTIVE

by

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## ABSTRACT

The purpose of this research was to describe, from a Vygotskian perspective, the nature and quality of the social interactions experienced by a fully integrated deaf child of hearing parents (dchp) in the school setting. Because social transmission of information is one of the key ways that members acquire social knowledge and because dchp do not have easy access to reciprocal communication with the hearing adults and peers who surround them, it was anticipated that examination of the social interaction processes would yield important information about the cultural knowledge of the deaf child.

A case study research design was used, focussing on the interactions of an eight year-old male dchp who had been fully integrated among hearing peers. The dchp was videotaped for nine hours in both social and instructional settings. The videotapes were analyzed to determine patterns of communicative action.

The dchp was found to interact primarily with girls in social settings and with the Sign Language interpreter in instructional settings. He seldom initiated interactions and responded only briefly to most of his partners' contributions. Linguistic semiotic mediation was used to discuss a limited number of topics and was usually highly contextualized. Although many communication breakdowns were not repaired, however, reciprocal dialogues between the deaf child and hearing partners who signed well were also noted. Unexpected findings emerged regarding the effects of the Sign Language interpreter during interaction between the classroom teacher and the deaf student. The case study design was found to be a pedagogically useful tool. Overall, the findings are consistent with Vygotsky's theory of child development.

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## DEDICATION

John was a student of mine. Sadly, he passed away shortly after the data were collected. His parents generously and enthusiastically cooperated in this research, encouraging me to continue even after John's death. I want to dedicate this paper to them and to John, whose gentle strength and quiet wisdom affected many people.

## CHAPTER I: INTRODUCTION

During the last two decades, a growing interest in social interaction with children has made researchers and educators aware of the need to consider the social context in which interactive and cognitive skills develop. An increasing number of researchers and educators has stressed the importance of every child fitting into a group, or in other words, acquiring a cultural identity which allows children to share experiences, knowledge and values with a group (Rutherford, 1988). It appears that children who are competent members of their own culture seem to have a strong sense of personal identity and of in-group membership. Because feelings of self-esteem and self-confidence may be related to feelings of competency within the culture, the role of educators is crucial in enabling students to become competent members of their own culture.

Deaf children experience a variety of interactional problems because they live in a world where others can hear. Deaf children of hearing parents (dchp) may face particular challenges in acquiring a cultural identity, and may "fall between two cultures" (Kannapell, 1991; Padden & Humphries, 1988). The purpose of this exploratory study is to examine the development of cultural identity of a deaf child growing up in a hearing milieu.

### Definition of Culture

Psychologists and anthropologists have defined culture in a variety of ways, including: a group's shared knowledge, customs, values, rules for behaviour, and conceptions of the world (Padden, 1980; Resnick, 1991), a group's shared ways of thinking and behaving (Levine & Moreland, 1991), an adaptation to an environment (Rutherford, 1988), that which individual members of a group must know or believe in order to function in the appropriate in-group manner

(Goodenough, 1970), and a group's socially learned understandings (Swartz, 1982). These broad definitions of culture include not only overt cultural products such as customs, language, arts, conveniences, but also the more covert cultural processes, such as ways of thinking and of organizing thoughts.

For the purposes of this paper, culture will be defined as the sum total of a group's thoughts, knowledge, understandings, and customs, as well as the tools and strategies the group uses to interact with the environment. Seen from this perspective, cultural knowledge is constantly and incrementally acquired by each member of the group and is distributed among group members (Boster, 1991). The amount of cultural knowledge acquired, and the rate at which it is acquired by any group member, depends, at least, on each member's opportunity to interact with others who share the cultural knowledge (Boster, 1991; Hutchins, 1991).

### Acquisition of Cultural Knowledge: A Theoretical Framework

Implicit in the acquisition of cultural knowledge is the notion of interaction, the idea of people actively engaged in dialogue, that is, sending and receiving messages. A theoretical framework that emphasizes the role of active dialogue in cultural acquisition, therefore, seems most appropriate to this examination. In the 1930's, L. S. Vygotsky, a Soviet developmental psychologist, proposed one of the initial theories of psychological development emphasizing the importance of social interaction between children and others more knowledgeable in their culture (1978, 1987). Vygotsky believed cognitive development involved the acquisition of cultural products and processes which developed during social interaction with individuals more skilled in the culture. He regarded these reciprocal processes of social interaction as the center of the development of higher mental functioning

and believed that cultural acquisition and cognitive development could only be understood by examining and understanding their roots in social interaction:

Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first between people (interpsychological), and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relations between human individuals. (Vygotsky, 1978, p. 57)

Vygotsky proposed the concept of the "zone of proximal development" (ZPD) to explain partially how cognitive development occurred through social interaction. The ZPD is created when children use the help of an adult or more capable peer to solve a problem that they would be unable to complete unassisted. Vygotsky claimed that social interaction was not only essential to cognitive development, but also that children actually internalize the social processes used during interactions in the ZPD. The gradual "appropriation" of these social processes by children signifies their cognitive development, and the acquisition of cultural knowledge.

Vygotsky introduced the concept of ZPD but he did not elaborate the actual processes which may occur during interaction in this zone. Wertsch (1984) contended that to understand fully the mechanics of the ZPD, at least three additional constructs are necessary: shared situation definition, intersubjectivity and semiotic mediation. Shared situation definition is created when the participants in a problem solving activity identify the goal of the activity in the same way. Intersubjectivity is the mutual understanding achieved between the partners. Semiotic mediation is the use of a symbol system, such as social language, mathematical systems, diagrams, mnemonic devices and literacy, to guide oneself or others in problem solving. These three constructs focus attention on the

importance of the particular kinds of dialogue between children and their more knowledgeable partners that are necessary for the creation of the ZPD. These constructs give adults a key role in the diagnosing of children's ZPD and in the linking of children's present knowledge with their potential level of development.

The focus on mutually understood dialogue and conversational processes implies that language plays a key role in Vygotskian theory. In fact, Vygotsky believed that language was the most powerful tool used by humans in the interactive process of cultural acquisition. Language is the predominant, though not the only, means by which children indicate their present knowledge and by means of which they are guided by adults in the ZPD. It is the language itself that children appropriate when they begin to order their own thinking. In this connection, Boster (1991) states that intracultural variation of cultural knowledge reflects each individual's opportunity to learn the culture during interactions with others. It is reasonable on this basis to assume, therefore, that any disruption in the interactional processes leading to reciprocal communication, as is the case with deaf children and hearing parents (Bouvet, 1990; Erting, 1980, 1985, 1987, 1988; Moores, 1987; Wood, Wood, Griffiths, & Howarth, 1986), would impede the transmission and acquisition of cultural norms and values (Tudge & Rogoff, 1989). The natural auditory language of the surrounding culture cannot be easily understood or used by deaf people (Bouvet, 1990) and thus the social transmission of information is difficult.

Bouvet (1990) states that the "handicap" of deaf people is "*cultural* [author's emphasis], stemming from their profound isolation from any kind of positive communication with the majority population" (p. 88). Anecdotal evidence suggests that dchp who are educated in integrated settings grow up belonging fully to neither deaf nor hearing cultures (Henderson & Hendershott, 1991; Kannapell, 1980, 1991). They seem to acquire marginal cultural identities, which suggests

that they participate less fully in either culture than do hearing children of hearing parents or deaf children of deaf parents.

Studies of the interactional patterns between deaf children and hearing caregivers have shown that reciprocal communication seldom occurs to the extent that it does between hearing children and their parents (Brinich, 1980; Cheskin, 1981, 1982; Kenworthy, 1986; Meadow, Greenberg, Erting, & Carmichael, 1981; Spencer & Gutfreund, 1990; Wedell-Monnig & Lumley, 1980). Hearing caregivers and deaf children do not engage often in the mutual dialogue necessary to create a shared situation definition and achieve intersubjectivity.

Although school has traditionally been the primary setting of cultural transmission for dchp (Padden & Humphries, 1988; Reagan, 1990), there has been little research examining the cultural transmissions between deaf students and hearing teachers and hearing peers (Antia, 1982; Brackett & Henniges, 1976; Lederberg, Ryan & Robbins, 1986; Vandell & George, 1981). However, it has been suggested that these interactions are similar to those which occur between deaf children and hearing parents (Erting, 1980, 1988; Mather, 1989; Wood et al., 1986). There has been even less research to document the processes by which cultural transmission occurs in an educational context. Examination of the processes of interaction between integrated deaf children and their hearing teachers and peers seems necessary if a clear understanding of the development of these children's cultural identity is to be acquired.

### Purpose of the Study and Research Questions

The rationale behind this study is that because integrated dchp do not have easy access to reciprocal communication with the hearing adults and peers who surround them, the linguistic semiotic mediation to which they are exposed may

not be conducive to the establishment of a shared situation definition nor, in turn, intersubjectivity. Because social transmission of information is one of the key ways members acquire cultural knowledge and strategies (Boster, 1991) and because dchp do not participate fully in either deaf or hearing cultures, they may acquire "marginal" cultural identities.

The purpose of the present research is to describe the nature and quality of the social interactions experienced by a fully integrated dchp in the school setting from a Vygotskian perspective. In this attempt to explore the processes of cultural transmission occurring between this child and the surrounding school community, the following three research questions will be addressed:

- (1) With whom do fully integrated deaf children of hearing parents interact in the school setting?
- (2) What forms of semiotic mediation occur between deaf children and their hearing partners as they attempt to create a shared situation definition?

Examination of these questions from a sociocognitive viewpoint may assist in describing the covert processes by means of which a deaf child educated in a hearing milieu acquires a cultural identity.

A case study research design will be used to examine these questions. In addition to focussing on the above questions, the present research will also reflect on the nature and usefulness of the individual case study as a prescriptive tool for teachers with fully or partially integrated deaf students when they are integrated among hearing classmates. Therefore, a third research question is:

- (3) What is the nature of the individual case study in the educational context and in what ways may it be used as a prescriptive tool for teachers of integrated deaf students?

### Definition of Terms

Social interaction refers to the process by which people enter into relationship; this process may or may not include linguistic communication.

Reciprocal communication refers to the pattern of communication which occurs when one partner acts in response or reaction to the other partner (Palincsar, 1986). Mutually understood dialogue is assumed in this process.

The use of the capitalized "Deaf" refers to deaf people who consider themselves members of Deaf culture; that is, they have a working knowledge of the language, norms, values, behaviours, social relations, literature, folklore, and visual arts which are identified as part of Deaf culture (Johnson & Erting, 1989; Kannapell, 1991; Padden, 1980; Rutherford, 1988).

The use of the non-capitalized "deaf" refers, in the most generic sense, to the audiological condition of deafness, which is the inability to process linguistic information through audition alone, with or without the use of a hearing aid (Moores, 1987).

The use of the capitalized noun "Sign" refers to visual-gestural communication (e.g., ASL, Pidgin Sign).

The use of the non-capitalized noun "sign" refers to aspects of semiotic mediation.

American Sign Language (ASL) is the Signed language of the culture of Deaf people in most of the United States and Canada (Padden, 1980). Like all languages, ASL is rule-governed and generative in nature. It has a visual and spatial grammar and structure unrelated to English. The grammatical structures may be carried in body movement and facial expression as well as on the hands themselves. The English sentence "I have eaten" could be translated into ASL as:

(right hand) FINISH ME

(left hand) EAT (Woodward, 1980, p. 123)

(The use of capital letters is a convention used for representing Signs.)

Pidgin Sign or Pidgin Sign English (PSE) refer to a range of different types of Signing that incorporates various amounts of English and ASL but which does not adhere completely to the structures of either language (Baker-Shenk & Cokely, 1991). Like spoken pidgins, the grammar of the original languages is reduced or simplified (Samarin, 1971). Generally, ASL Signs are placed in English word order and the visual structures of ASL, such as directionality and placement, may or may not be incorporated, depending on the familiarity of the user with ASL. The English sentence "I have eaten." could be translated into ASL-like PSE as: EAT FINISH ME or into more English-like PSE as I HAVE EAT (Woodward, 1980). Deaf Signers apparently retain more ASL in their PSE than hearing Signers and hearing Signers retain more English characteristics than Deaf Signers (Woodward, 1980).

Pidgins are defined not only by the reduction of grammar, but also by the reduction of their communicative functions and the range of social contexts in which they are used (Samarin, 1971). When compared to the variety of uses of the original languages, pidgins are used in fewer contexts to talk about a limited range of topics. Commonly, they do not have the stylistic variation that allows for a change of register appropriate to the context or situation.

Signed English refers to the manual presentation of ASL vocabulary in grammatical English. In Signed English, the Sign is initialized, so that the original handshape is altered to incorporate the handshape from the manual alphabet that corresponds to the initial letter of the particular English word (Baker-Shenk & Cokely, 1991). Some Signs are invented for instructional purposes and in order to represent all English grammatical structures on the hands alone. For example, the English sentence "I have eaten" would be translated into Signed English as: I HAVE EAT FINISH. The Sign for "I" would be made with an "i" handshape and

"have" would be made with a "V" handshape to indicate "have" as opposed to "had" or "has".

Sign Supported Speech refers to the simultaneous use of spoken English with Signs (Johnson, Liddell, & Erting, 1989). It is also referred to as "Total Communication".

A case study involves the an "intensive, holistic description and analysis of a single entity" (Merriam, 1988, p.16). Yin (1989) states that is a particularly useful tool when a phenomenon cannot be clearly delineated from its context.

### Significance of the Study

It is anticipated that a systematic examination of the social and linguistic interactions of a dchp, from a participant-observer methodology and framed within a Vygotskian perspective, will add to the understanding of the processes of cultural acquisition by integrated dchp. In addition, an identification of some of the processes by which a dchp accumulates cultural knowledge may be of benefit to educators working with deaf children in geographically isolated settings. The findings may shed light on strategies by means of which hearing educators and parents may improve the effectiveness of their social interactions with deaf children, thereby facilitating the deaf child's acquisition of the appropriate processes and products of the culture. Finally, the findings of this study may provide important suggestions as to the usefulness of individual case study design as a prescriptive tool for educators. The particular child chosen for this case study was a student of the researcher.

## CHAPTER II: REVIEW OF THE LITERATURE

"What concerns me the most is that more and more deaf young people seem to be marginal, not fitting into any group of people."

Kannapell, 1991, p. 7

From a Vygotskian perspective, cultural identity is acquired during interactions with other members of the cultural group. Some children, such as deaf children of hearing parents (dchp), grow up acquiring a "marginal" cultural identity. The purpose of the present research is to examine the social and linguistic interactions of a dchp in an integrated educational setting in order to identify the processes by which marginal cultural transmission occurs.

This chapter begins with an overview of the Vygotskian theoretical framework of cognitive and cultural development. The key constructs of this framework, namely shared situation definition, intersubjectivity, and semiotic mediation, are then applied to an examination of the literature regarding the processes of cognitive development/cultural acquisition in children of various ages and cultures. In an attempt to understand why some children do not become fully functioning members of their culture, the case of deafness is introduced as an example of disruption in the normal processes of cultural transmission and acquisition. The interaction patterns between deaf children and hearing caregivers at home and between deaf children and hearing teachers and peers at school are then examined, again using the key constructs of Vygotskian theory as a framework. The available literature on the use of the case study as a research design in an educational setting will be examined in Chapter III.

## Acquisition of Cultural Knowledge

Cultural knowledge is defined herein as the sum total of a group's thoughts, understandings, and customs, as well as the tools and strategies used to interact with the environment. From this perspective cultural knowledge is constantly and incrementally acquired by each group member. Cultural knowledge is distributed among the members of the group (Boster, 1991), with intracultural variation being related to the nature of the individuals within the group and the communication patterns among them (Hutchins, 1991; Swartz, 1982). The rate at which members acquire cultural knowledge may vary according to those with whom they have interacted and that about which they have communicated. The ability of members to use appropriate cultural knowledge may be affected by their access to environmental evidence, e.g., the access to visual or auditory stimuli. It is, therefore, possible for some members of the culture to have more cultural knowledge and some less, depending on the opportunities each individual has had to interact with others and learn from them (Boster, 1991; Hutchins, 1991).

## The Vygotskian Perspective: An Overview

Vygotsky's theoretical framework (e.g., 1978, 1987) for cognitive development emphasizes the interrelatedness of social interaction, language acquisition and higher mental processes. He argued that language and thought are not only interrelated, but that language mediates both the speech used to maintain social relationships and the ability to form concepts and reason in culturally appropriate ways. The key aspect to developing higher mental processes is the "zone of proximal development" (ZPD), which is "the distance between the actual developmental level as determined by independent problem

solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Adults and more capable peers do not teach problem solving, but rather, join in activities with children, emphasizing important actions, providing guidance, regulating the difficulty of the task, and providing help when necessary (Rogoff & Gardner, 1984; Rogoff, Malkin, & Gilbride, 1984). Children internalize the social processes that are used during interaction in the ZPD and this internalization of processes forms the base of their cognitive/cultural development. As the ZPD is an essential part of cultural and cognitive development, a thorough understanding of its creation is necessary.

Wertsch (1984) and Rogoff (1990) have explicated and elaborated upon a portion of Vygotsky's concept of the ZPD. Wertsch introduced three additional constructs which are central to a full understanding of operations in the zone: 1) situation definition 2) intersubjectivity and 3) semiotic mediation.

Situation definition refers to the way in which individuals who are operating in a problem solving situation define the context, or, in other words, what they believe the activity to be (Wertsch, 1984). According to Wertsch, any interaction in the ZPD typically involves children and adults initially representing and understanding objects and events in different ways because of their differing levels of knowledge. Adults (or more capable peers) must modify their definition of the situation to one that they believe is more understandable to children (Rogoff, 1990; Rogoff, Mosier, Mistry, & Göncü, 1989; Wertsch, 1984). Once a common situation definition is shared between adults and children, communication about the situation can occur.

When partners have created a shared situation definition, intersubjectivity, or the mutual understanding that occurs through joint participation in the task, can occur (Rogoff, 1990; Wertsch, 1984). The achievement of intersubjectivity requires

the learner's active participation and the partner's sensitive adjustment of the dialogue, using the learner's understanding as the point of departure. The processes of achieving intersubjectivity and a shared situation definition require negotiation on the part of both communicative partners.

To achieve intersubjectivity, adults create bridges between the understandings or schema that children already possess and the new problem they are facing. These bridges are created through the appropriate use of Wertsch's (1984, 1991) third construct, "semiotic" or sign-based mediation. In this context, signs are the intellectual tools that allow humans to mediate their mental functioning (Vygotsky, 1978). At first these signs are a means of social interaction with others but they are internalized and become the basis for all higher mental processes (Vygotsky, 1978; Wertsch, 1984; Wertsch & Toma, 1990). Means of semiotic mediation include social language (both spoken and Signed), mathematical systems, diagrams, mnemonic devices and literacy (Rogoff et al., 1989; Wertsch, 1989; Wertsch & Toma, 1990).

Semiotic mediation shapes thinking and behaviour, which in turn shape the development of signs. The forms of semiotic mediation, or the kinds of intellectual tools used and the way they are used, are determined by the cultural context. Children learn to use the tools and signs of their culture while learning the valued skills of that culture during work in the ZPD.

Semiotic mediation is both the tool by which adults guide children in the ZPD and a part of the cultural processes that children internalize. Language, which Vygotsky (1978) believed to be primary among the intellectual tools of mediation, is a good example of this two-fold role of semiotic mediation. During social interaction, infants and children learn language, which helps them to initiate and maintain interaction with others. Adults use language to guide children during work in the ZPD, and in the process, children learn both the language of the culture

and how to use language to organize their thinking. Children gradually internalize the language used during social interaction, which, in effect, becomes their thinking patterns or their way of organizing the world. Because these internal patterns have their base in social interaction within a cultural context, they are organized by cultural processes.

An example will help to clarify how these three constructs of shared situation definition, intersubjectivity, and semiotic mediation interact with each other and fit within the ZPD. A study by Wertsch (1979) examined the ways in which mothers worked with their children to complete a puzzle. In order for the mothers to support their children in the task, they first had to diagnose their children's understanding of the task (i.e., their situation definition). The mothers accomplished this by talking with their children and observing their actions and responses. For example, the mothers were able to determine whether their children knew to copy the model, knew they were making a specific object, or were just putting puzzle pieces together. The mothers had to begin their support at the level of their children's understandings of the task, as to begin higher would risk misunderstanding (e.g., when one mother suggested that one puzzle piece was part of the truck window, her child looked at the window in the classroom and then dropped the piece). When the mothers and children were jointly engaged in the task and understood each other's comments and questions in terms of the shared goals of the task, they could be said to have achieved intersubjectivity. The mothers used questions, comments and hints (i.e., appropriate semiotic mediation) to challenge their children to higher levels of independent problem solving. The mothers varied the amount of direction they gave depending on their children's needs. When the children failed to understand their mothers' prompts, the mothers gave more explicit directions. If the children were successful, the mothers gave less support. The mothers were able to help their children to make

the puzzle, never helping too much, nor allowing the children to become frustrated. With their mothers' support, the children were able to complete the puzzle, a task they would have been unable to accomplish alone. While completing the puzzle with their mothers, the children practiced culturally appropriate cognitive processes, sometimes supported by their mothers, and at other times alone, depending on their level of independence.

### The Acquisition of Cultural Knowledge

#### from a Vygotskian Perspective

There is a vast literature on the acquisition of cultural knowledge (e.g., Boster, 1991; Childs & Greenfield, 1980; Cole, 1985; Hutchins, 1991; Resnick et al., 1991; Rogoff, 1990; Rogoff, Gauvain, & Ellis, 1984; Rogoff et al., 1989; Spindler & Spindler, 1987; Swartz, 1982). In this section, salient aspects of Vygotsky's theoretical framework will be used to examine some of this research with a focus on the interactional processes that lead to the transmission of cultural knowledge. The following aspects will be explored: first, the means by which a shared situation definition and intersubjectivity are developed through reciprocal and contingent social interactions, and second, the role of linguistic semiotic mediation in these interactions.

There is an overlap among the constructs of shared situation definition, intersubjectivity and semiotic mediation because the entire process is fluid. In order for learning to occur in a joint problem solving situation, all three constructs must occur. Although it is, therefore, somewhat artificial to attempt to highlight one construct at a time, in order to examine the nature and quality of social interactions, the role of each construct will be examined separately.

### Shared Situation Definition and Intersubjectivity

As mentioned previously, cultural products and processes are transmitted from the more capable to the less capable partner during interaction in the ZPD (Rogoff, 1990; Vygotsky, 1978; Wertsch, 1984). Shared situation definition and intersubjectivity between partners, which are essential to the creation of this zone, may require negotiation between partners as they try to understand each other and modify their own input in order to be understood (Wells, 1986). Dialogue is of primary importance in this negotiation process.

The first interactions between caregivers and infants revolve around shared attention to the environment and shared routines (Bouvet, 1990; Wells, 1986). Caregivers and infants share much non-verbally and caregivers' talk tends to be in context (Bouvet, 1990; Rogoff, 1990; Wells, 1986). Developing a shared situation definition requires only that caregivers link their language and gestures to the context and to what they believe would be the infant's point of view. Caregivers allow their infant to control the topic of conversation, while at the same time, they control the dialogue and the processes of the interaction itself. Caregivers set up and respond to interactions as if the processes were reciprocal, as if the infant were intending to be an active participant in the dialogue and were intentionally meaningful and communicative (Bouvet, 1990). For example, caregivers follow their infant's eye gaze and comment on what they imagine the infant might be thinking. When infants turn their heads and appear to be looking at objects and smiling, caregivers may respond as if the infants are intentionally looking at objects and feeling happy. Caregivers may say something such as, "Oh, you like the teddy bear. Here, I'll move it so you can touch it." Caregivers so readily adapt to infants' situation definitions that intersubjectivity is achieved easily.

Even these earliest social interactions with infants involve cultural transmission. The interactions themselves are guided by cultural rules for

conversational turn-taking and cultural routines for negotiating, maintaining and changing topics, and ending conversations (Litowitz, 1987). During this kind of intersubjective communication, the meanings attributed to the infant's gestures are culturally defined and the feedback provided by caregivers molds the infant toward culturally acceptable and culturally meaningful behaviours (Wells, 1986). For example, when an infant reaches, grasping for an object, caregivers interpret the behaviour as pointing, bringing a cultural meaning to the gesture. Caregivers validate these physical attempts by giving infants the objects for which they were reaching. In this way, infants learn to use reaching gestures as tools. Because of caregivers' abilities to grasp the situation definition of infants and to achieve intersubjectivity, infants quickly learn conversational routines and which gestures, objects and sounds are relevant in their culture.

The amount of control that caregivers assume in interactions decreases as children appropriate more responsibility for their own role in the negotiation process. Whereas during interaction with an infant, caregivers must infer the infant's understanding, as the child becomes more capable, caregivers can judge the child's understanding by the child's response. Reciprocal dialogue increases as both partners strive to create a shared situation definition in order to achieve intersubjectivity.

Creating a shared situation definition in order to achieve intersubjectivity is crucial across all ages. For example, more experienced partners often build bridges between an experience that is familiar to children and the new situation. In an experiment by Rogoff and Gardner (1984), mothers were observed while they were preparing their children for a memory test on the classification of objects. The mothers knew the goal of the activity but routinely modified their perceptions of the goal, that is, their situation definitions, to ones that were familiar to their children. For example, the classification of food items was made into a game about arriving

home from the grocery store and putting away the groceries; the classification of household objects was made into a story of a day's activities. Some mothers tied in the memory-test goal of the experiment with the grocery-sorting context with statements such as "...that's just where you're going to put 'em back when you come back and I'm not here. Okay?" (p. 99). By modifying their own perceptions of the situation and using the children's understandings as their points of departure, the mothers created shared situations where the children were able to participate actively. The partners had a common frame of reference and were able to understand each other, allowing communication to occur. During this communication, valuable cultural knowledge was transmitted to the children about the organization and classification of household objects and food items. For example, the grocery items were organized by picnic food, baking supplies, fruits, etc. and household objects were organized by their use or the time of day they were to be used. The children actively participated in sorting the objects and through this participation acquired some of the cultural knowledge transmitted.

Redundancy of information is an important means of building the bridge between old and new situations. Caregivers use visual or gestural prompts to create redundant information. Redundant information allows children to interpret the more directive gestural prompt if they do not understand the verbal prompt, without compromising intersubjectivity. For example, when sorting pictures of objects with her son, a mother gave the verbal prompt, "Do you see something else that helps you clean?" while she adjusted the picture of a broom (Rogoff & Gardner, 1984, p. 111). If the child was not able to interpret the question in terms of his situation definition, he was able to use his mother's gesture as a directive. Another child in the same study often did not need this amount of gestural redundant information and so his mother cued him merely with eye gazes. However, when he did not interpret an eye gaze correctly, she added pointing as

another level of redundant information. Caregivers aim to challenge children slightly, without losing intersubjectivity, in order to shift the children's situation definitions to ones closer to their own. Consistent monitoring of the child's understandings and increasing and decreasing the amount of redundant information in the appropriate direction are essential in this process.

### Linguistic Semiotic Mediation

According to Vygotsky (1978), children internalize the mediation that occurs during social interaction and this internalized semiotic mediation, in turn, becomes the basis for their higher mental processes. However, Vygotsky believed language to be the primary form of semiotic mediation. Linguistic semiotic mediation seems, therefore, to have at least two interrelated roles: first, as the medium through which the cultural product of language is transmitted and second, as the tool through which culturally appropriate cognitive processes are transmitted. These two functions are not really separate, as can be seen in the use of linguistic semiotic mediation to both initiate and maintain social interaction. Children learn the language of the culture in order to understand and to be understood during social interaction. However, during these social interactions, language is used to guide children through activities in the ZPD and to transmit the cognitive processes of the culture. Children internalize the linguistic semiotic mediation processes used in these interactions and eventually use them to guide themselves. The internal cultural processes of semiotic mediation are essentially in the form of the cultural product, language.

Linguistic semiotic mediation and language learning. Just as adults do not teach problem solving, they do not teach language. Language is learned as a tool to initiate and maintain social interaction. During interactions, adults shape

children's language towards the cultural norm. Through the use of semiotic mediation, they help children to assign culturally appropriate labels to what they see. For example, when a child labelled a design on an ornamental plate as a "flower," his mother corrected him by saying "'It's a plate with a pattern on, but it's not like a flower'" (Foster, 1983, p. 48), thus helping the child to learn the label that is the cultural norm.

Adults guide children in learning the cultural rules for correct syntax and discourse. As children become older, the adult guidance becomes more complex. Foster (1983) comments that caregivers must identify children's meanings and then model syntactic devices which would make the utterance clear. Caregivers must first understand the situation children are talking about. This is made easier because of previous shared contexts. Caregivers then check their understanding of what children are saying, making sure they have achieved intersubjectivity. Only then do they provide the semiotic mediation to assist children in acquiring the appropriate syntax. For example, a mother and her 2 1/2 year old son engaged in 13 conversational turns while the mother tried to understand what her son meant in his 2-3 word utterances. Finally, when she understood, she combined it into one sentence, attempting to model the syntax for him: "'You get out of the, you get out of the bed in the night, did you, and ran around in the dark'" [sic] (Foster, 1983, p. 47). Caregivers guide their children in acquiring the pragmatic and grammatical language skills of their culture through this type of consistent semiotic mediation of the children's potential level of linguistic development.

#### Linguistic semiotic mediation and developing cognitive processes.

Caregivers or more capable partners use linguistic semiotic mediation to connect the present understandings of children with the new problems being faced (Rogoff & Gardner, 1984). In order to maintain intersubjectivity and a shared situation

definition, the more capable partners must be constantly flexible in their semiotic mediation. They must monitor the children's varying levels of understanding and accordingly change the words and phrases they use and the amount of direction they give.

Wertsch (1979) observed how mothers changed the amount of directiveness in their speech according to input from their children. When they were unable to create a shared situation definition with their children, the mothers were very directive, using imperatives and gestures to achieve intersubjectivity. If the mothers judged the children's situation definitions to be close to their own, they became less controlling in the semiotic mediation they used, relying on hints and implied directives (for example, "Where's the black one go on mom's?" (p. 15)). However, if the mothers had misdiagnosed the children's levels of understanding, and the children did not understand the hints, they would return again to more controlling mediation ("Look at the other truck and then you can tell." (p. 13)). The mothers changed the kind and amount of linguistic semiotic mediation they used according to the children's levels of understanding of the situation and according to what was needed to maintain intersubjectivity.

Radziszewska and Rogoff (1991) studied the collaborative processes involved in errand planning. They found that adults created shared situation definitions by using what they knew to be children's past experiences and knowledge. The adults involved the children actively, allowing the children's participation to help create the shared context and achieve intersubjectivity. In addition, the researchers observed that the adults also provided semiotic mediation about the planning process by "thinking aloud" and explaining the planning strategies that they were using. However, the adults also allowed the children to verbalize their own semiotic mediation. In order to engage successfully

in such a collaborative planning exercise, the partners had to employ much reciprocal communication.

This flexibility in the kind and amount of semiotic mediation used in tasks is also evident in non-Western cultures. During observation of weavers in the Zincautan culture, Childs and Greenfield (1980) found that when the novices were first learning any new step in the weaving process, the experts intervened heavily, using more commands to achieve intersubjectivity. As the novice weavers became more skillful and their situation definition became more like the experts, the experts intervened less and the semiotic mediation they used changed from predominantly commands to comments about salient aspects of the work. Although cultures that do not promote Western-type schooling seem not to use as extensive linguistic semiotic mediation to achieve intersubjectivity and shared situation definition (Rogoff, 1990) as those that do, there is flexibility in the kind and amount of semiotic mediation that does occur.

As children become more capable, caregivers must know when to allow them to use their own semiotic mediation. This requires a constant diagnosis of the children's situation definition. Rogoff and Gardner (1984) observed mothers setting up mnemonic structures to help the children's recall during the test. As they became more capable in the task and their situation definition became closer to that of the adults, the children required less semiotic mediation by the adult. The children substituted their own semiotic mediation. An examination of the dialogue segments in Wertsch's study (1979) indicates an inverse relationship between the amount of semiotic mediation the children used themselves as they performed the puzzle and the amount of explicit mediation from the mothers. As children became more capable and more knowledgeable in cultural processes, they gradually appropriated more of the linguistic mediation that had been used and employed it

to regulate their own actions in tasks (Rogoff, 1990; Vygotsky, 1987; Wertsch, 1984).

The constant fluctuation in the kind and amount of semiotic mediation provided by more capable partners requires a sensitivity to the learners' needs, as well as a high level of linguistic flexibility. The dialogue that occurs between partners who are engaged in a task seems to assist the more capable partners in diagnosing the learners' understandings (Jamieson & Pedersen, 1993). When the more capable partners are able to diagnose the less capable partners' situation definitions precisely, they can then achieve intersubjectivity by providing the appropriate kind and amount of semiotic mediation. However, to provide contingent semiotic mediation, reciprocal communication must occur and the more capable partner must be able to use language flexibly in order to communicate at the level of the less capable partner (Radziszewska & Rogoff, 1991).

When partners are able to create a shared situation definition and achieve intersubjectivity through the use of contingent semiotic mediation, they construct a ZPD. It is through the use of this ZPD that the norms and values of the culture may be transmitted to, and acquired by, the less capable partner.

## Classroom Interaction

### Interaction between Teacher and Students

The discourse between students and teacher and among the students themselves is the context for all the learning, academic, social, and cultural, that occurs in the classroom (Bloome & Knott, 1985). Discourse provides a framework for interpreting and understanding what is happening in the classroom. There are interactional rules for turn taking, for constructing narratives, and for indicating group membership. Verbal, nonverbal, and prosodic cues allow for the

appropriate interpretation of the discourse. The students learn how to participate in the lesson while they are learning the academic content of the lesson.

It is this classroom-wide semiotic mediation that has the potential to create a shared situation definition among the students and between the students and teacher. The teacher gages the students' understandings by their responses, both verbal and non-verbal. Breach of contextually appropriate behaviour (for example, talking out when it is not appropriate, not finishing up work when the teacher makes a transition to the next lesson) is admonished.

The students in a classroom setting are also helped in their understanding of how to participate in the lesson and of the academic content by overhearing the teacher talking to other children. Bloome and Knott (1985) suggest that, in fact, all teacher-student discourse is actually teacher-class discourse. Even when the teacher is addressing one student explicitly, the whole class is being addressed implicitly.

### Interaction between Peers

Vygotsky stated that children learn their cultural norms and values not only from adults but also from more capable peers. A review of recent literature on peer learning does seem to indicate that collaborative problem solving between peers is more conducive to learning than individual problem solving; however, the results on independent work are inconclusive (Azmitia, 1988; Forman & Cazden, 1985; Radziszewska & Rogoff, 1991; Webb, 1989). One theme emerges consistently in this literature--in order to achieve intersubjectivity, the partners must have a shared situation definition and an appropriate level of semiotic mediation must be used. When these elements occur, partners seem to learn from collaborative interaction. For example, Forman and Cazden (1985) found that when matched partners constructed a common "set of assumptions, procedures, and information" (p. 343)

by assuming complementary problem-solving roles, they achieved a higher level of functioning than they would have independently. Each partner took impromptu turns performing the task while the other observed, guided, and corrected through speech. In other words, they came to a shared situation definition by working together on the task and used linguistic semiotic mediation to maintain intersubjectivity and to guide each other.

These findings are similar to Azmitia's (1988) observations that children who mediated their work with verbal interaction increased in competence. However, Radziszewska and Rogoff (1991) found that children were often unable to verbalize their planning strategies and that peers who were more knowledgeable in the task often gave answers or used demonstration without providing the appropriate linguistic semiotic mediation. When matched peers attempted to collaborate, one peer often took over. The peers in Radziszewska and Rogoff's study seemed unable to create a shared situation definition or achieve intersubjectivity with their partners.

The difference between the performance of the peers observed by Azmitia (1988) and Forman and Cazden (1985) and those observed by Radziszewska and Rogoff (1991) may have been due to the peers' abilities to achieve intersubjectivity through reciprocal communication about the shared task. Reciprocal communication leading to intersubjectivity allows peers to know how much and what kind of help to give. Webb (1989) confirms that peers must be able to give an appropriate level of help for the interaction to promote learning. Appropriate assistance through linguistic semiotic mediation permits peers to incorporate the thinking strategies of their partners into their own repertoire and to practice their own mediation.

It seems apparent that for learning to occur between peers, some of the interactional processes involved in peer learning are similar to those which occur

between adults and children. More precisely, appropriate semiotic mediation must be used to create a shared situation definition and to achieve intersubjectivity. Peers who are able to work collaboratively and use semiotic mediation to achieve and maintain intersubjectivity are able to help each other appropriately and consequently learn from each other. In this way, they are able to complete tasks together that neither would be able to complete independently.

### Deafness: The Processes of Cultural Transmission

When reciprocal communication is not readily accessible between children and the more experienced members of their culture, there is little opportunity for the children to acquire fully the understandings of that culture. For example, the natural auditory-oral language of hearing parents is one that deaf children can neither spontaneously produce nor easily perceive (Bouvet, 1990). This means that the forms of semiotic mediation and linguistic communication that are easiest for hearing parents are not the easiest for deaf children. Although some deaf children have access to Deaf adults with whom they can experience reciprocal communication and from whom they can acquire some knowledge of Deaf culture, dchp who are isolated from other Deaf people seldom experience this kind of effective interaction. An examination of the social and linguistic interactions of such children may increase the understanding of the processes by which some deaf children become marginal members of both the culture of their hearing families and Deaf culture.

In the literature, dcdp are often taken as the exemplars of Deaf culture. The process of dchp's cultural acquisition is different and although it is the most frequent pattern, it is not accepted as the cultural norm.

### Demographics of Childhood Deafness

Approximately 1 child in 1000 is born with a hearing loss severe enough that speech cannot be understood through the ear alone, with or without the use of a hearing aid (Moores, 1987). Such children are considered, in strict audiological terms, to be deaf. Approximately 90% of deaf children are born into hearing families who typically have never had any previous experience with deafness (Moores, 1987). The other 10% are born into families with at least one deaf parent.

The annual survey of American deaf children by the Center for Assessment and Demographic Studies at Gallaudet University in Washington, D.C. is the most complete and most current source of demographic information about deaf students available in North America. However, the information in this survey has a slight bias because data are obtained only on deaf and hard of hearing students who receive some degree of special support services (i.e., deaf or hard of hearing students who are not served by special education are omitted) and the survey collects information primarily from full-time programs, so that severe-profound students are over-represented (Bornstein, 1990). Nevertheless, the following data, taken from the 1988-1989 survey, are at least indicative of the demographics of the 46,000 school age American children who had some degree of hearing loss. The survey indicates that in 1988-1989 the deaf students in America were predominantly male (54%) and Caucasian (64%). Almost all the students (94%) had lost their hearing before the age of three. More than half of the students surveyed (59%) had hearing losses in the severe-profound range. One-third of the students had one or more handicaps in addition to their hearing loss. Educational information reported in the survey indicates that some degree of instruction in a special education classroom was received by 95% of the deaf students. Total Communication, or Sign Supported Speech, was the primary method of teaching 60% of the students. Although half of the students were integrated to some extent

with hearing students, 83% were not provided with a Sign Language interpreter in the classroom.

There is a wide range of educational placements available for deaf children, and although many parents want their child to live at home (Moores, 1991), only a limited number of these placements may actually be available in the child's home school district. The continuum extends from residential schools for the deaf to full integration with hearing students in neighbourhood schools and includes: 1) day schools where deaf students attend for the day only, 2) day classes for deaf students in public schools where the majority of students have normal hearing, 3) resource rooms for deaf students who spend most of their day in regular classes but require additional assistance in English or other academic subjects, and 4) itinerant programs for deaf students who attend regular classes full time but receive support from an itinerant teacher of the deaf on a daily or weekly basis (Moores, 1987). In addition, it is likely that more than 10% of deaf students receive no special support services (Moores, 1987).

In the past, integrated deaf students tended to have more residual hearing and better oral skills than those deaf students who were not integrated. The more common use of Sign Language interpreters means that more deaf children can now be educated in regular class settings (Moores, 1987, 1991). However, because deafness is a low incidence handicap, 52% of all schools have only one hearing-impaired student (Schildroth, 1988). An additional 16% have only two hearing-impaired students (Schildroth, 1988). Yet, because of the nature of deafness, these children require the services of highly trained specialists (Moores, 1991). Support services for integrated deaf students include itinerant teachers of the deaf, educational interpreters, and Signing assistants. However, these support services are usually contingent on the funds available and the flexibility of the school district.

Deaf students may learn to communicate through a spoken language alone (e.g., oral English), a Signed language (e.g., ASL), a Signed code for a spoken language (e.g., Signed English) or any combination of these (e.g., Total Communication). It is apparent, however, that parents are not given adequate information about educational issues and the services available before they become involved in a program (Meadow-Orlans, 1987). Parents may be forced to make uninformed and premature decisions about their child's educational placement and communication method, even when all programs are available.

### Two Opposing Views of Deafness

Deafness can be viewed in at least two opposing ways--as a pathology or as a culture (Baker-Shenk & Cokely, 1991; Padden & Humphries, 1988; Wilcox & Corwin, 1990). Those holding the pathological view think of deaf children as impaired hearing children and seek to remediate this barrier to their development into normal hearing adults. This perspective is held by many medical professionals, from whom hearing parents first learn that their child is deaf (Baker-Shenk & Cokely, 1991; Fletcher, 1987; Moores, 1987). Hearing parents may thus learn to understand deafness as a pathology, as an inability to use spoken communication (Bouvet, 1990) . Because vocal communication is thought of often as that which makes us uniquely human (Bouvet, 1990; Erting, 1985), parents may actually be more distressed about their child's inability to speak than their inability to hear (Bouvet, 1990). Thus, traditionally, early intervention has emphasized overcoming the pathology of hearing loss by teaching deaf children to speak and understand the language of the family or at least to use a manual representation of the spoken language of the family (Bouvet, 1990). The emphasis in the education of deaf children has, therefore, been on speech therapy and integration into the hearing world.

In contrast, those people who conceive of deafness from the cultural perspective emphasize the experiences and values of people who happen to be deaf. Deaf children of Deaf parents are seen as the exemplars of Deaf culture and advocates suggest that deaf children should learn Sign Language and have many opportunities to interact with Deaf adults and Deaf peers in order to acquire some degree of Deaf cultural knowledge (Padden & Humphries, 1988). Although supporters of the cultural perspective emphasize the importance of easy reciprocal communication in the acquisition of cultural knowledge, they often underestimate the developmental aspects of cultural acquisition and the importance of cultural sharing between the hearing family and the deaf child.

### The Acquisition of Cultural Knowledge from a Vygotskian Perspective when Deafness is a Factor

#### Deaf Children of Deaf Parents

Although only 5% to 10% of deaf children are born into families where one or more parent is deaf, these children and their families form an accepted cultural and linguistic group (Erting, 1985; Johnson & Erting, 1989; Moores, 1987; Padden, 1980; Padden & Humphries, 1988). The social interactions of Deaf parents with their deaf children has only begun to receive widespread attention from researchers in the last decade (Erting, Prezioso & O'Grady-Hynes, 1990; Maestas y Moores, 1980; Meadow et al., 1981; Spencer & Gutfreund, 1990). From these preliminary studies, it has been learned that the quality of interactions between Deaf parents and deaf children is very similar to that between hearing parents and hearing children. Deaf adults have, like deaf children, a visual orientation to the world. Deaf parents and deaf children have been found to engage in mutual, contingent, and reciprocal linguistic communication (Spencer & Gutfreund, 1990).

These children learn how to take turns in conversations, initiate, maintain, and end topics, and use language to express themselves clearly, following the same interactional patterns as hearing children of hearing parents. Deaf parents engage in natural, relaxed, and reciprocal communicative interactions with their children, reading meaning into their children's manual actions and facial expressions (Maestas y Moores, 1980). Deaf parents work to create a shared situation definition with their children and achieve intersubjectivity in much the same way as hearing parents of hearing children. The early interactions between Deaf caregivers and infants revolve around shared attention to the environment and routines (Maestas y Moores, 1980). Deaf caregivers follow the eye gaze of their infants and allow them to establish the topic (Erting et al., 1990; Maestas y Moores, 1980).

In other words, like hearing caregivers of hearing infants, Deaf caregivers conform to their deaf infant's situation definition. Like hearing parents of hearing children, Deaf parents use redundant information and simplified language to achieve intersubjectivity (Maestas y Moores, 1980). Deaf parents provide contingent language (i.e., appropriate semiotic mediation) when involved in activities with their children (Spencer & Gutfreund, 1990). By signing in a space related to their infant's direction of gaze, Deaf parents ascertain that their infants link the semiotic mediation with the activity (Erting et al., 1990). Overall, the interaction patterns between Deaf parents and their children are comparable to the interaction between hearing parents and hearing children (Meadow et al., 1981; Spencer & Gutfreund, 1990).

Because Deaf parents and deaf children share the same easily accessible communication tools, reciprocal communication is facilitated, allowing the constant acquisition of cultural knowledge. In this connection, deaf children of Deaf parents are full participants in their culture. When compared to deaf children of hearing

families, deaf children of Deaf parents tend to have higher scholastic achievement scores (Brasel & Quigley, 1977; Stuckless & Birch, 1966; Vernon & Koh, 1970) and are often the respected role models for Deaf culture because of their facility in the language (Padden & Humphries, 1988) .

### Deaf Children of Hearing Parents

The remainder of this literature review will focus on dchp, beginning with a brief introduction to recent literature regarding the typical reaction of hearing parents to the diagnosis of deafness in their child. Following this, the interactional processes between deaf children and hearing adults and peers will be examined using the constructs of situation definition, intersubjectivity and semiotic mediation as organizational tools.

Parental response to deafness. As natural as the acquisition of cultural norms and values appears to be for deaf children of Deaf parents, 90% of deaf children do not have this advantage (Moores, 1987). Early in their infant's life, hearing parents may notice that their infant does not respond to the environment in the expected manner and they may feel perplexed, not knowing what is wrong (Fletcher, 1987). They may even have difficulty convincing professionals that something is different about their child (Meadow-Orlans, 1987), compounding the potential "horror" of the diagnosis of deafness. On the average, there is a gap of approximately one year between the time hearing caregivers first suspect deafness and the actual confirmation by a professional (Moores, 1987). Feelings of worry and uncertainty about the failure of parent-child interactions may affect the way in which hearing parents interact with their deaf child long before the actual diagnosis (Fletcher, 1987). The medical confirmation of deafness culminates in

feelings of grief and shock that may continue to interfere with normal interactions (Moores, 1987).

Hearing parents are likely to undergo a grieving process similar to that experienced in reaction to other types of crises, including the responses of denial, guilt, depression, anger, anxiety and coping (Moses, 1985). Although it is crucial for hearing caregivers to acknowledge and process their emotional reactions, each stage of grieving affects their deaf child's development. For example, denial of deafness may prevent hearing parents from making the necessary adjustments that deafness requires for effective parent-child communication. Instead of focussing on visual communication, learning new ways of communicating and continuing to think of their child as a communicative being (Bouvet, 1990), these parents may deny their deaf child the use of hearing aids and prohibit the use of gestures (Moores, 1987).

Bouvet (1990) suggests that when hearing mothers learn their child is deaf, and learn that their vocal communication is not being fully understood, they often seem to lose their ability to communicate naturally. Professionals, coming from a pathological perspective, may emphasize the importance of vocal communication (Fletcher, 1987). However, because the auditory channel is the most difficult for deaf children to utilize, they may not respond as expected. Hearing parents may feel inadequate, not knowing how to make communication easier. These feelings may lead to a further disruption in communication (Bouvet, 1990). Communication with their deaf child may begin to seem a formidable requirement instead of a natural pleasure, and even successful visually-oriented communication may stop.

It appears that when parents are unable to communicate effectively with their child, they become both more protective and more controlling of their child than they typically are with their normally hearing children (Koester & Meadow-Orlans, 1990; Meadow-Orlans, 1990; Moores, 1987). Research indicates that

hearing parents of deaf children often will overlook inappropriate behaviour but may supervise their deaf child more than they would a hearing child (Koester & Meadow-Orlans, 1990; Meadow-Orlans, 1990), direct their deaf child's behaviour (Meadow et al., 1981), and rely on a narrower range of discipline techniques (Moores, 1987).

Schlesinger (1985, 1987) has suggested that hearing caregivers may feel powerlessness in the face of their child's disability because they cannot change the fact that their child has a deficit. These feelings are further compounded by the fact that the usual parenting practices of hearing people do not result in the expected behaviours in deaf children (Schlesinger, 1987). Because communication is difficult, hearing parents may become unsure of their ability to be understood. They may feel powerless to explain rules of behaviour to their child (Schlesinger, 1985). Schlesinger (1987) has further proposed that parents who feel powerless may be less responsive to and more controlling of their children than are parents who feel more powerful. All levels of interaction between hearing parents and their deaf child may be affected by these feelings of powerlessness and trauma stemming from the diagnosis of deafness.

Unlike deaf children and Deaf parents or hearing children and hearing parents, hearing parent-deaf child dyads do not share the same easily accessible communication tools. Their difficulty with easy, reciprocal communication on a wide variety of topics may interfere with the child's acquisition of cultural knowledge. As a consequence, the parent is hindered in the ability to share the norms and values of the culture, and so, the deaf child may participate only peripherally in the culture of the parents.

### Shared Situation Definition and Intersubjectivity

Reciprocal communication leading to a shared situation definition and the achievement of intersubjectivity is necessary if cultural products and processes are to be transmitted from the more to the less capable partner (Rogoff, 1990; Vygotsky, 1978; Wertsch, 1984). Difficulties in communication between hearing caregivers and deaf children appear to cause a disruption in the processes of reciprocal communication. Research has consistently shown hearing mothers to be more controlling in conversations and social interactions with their deaf children than hearing mothers with hearing children, or deaf mothers with deaf children (Brinich, 1980; Cheskin, 1981; Cheskin, 1982; Kenworthy, 1986; Meadow et al., 1981; Spencer & Gutfreund, 1990; Swisher & Christie, nd; Wedell-Monnig & Lumley, 1980). Hearing mothers are less likely than deaf mothers or hearing mothers of hearing children to follow their deaf children's lead and less likely to provide them with contingent responses. These results appear to be consistent whether a vocal language or a Signed code for the vocal language is used (Meadow et al., 1981; Spencer & Gutfreund, 1990).

A review of the literature indicates a lack of detailed information about the actual interactional processes that occur between deaf children and hearing caregivers, but the findings that do exist suggest that barriers in parent-child communication may impede the achievement of a shared situation definition and intersubjectivity from the time of early interactions. Deafness is seldom identified early in an infant's life (Moores, 1987). Few research studies, therefore, have examined interactions between hearing caregivers and young deaf infants. However, it has been suggested by a hearing mother of a deaf child that some disruption of interaction may occur because deaf infants do not always respond as the hearing parent expects (Fletcher, 1987). This seems to occur even though many of the early interactions between deaf infants and their hearing caregivers

are based on extra-verbal communication (Bouvet, 1990). Because the visual channel is predominant through ritualized games and activities, potentially, the meanings of situations could be shared easily.

As previously stated, the amount of control caregivers assume for the interactional processes changes over time. Normally, caregivers begin to expect their child to take an active role in the creation of a shared situation definition and begin to judge the achievement of intersubjectivity by the child's responses. By the beginning of the second year, caregivers have begun to rely more on reciprocal communication in the auditory channel and less on context to create shared situation definition in order to achieve intersubjectivity (Bouvet, 1990). In the case of hearing mothers of deaf children, this is the time when communication becomes more difficult than before. This period often coincides with the actual diagnosis of deafness, compounding communication difficulties with feelings of grief and powerlessness. Research indicates that once the deaf child reaches an age when communication should normally become predominantly auditory/oral, hearing caregivers may have difficulty viewing continued gestural communicative attempts as meaningful (Wedell-Monnig & Lumley, 1980). Deaf children's gestural initiations are frequently misunderstood or ignored. This problem occurs even though hearing caregivers realize that their deaf child relies on the visual channel and on gestural communicative attempts. Hearing mothers have been found to initiate more interactions than their deaf child, which means that they control the topics of the interactions, often telling the deaf child what to do or where to look (Cheskin, 1982; Meadow et al., 1981; Wedell-Monnig & Lumley, 1980). Research by Spencer & Gutfreund (1990) indicates that topics initiated by mothers are not necessarily contingent on their infant's previous visual attention. Whereas hearing caregivers allow their hearing children to lead the interaction and provide contingent responses to them, modifying their own situation definition in order to

achieve intersubjectivity, it appears that the deaf child must try to understand and respond to the hearing adult's situation definition. This would seem to be very difficult for two reasons: first, the adult's cognitive understanding of the situation is much greater than the child's and second, the adult's situation definition may rely on the auditory context and the deaf child does not have full access to this channel. Although this control appears counter-productive, it may arise from the parents' natural desire to achieve understanding with their children: if they control the conversation, they reduce misunderstanding.

Recent research by Spencer and Gutfreund (1990) further indicates that maternal topic control may be a factor in the interactions of Deaf mothers with hearing children as well. Spencer and Gutfreund suggest that Deaf mothers of hearing children may also carry some fear about not being able to influence effectively their children's language development. The intuitive and automatic nature of mother-infant interaction may be disrupted by cross-modal communication. Mothers who use a different modality from their children must use cognitive energy to remain alert to the differences between their usual mode of communication and those of their infants. Deaf mothers of hearing children must remain alert to visual evidence of auditory stimuli, such as their infants' vocal behaviours or other environmental sounds. Maternal topic control in interaction limits the children's response to incoming stimuli and thus reduces the cognitive energy the mother must devote to monitoring the environment. As well, maternal topic control reduces misunderstanding caused by cross-modal communication.

It seems that even when deaf children use the auditory channel, communication difficulties inhibit the creation of a shared situation definition and the achievement of intersubjectivity. Cheskin (1981) found that hearing mothers often were not able to understand their deaf children's verbal speech and tended to respond to their verbal communication initiations as attempts to label objects or

events in the immediate environment. This misinterpretation of the children's perspective reduced the amount of meaningful conversation that occurred and prohibited intersubjectivity. No dialogue was used to join the new labels or events to schemata the deaf children already possessed and the children were not challenged to reach new understandings.

In a study examining the interactions between hearing mothers using Sign Supported Speech and their deaf children, Swisher and Christie (nd) observed many communicative clashes such as both partners signing at the same time. These clashes suggested that hearing mothers were not able to monitor fully what their deaf children were receiving and, as a consequence, it can be inferred that intersubjectivity was not occurring. There was little mutual communication, as hearing mothers seldom responded to their deaf children's excited comments and did not attempt to repair the interactions when the children did not understand. It may be that they did not know that misunderstanding had occurred or they did not know how to make repairs in Sign Supported Speech. As in the Cheskin (1981) study, there was no reciprocal dialogue to suggest that the hearing mothers were helping their deaf children assimilate new information with existing knowledge. The researchers' observations of these interactions is suggestive that the lack of reciprocal communication inhibited the creation of shared situation definition and, in turn, the achievement of intersubjectivity.

Hearing caregivers often use gestures combined with verbal language to help achieve intersubjectivity with their hearing children. The gestures may provide redundant information which helps children to have a context for the linguistic information. Swisher and Christie (nd) point out that gestures and verbal language are in two different channels of communication (visual and auditory) for hearing people and can, therefore, be produced simultaneously. When language communication is through Sign, both gesture and language are produced in the

visual channel and must be produced sequentially. Deaf adults are able to produce gesture and language sequentially, modifying their communication so that they maintain visual attention of the children (Mather, 1990). However, hearing people are accustomed to using two channels simultaneously. When they have only one channel of communication at their disposal, they have difficulty knowing how to use Signed language and gesture sequentially. Hearing mothers must learn to make changes in the timing of their discourse in order to accommodate the need to use gesture and language sequentially. When sharing picture books with their deaf children, hearing mothers tended to point to the picture and then quickly begin signing (Swisher & Christie, nd). Often the deaf children were not able to shift visually from the book to the mother fast enough to see both the book and her Signs. As a consequence, they tended to miss part of the redundant information. This means that the deaf children were forced to discern what their mothers meant without the additional redundant information that may have helped them to have a context for the interaction. Again, it appears that intersubjectivity was not achieved because a shared situation definition had not been adequately created.

#### Linguistic Semiotic Mediation as Language Learning

Interactions between hearing caregivers and hearing infants revolve around shared attention to the environment. Caregivers follow infant eye gaze and interpret the environment linguistically for the infant, constantly mediating the visual stimuli with linguistic input. At first, so much of the interaction is in the visual realm that deaf infants of hearing caregivers may seem to develop normal competence in the early pseudo-dialogues (Bouvet, 1990). However, deaf infants may not be aware of the linguistic interpretation that accompanies visual events. In

some cases, deaf infants may not even realize that interactions are taking place if they occur only in the auditory channel or without their visual attention.

The literature indicates that hearing caregivers do not use the same processes to shape their deaf children's language and communication skills as do hearing parents of hearing children or Deaf parents of deaf children. For example, conversations between deaf children and their hearing caregivers often include topics chosen by the caregivers, yes/no question-and-answer routines for which the caregivers already know the answers, unrepaired communication breakdowns and the active teaching of language structures and speech sounds (Bouvet, 1990; Cheskin, 1981, 1982; Mather, 1989; Meadow et al., 1981; Spencer & Gutfreund, 1990; Spencer-Day, 1986; Swisher & Christie, nd; Wedell-Monnig & Lumley, 1980). It may be that hearing caregivers control conversations with their deaf children in order to minimize the possibility of misunderstanding. However, from these kinds of interactions deaf children may deduce a number of misguided discourse rules. Meadow and her colleagues (1981) found that deaf children of hearing caregivers asked fewer questions, made fewer references to themselves and initiated and elaborated interactions less often than did hearing children. Dchp may learn to wait for others to initiate conversations, and learn to answer only low level questions. They may not learn to build on their partners' comments or understand the real meaning of what is said. Conversation, rather than being a means of communication, of achieving intersubjectivity, may become an unpleasant question-and-answer routine. This point is well illustrated by an example of a conversation between a deaf child and Bouvet (1990):

One sunny afternoon in early spring we exchanged a few words as school let out. Both of us were delighted to see that spring had finally come; in fact I myself was eager to get out and enjoy the weather. 'It's nice out... What are you going to do after school?' I asked. Since we often talked about his

backyard, I expected him to answer that he would go out to play, to ride his bicycle or to be in the sun... But after making me ask the question several times so that he could read it on my lips, he answered, 'I am going to walk on the sidewalk...' . It took him some time to formulate this answer as he visibly summoned up all the effort and determination the response required.

Needless to say, the performance was totally devoid of any pleasure. (p. 14)

By following this pattern, dchp may learn to produce perfectly structured sentences but fail to learn the pragmatics, or the conversational rules, of language.

Children learn the pragmatic rules of communication through the linguistic semiotic mediation that helps to create a shared situation definition and achieve intersubjectivity. In the absence of mutually understood linguistic tools, dchp may learn vastly different rules of language use than those that are acceptable and meaningful in the culture, which may lead to a further breakdown in communication. Dchp may learn to respond to surface level meaning in conversation (Bouvet, 1990), to be passive participants in conversation (Meadow et al., 1981; Spencer & Gutfreund, 1990) and that others' interests are more important than their own (Spencer & Gutfreund, 1990).

A knowledge of the pragmatic aspects of communication is particularly important in order for deaf children to become fully participating members of their social group. They must be able to use and understand culturally appropriate communication. In order to participate in and benefit from communication, the deaf child must learn to concentrate on the source of information and to give evidence of this attention, to initiate a conversational turn and allocate a turn to others, to use structural ties that bring cohesiveness to a topic, to recognize, indicate, and clarify unsuccessful utterances, and "to adjust the form and content of the utterance according to the ... [role and situation of] the listeners" (Spinelli & Ripich, 1985, p. 5). These communicative and metacommunicative skills become even more

essential in school, where a wide range of communicative demands are placed on deaf students.

### Linguistic Semiotic Mediation and Developing Cognitive Processes

Linguistic semiotic mediation is used by caregivers and more capable partners to achieve intersubjectivity, to build bridges between the present knowledge of children and the potential knowledge in the new problem being faced (Rogoff & Gardner, 1984; Wertsch, 1984). Children internalize the linguistic processes of semiotic mediation and use these processes to guide their own higher mental functioning (Vygotsky, 1978). Some researchers suggest that dchp may not be aware of much of the linguistic semiotic mediation that accompanies visual events (Swisher & Christie, nd; Wood et al., 1986). There seems to be two reasons for this. First, hearing caregivers may not have their deaf children's visual attention when they are providing semiotic mediation (Swisher & Christie, nd). Because hearing caregivers have relied all their lives on the auditory channel for linguistic mediation, they may not be able to monitor adequately the visual channel (Johnson et al., 1989). Second, dchp must look back and forth from the activity to the caregiver's semiotic mediation (Wood, 1991; Wood et al., 1986). Wood et al. (1986) and Wood (1991) call this "divided attention" and suggest that this phenomenon places great demands on the memory and cognitive development of dchp. Because of divided attention and the lack of visual attention, dchp may benefit from little of the linguistic semiotic mediation that hearing caregivers provide.

In addition, if children are to benefit from the semiotic mediation that is provided, it must be at a level that coincides with their needs, given their situation definition. Linguistic semiotic mediation is used to achieve intersubjectivity within the children's potential level of development. The kind of semiotic mediation used

"sets the level at which intersubjectivity is to be established" (Wertsch, 1984, p. 14). It appears that hearing caregivers of deaf children may use pointing and manipulating of materials rather than linguistic semiotic mediation when engaged in problem solving activities with their deaf children (Jamieson & Pedersen, 1993). Although pointing may be beneficial as redundant information, its use without linguistic semiotic mediation may mean that intersubjectivity is not being established at a high enough level and thus the children are working at or below their actual level of development rather than at their potential level. In addition, it must be noted that children develop higher level processes by internalizing the linguistic social processes. A further result of inflexible directiveness and the lack of linguistic semiotic mediation during interactions may be that the deaf children engaged in interactions may not fully internalize the linguistic social processes, thereby decreasing the amount that they benefit from the activities.

Children use internalized semiotic mediation to guide their own higher mental processes. It appears that dchp may not receive appropriate semiotic mediation and, therefore, often may "lack the highly specific, disciplined and, above all, *socialized* [authors' emphasis] forms of reflection that are the product of language" (Wood et al., 1986, p. 145). Without internalized semiotic mediation to structure and guide processes such as self-control, recollection, reflection, planning, and thinking of alternatives and options, dchp may seem impulsive, inflexible and concrete thinkers (Wood et al., 1986). In addition, the low scholastic achievement levels of many dchp (Allen, 1986; Moores, 1987) may also be related to the lack of appropriate semiotic mediation in their everyday environments.

### Cultural Sharing Between Parents and Children

As mentioned previously, cultural knowledge is constantly being acquired by group members through their social interactions with others. In this connection,

Swartz (1982) suggests that culture is not shared equally among the participants and that different kinds of cultural information are imparted by different members. Parents play an extremely important role in imparting cultural information to their children.

Reciprocal communication is extremely important to the transmission of cultural knowledge. However, it seems that reciprocal communication alone is not sufficient; there exists specific cultural knowledge that can be transmitted only by parents. Therefore, in order for these understandings to be acquired by children, the parental role is most effectively filled by parents, even when reciprocal communication is not optimal. In other words, although the research has shown that reciprocal communication appears hindered between deaf children and their hearing parents, the information the hearing parents impart and the roles they play in the transmission of cultural knowledge is crucial. In support of this, research by Jamieson and Pedersen (1993) illustrates the critical nature of the parental role. They found that although the hearing mothers of deaf children were less effective in teaching problem solving skills to their children than were hearing mothers of hearing children or Deaf mothers of deaf children, they brought considerable skills to the interactional process. As parents, they were able to impart much valuable cultural information and understandings to their children even without optimal reciprocal communication.

### Interaction at School

Poor communication with their hearing caregivers has meant that dchp often do not learn fully the hearing cultural values of the home (Stevens, 1980). Therefore, school, and residential school in particular, has tended to be the crucial place of enculturation for deaf children (Padden & Humphries, 1988; Reagan, 1990). In that setting, traditionally, dchp met deaf children of Deaf parents and Deaf

adults for the first time and "in the informal dormitory environment [they learned] not only Sign language but the content of [Deaf] culture" (Padden & Humphries, 1988, p. 6). However, most dchp no longer attend residential schools; instead, they usually attend regional programs or their local neighbourhood school (Center for Assessment and Demographic Studies, 1992). Many are fully integrated with little, if any, interaction with others who are deaf like themselves. A review of the literature indicates very little research on the nature of interactions between deaf children and others in their school environment. However, the studies that do exist tend to quantify the number of initiation attempts by deaf or hearing children (e.g., Antia, 1982; Arnold & Tremblay, 1979; Brackett & Henniges, 1976; Vandell & George, 1981), categorize the interactions as positive/negative (Antia & Kreimeyer, 1988), or identify the type of play (Esposito & Koorland, 1989; Higginbotham & Baker, 1981). Few studies examine the nature of interactions between deaf and hearing elementary school students; the majority focus on preschool children (e.g., Arnold & Tremblay, 1979; Brackett & Henniges, 1976; Esposito & Koorland, 1989; Higginbotham & Baker, 1981; Vandell & George, 1981) or high school and college students (e.g., Foster & Mudgett-DeCaro, 1990; Mertens, 1989). From this research, it appears that deaf children tend to interact with other deaf children or teachers more than with hearing children and that the greater a child's communicative competence, the more positive the interactions which occur.

Few studies analyze the interactional processes in a way that allows inferences to be made about the transmission of culture (Erting, 1980, 1988; Johnson & Erting, 1989; Mather, 1989; Wood, 1991; Wood et al., 1986). Research by Mather (1989), Erting (1980, 1988), and Wood and his colleagues (1986) indicates that hearing teachers tend to behave much like hearing caregivers. Wood and his colleagues found that hearing teachers controlled conversations with deaf children and created situations of divided attention when they attempted

to provide verbal and non-verbal information. Erting (1988) reported that hearing teachers may focus on auditory rather than visual information and may often begin to sign without having the visual attention of their students. Mather observed that hearing teachers ask questions that require specific information rather than ones that require conjecture or predictions. It can be inferred from this that hearing teachers may have difficulties similar to those of hearing caregivers in the creation of shared situation definitions, the achievement of intersubjectivity, and the use of linguistic semiotic mediation. Wood (1991), in fact, confirms teachers' difficulties in transmitting cultural norms and values when he states that "hearing people find it more difficult to pass on their knowledge, skill and understanding to [deaf children] because of problems of communication" (p. 249).

## Summary

The processes by which children acquire cultural norms and values is of major concern to parents and educators. From a Vygotskian perspective, cultural transmission between knowledgeable members of a culture and children requires that intersubjectivity is achieved. The development of a shared situation definition, which is largely accomplished through effective semiotic mediation, is necessary in this process (Wertsch, 1984). A review of the major research, from a Vygotskian perspective, of interactions between children and their communicative partners reveals that children who have easy access to reciprocal and contingent communication normally develop an ability to establish a shared situation definition and intersubjectivity with others through linguistic semiotic mediation (e.g., Forman & Cazden, 1985; Radziszewska & Rogoff, 1991; Rogoff, 1990; Rogoff & Gardner, 1984; Rogoff et al., 1984; Webb, 1989; Wells, 1986).

Research examining the interactions between deaf children and their hearing caregivers indicates that deaf children of hearing parents (dchp) may not have the same easy access to reciprocal communication as do hearing children of hearing parents or deaf children of Deaf parents (e.g., Cheskin, 1981; Cheskin, 1982; Erting et al., 1990; Maestas y Moores, 1980; Meadow et al., 1981; Spencer & Gutfreund, 1990; Swisher & Christie, nd; Wedell-Monnig & Lumley, 1980). They may not be exposed at home to the kind of linguistic semiotic mediation which is conducive to the establishment of a shared situation definition or intersubjectivity, thereby inhibiting the cultural transmission between hearing parents and deaf children. Deaf children have traditionally attended residential school (Moores, 1987) where they have tended to be exposed to Deaf adults with whom they may have easy reciprocal and contingent communication, enhancing the cultural transmissions between Deaf adults and deaf children (Erting, 1988; Mather, 1990; Padden & Humphries, 1988; Reagan, 1990). Although no research to date has examined the development of cultural identity in a deaf child in the integrated classroom, it seems reasonable to assume that the integrated deaf child experiences difficulty in developing a shared situation definition with hearing classmates and hearing teachers because of ineffective reciprocal communication (Erting, 1980, 1988; Mather, 1990; Wood et al., 1986), and so does not easily reach full intersubjectivity with other members of the culture in the school setting. In other words, the hearing classroom appears to provide institutional support for the processes of "marginal cultural transmission" initiated earlier in the home.

There exists some research examining the interactions of dchp with the hearing adults and peers at school (e.g., Antia, 1982; Erting, 1980, 1988; Mather, 1990; Vandell & George, 1981; Wood et al., 1986) However, there has been little examination of the processes cultural transmission involved in these interactions,

specifically how communicative partners use linguistic semiotic communication to establish a shared situation definition and maintain intersubjectivity.

The present research aims to use a case study design to describe the semiotic mediational processes used between a dchp and the hearing teachers and classmates who surround him. This approach may help delineate some of the specific conditions which inhibit the attainment of a shared situation definition, which, in turn, complicates the achievement of intersubjectivity and cultural transmission.

The following three research questions will be addressed:

- (1) With whom do fully integrated deaf children of hearing parents interact in the school setting?
- (2) What forms of semiotic mediation occur between deaf children and their hearing partners as they attempt to create a shared situation definition?
- (3) What is the nature of the individual case study in the educational context and in what ways may it be used as a prescriptive tool for teachers of integrated deaf students?

It is anticipated that an examination of these questions from a sociocognitive perspective may assist in describing the covert processes by means of which a deaf child educated in a hearing milieu acquires a cultural identity. The discussion of this research will also reflect on the usefulness of the individual case study as an instructional tool for teachers working with deaf students who are fully or partially integrated among hearing classmates.

## CHAPTER III: METHODOLOGY

### Purpose

The purpose of the research is to describe the nature and quality of the social interactions experienced by a fully integrated deaf child of hearing parents (dchp) in the school setting.

Three questions will guide this research:

- (1) With whom do fully integrated deaf children of hearing parents interact in the school setting?
- (2) What forms of semiotic mediation occur between deaf children and their hearing partners as they attempt to create a shared situation definition?
- (3) What is the nature of the individual case study in the educational context and in what ways may it be used as a prescriptive tool for teachers of integrated deaf students?

### Case Study Research

The case study research design has historically been used in the fields of sociology, anthropology and psychology (Merriam, 1988; Yin, 1989). Although there has been some confusion about the actual nature of case study research and it has been equated to fieldwork, ethnography, participant-observation and naturalistic research, Stake (1986) suggests the case study is a research design rather than a methodology, the difference between a case study and other research methods being primarily a difference of focus. Stake (nd) defines case study "as the study of a single case or bounded system" (p. 278) through naturalistic observation and interpretation of higher-order interrelations. Many different data

collection methods may be used within the design of a case study, including participant-observation, fieldwork (Stake, 1986), and surveys and interviewing (Merriam, 1988) and both quantitative and qualitative data may be included (Merriam, 1988).

The case study research design is said to be well suited to situations where the phenomenon under study cannot be separated from the context in which it occurs (Yin, 1989) and when an attempt is being made to understand the meaning of an experience (Merriam, 1988). Because of the particularistic and inductive nature of the case study (Merriam, 1988), there has been controversy about the scientific respectability of the case study, along with other naturalistic research (Smith & Glass, 1987). In this connection, Yin offers tactics to help case study researchers minimize the difficulties concerning construct, internal and external validity, and reliability.

### Case Study Research in the Educational Setting

Merriam (1988) suggests that the case study research design is an excellent vehicle for "understanding and interpreting observations of educational phenomena" (p. 2). Some researchers have suggested that classrooms are their own special cultures (e.g., Cazden, 1988; Lutz, 1981) and that this culture as a whole and the specific interactive processes within it may be studied holistically through ethnographic means such as a case study (Lutz, 1981).

Because the case study is suited to examine an entity in context, it may be used to increase the knowledge base of educators and educational researchers and to look at problems of educational practice. Case study research in educational settings can also focus on individual students in order to better understand learning or behaviour problems (Merriam, 1988).

Case study research is particularly useful to educators because it focuses on process, unlike other approaches which are primarily concerned with product (Merriam, 1988). In this way, it is a more prescriptive approach and has the potential to provide insights concerning intervention, lesson construction, lesson participation, and social interactions within the school culture (Green & Wallat, 1981; Merriam, 1988). Examination of the processes of the complex social unit of the classroom and the individual within it may bring about new understandings and new insights.

The present research has used a case study research design to gain an in-depth examination of the social interaction processes of a deaf child of hearing parents integrated among hearing peers, with a view to understanding the cultural values being formed. As mentioned previously, Kannapell (1991) and Padden and Humphries (1988) have suggested that deaf children who are strong members of a culture feel more successful and have more of a sense of social identity than those who are not. In his sociocultural theory, Vygotsky (1978,1987) suggests that cultural values are formed during social interaction with other members of the culture. The amount of cultural knowledge acquired appears to depend, at least, on an individual's opportunity to interact with others (Boster, 1991; Hutchins, 1991), or, in other words, on the nature and degree of their social integration. Therefore, it was anticipated that an examination of a deaf child's social interactions would yield insights into the cultural values being formed. This knowledge, in turn, may assist the teacher of the integrated deaf child to discover ways that the deaf child could be more fully socially integrated, and thereby acquire a more complete set of cultural values.

## **Subject**

John was an 8 year-old deaf boy of hearing parents in Grade 3 when the data were collected. (Shortly after the data collection, John unexpectedly, and with sadness on the part of the researcher, passed away due to complications from a kidney transplant.) John was chosen as the focus of this case study because he shared most of the relevant characteristics of fully integrated deaf children as described in the literature (Center for Assessment and Demographic Studies, 1989, 1992; Ries, 1986), namely, he was male, Caucasian, had hearing parents, lost his hearing before the age of 3, had a severe-profound hearing loss, used Sign and speech and received some degree of special education services due to his hearing loss.

## **Family**

John was the only deaf child of an intact hearing family. He had a younger brother, age 5, who began Kindergarten in John's school the year the data were collected. Before John's birth, his family had had no previous experience with deaf people.

## **Etiology and Audiological Background**

John had been deaf since a few days after birth, following the administration of an ototoxic drug. However, his deafness was not actually diagnosed until he was one year-old. Like one-third of American deaf children (Center for Assessment and Demographic Studies, 1989), John suffered from educationally significant handicapping conditions in addition to his hearing loss. He had mild cerebral palsy and visual limitations only partially corrected by glasses. It was the educational team's belief that his vision problems did not appear to interfere with

his ability to see Signs or faces or to interact with his peers. However, he had difficulty tracking between the T. V. and interpreter and tracking when reading. Although his printing was slow and often messy and he sat in the front row to see the board, John's teachers, parents, and interpreters agreed that these physical limitations interfered only minimally with his communication abilities and the progress of his overall education. In addition, he had health problems related to Prune Belly Syndrome, including renal failure. However, at the time of the data collection, these health concerns had not kept him out of school for any prolonged period of time. The etiologies of these health and physical problems were unrelated to the etiology of his deafness.

John had a severe hearing loss in the right ear and a profound loss in the left. His unaided better ear average (500, 1000, and 2000 Hz) was 98dB. With hearing aids, his better ear average was 42dB (see audiogram in Appendix A). He was first fitted with a body aid soon after diagnosis (at one year old), which was changed to ear level aids at four years of age. At the time of data collection, John wore Unitron UE 12PPL behind-the-ear aids.

## School

John had always been the only deaf or hard of hearing student in his school and the only deaf student who signed in the school district. He attended a local development center for children with special needs for 3 1/2 years and began to attend his neighbourhood school at age 5. He was considered by the school district administration to be fully integrated.

At his neighbourhood school, John had an educational interpreter during all class time. He had the same interpreter for the first three years of school. When this interpreter felt that she did not have sufficient Sign Language skills to continue to interpret academic subjects, a new interpreter was hired and she began working

with John in September of Grade 3. In addition to the interpreter, John received daily support from the itinerant teacher of the deaf and hard of hearing. The same itinerant teacher worked with John an average of 7 hours a week every year.

At the time of data collection John was registered in Grade 3 in a Grade 2/3 class of 22 students. He spent only about 70% of his time in this class, despite his official status as a fully integrated student. During the remaining time, John worked individually with the itinerant teacher of the deaf and hard of hearing or with his interpreter.

#### Developmental History in School

John's mother reports that John was always small for his age, due perhaps to his renal problems. By Grade 3, although he was the shortest child in his class, he was physically strong and active. He tried to keep up with his classmates in P.E. and in other physical activities. John loved watching and talking about sports, baseball and hockey especially. He took several skating lessons and was very disappointed when he had to stop because of difficulties interpreting the lessons. John also loved to take physical risks, even when he knew the possible consequences--jumping from high places, riding his bike down steep hills.

John knew only a few Signs when he began school at age 5 and seldom combined these. Although his ability to communicate in Sign improved rapidly, his knowledge of the world was limited and his reactions to others were often young for his chronological age. His behaviour and the depth of his communication depended on the Signing ability of others. For example, with many children John communicated superficially and briefly. However, with adults who could sign more fluently than he could, he played with Signs, made up stories and showed a keen sense of humor.

A reading of the home-school communication books reveals much about John's language and social development. There are highlights about his language such as "John answered a question with 'because' for the first time that we can remember " (January 21, 1992) and about his growing awareness of his needs: "John signed 'HURRY D., INTERPRET ME' today when I was slow getting to the video to interpret" (May 14, 1991). He passed through several phases of not wanting to sign and of trying to use his voice. His concept of "DEAF" grew from meaning, at age 6, any person who could sign, to meaning, at age 7, "no sound" (on a video) and "no talking" (when a person was signing), to meaning, at age 8, a person who could not hear. However, in Grade 3 he still could not understand why other children who wore hearing aids did not sign.

John was liked by other students, even though many could not communicate deeply with him. Reading the home-school communication books indicates that he had many school friends, especially in the first three years of school. He occasionally had friends over to his house and occasionally would go to someone else's house. His favorite friends were usually girls from his class. In the first three years of school these girls liked John as well and put up with his somewhat immature behaviour and pestering. In Grade 3, the girl he called his girlfriend was more direct about not wanting to play with him or sit beside him all the time and was less accepting of him than were many other students. The teachers and interpreter indicated a concern that John was, in general, less socially accepted in Grade 3 than previously. Indeed, a survey done by his teacher in the fall of that year indicated that many students wanted to sit beside him. However, a similar survey done in the late winter revealed that only two students wanted to sit beside him.

### Communication History

John 's mother states that she believed from the outset that a visual-gestural form of communication was most appropriate for John. She began using gestures with him as soon as he was diagnosed as deaf. Later, she was able to take local courses in Signed English and used a Signed English Dictionary to learn Signs she did not know, beginning to sign some words to him when he was approximately 2 years of age. She attempted to communicate with him through Sign alone without voice, but much of the time used her voice supported by a few Signs. For example, she had been seen to voice "You're going back to school now?" and simultaneously sign "GO SCHOOL".

John 's father and younger brother learned few Signs and communicated with him primarily orally and with gestures. One aunt and uncle learned some Sign but all other extended family members communicated with him through oral language and gestures. His paternal grandmother and grandfather, with whom he spent a great deal of time, spoke English as a second language.

John's preferred mode of communication with his family was oral. He signed some when he and his mother were alone but in the presence of others who did not sign or signed little, he preferred oral communication. At school, he used oral language or gesture with those people who did not sign. With those people who did sign, his preferred mode of communication was Sign with no voice. Even with fluent Signers he used his voice occasionally, or voice and Sign, if his Signs alone were not understood.

From 18 months to 5 years of age, John received Speech and Language therapy twice a week. During these sessions, a Sign Supported Speech (Total Communication) method was followed with much emphasis on speech. There was little Signing used with him at the children's development center.

During Kindergarten, the interpreter and teacher of the deaf and hard of hearing used Sign Supported Speech with John. For example, they would voice "Where did you go last night?" and sign "WHERE GO LAST NIGHT." In February of Grade 1, the educational team, including the parents, made a decision to try to use a more conceptually correct Pidgin Sign English and to drop the oral/aural component. This meant that the focus was on producing the whole message visually. Because this appeared to result in an immediate improvement in John's comprehension, it was subsequently decided that the interpreter would use a Pidgin Sign English (P.S.E.) as close to American Sign Language (ASL) as possible and that the teacher of the deaf and hard of hearing would teach John English through reading and writing.

ASL differs from English in form and grammar. English is a spoken language with a second written form. ASL, on the other hand, is a Signed language, having its own grammar which is not derived from that of English. Pidgin Sign English is technically not a language, but rather a simplification of ASL and English which varies on a continuum from user to user. Because John had had no interaction with Deaf users of ASL, it could not be said that he was learning ASL as a first language. However, the Pidgin Sign English that was used by the interpreter included many ASL grammatical structures such as placement, classifiers, and directionality and much ASL paralinguistic information such as puffed cheeks and pursed lips. For ease of communication among the team members and with John, the term "Sign Language" was used to refer to the Signed communication John was acquiring.

By the middle of Grade 2, John understood that he was learning two different forms of communication (i.e., P.S.E. and English) and would often ask for interpretation of a sentence into the other form. He was beginning to understand what he was reading and could change the English into conceptually correct

Signs. For example, when reading the story of Little Red Riding Hood, he first signed, "And she ate it all up" word for word. He then stopped, corrected himself, signing "eat-all-up" conceptually. He then laughed as he signed the English again, pointing up for "up". He then signed "English dumb."

Each year, John and the interpreter taught his class Sign several times a week. By the end of each year there were some students in the class who were able to sign short phrases to John such as "Watch the teacher," "What do you want to do now?" and "What's in your lunch?". However, each year students were moved and few of the students who could sign remained in John's class for two consecutive years. There was a weekly Sign Club in the school on two occasions but the students seldom used the Signs they had learned. One year each class in the school was taught a new phrase every week (e.g., "Hi, how are you?" "Merry Christmas, Happy New Year") but it was found that the students used the phrases inappropriately and out of context, which was confusing for John. Only one of his classroom teachers learned any Sign. None of the other staff members signed and many were confused about how to communicate with John through the interpreter.

### Assessment Results

Cognitive ability. The performance scale of the Weschler Intelligence Scale for Children-Revised (Weschler, 1967) was administered in February, 1992. However, the validity of this test was compromised by interpreting the questions into Pidgin Sign and interpreting John's responses into spoken English. His scores on the performance battery were within the average range, with some in the high average:

Picture Completion:	average
Picture Arrangement:	high average
Block Design:	average
Object Assembly:	average
Coding:	very low

John's overall quotient for the performance battery was 92 which is within the low average range for hearing students. There are no norms for deaf students available for this test. The coding sub-test was very difficult for John because of the motor dexterity, particularly pencil manipulation, required.

The Raven's Standard Progressive Matrices (Raven, Court, & Raven, 1977) were administered as a non-verbal test of intelligence in November, 1992. John scored between the 75th and 90th percentile for his age, indicating that his intelligence was in the above average range. John's classroom teachers and the itinerant teacher consistently reported John's intelligence as within normal limits as assessed through informal ratings.

Signed language ability. Because John was learning conceptually correct Pidgin Sign as his primary method of communication and English through reading and writing, little testing of his vocabulary or syntax was performed. At present there are no tests available designed to assess a child's development in Sign. Most English-based standardized tests of language would have been invalid for use with John because English was, in a sense, his second language.

Although the standardized results were invalid, subtests of some standardized language tests were interpreted into Pidgin Sign and administered to John in order to get an idea of his language development. The Oral Vocabulary and Grammatic Understanding subtests of the Test of Language Development-Primary (Newcomer & Hammil, 1982) were administered in February, 1992. The

Oral Vocabulary subtest requires that the child give a characteristic of the stimulus word. For example, if the stimulus word is "bird" the child is given a point for saying "has feathers." John's standard score for this subtest was in the average range for his age. The Grammatic Understanding subtest requires that the child point to the one of three pictures that best illustrates the sentence spoken (Signed) by the examiner. John's standard score was again in the average range for his age. John's teachers and interpreter believe that these scores were not an accurate reflection of his language level, which was more likely slightly lower than the average for his age.

An informal Signed language sample was taken and analyzed in November, 1992. This language sample revealed that, in conversation with a person skilled in Sign, John used utterances of up to nine Signs in length. The average length of utterance was 5.1 Signs. More than 65% of the Signs he used were nouns and verbs. John used negatives readily and asked both "wh" and "yes/no" questions, although he did not use facial expression to mark either questions or negatives. He often checked his understanding by repeating what his partner had signed. For example, when his conversational partner explained at length that her female cat didn't like people although her male cat did, John checked his understanding by signing ("BOY LIKE PEOPLE, GIRL LIKE PEOPLE"). He attempted to interrupt and take his turn in conversation by first signing the person's name and then using his voice if this attempt was ignored.

Auditory reception of spoken language. The Test of Auditory Comprehension (1977) was administered in September, 1992. In this test, which is normed on hard of hearing and deaf children, the child must listen to a stimulus sound or sentence on a tape and demonstrate understanding by pointing to the correct picture. For example, in the first level the stimulus might be the sound of a

woman crying and the child must choose between a picture of a woman crying and bell ringing; at a more advanced level, the stimulus may be "Show me the airplane" and the child may have to choose between three pictures. John scored within the average range when asked to distinguish between linguistic, human non-linguistic (e.g., crying) and environmental sounds. However, he scored two standard deviations below average when asked to identify stereotypic messages and one standard deviation below average when asked to identify short phrases using core noun vocabulary (e.g., "Show me the airplane").

Speech intelligibility. The intelligibility of John's speech was assessed using the CID Picture Speech Intelligibility Evaluation (Monsen, Moog, & Geers, 1988) in October, 1992. This test does not evaluate how well a word is said but only if the quality of the production is functionally understandable. The test does not yet provide normative data, but is suggestive of approximate interpretations of the scores. Only 47% of John's productions were functionally understandable. The Picture SPINE rates this score as unintelligible, suggesting that even experienced listeners will have difficulty understanding more than the occasional word.

Spontaneously produced spoken language. In October, 1992, an attempt was made to elicit a spoken language sample through conversation; however, this was not possible because both partners became frustrated by misunderstandings within the first exchange. Therefore, the spoken language sample was elicited using picture story cards and an activity in which John was required to direct a person in the making of a cheese sandwich. The videotaped production was then analyzed for the number and length of utterances, as well as the level of linguistic complexity (single words, two-word phrases, noun and verb phrases, simple sentences, compound sentences, complex sentences). The results indicated that

John's mean length of utterance was 1.9 words in spontaneous spoken language production. He used a total of 68 different words, of which 53% were simple noun-verb combinations. In sentences where he chose to sign and speak at the same time, the length of his spoken utterance appeared greater than the sentences in which he used spoken language alone. However, when calculated, the utterances averaged the same length (1.9 words). When he was asked to speak only and not sign, he relied on telegraphic messages. For example "butter" seemed to mean "put the butter on the bread and spread it around." John used no complete English sentence with the exception of "I don't know." He attempted to create compound sentences but did not use correct English syntax (e.g., "volleyball slip, fall"). He used a great deal of gesture to complement his spoken language and to help his partner to understand. John did not attempt to repair the conversation if he or his partner did not understand. When there was a message that he really wanted to communicate, he switched into Sign alone. For example, the picture card story reminded him of another situation that interested him greatly and he stopped speaking and began to sign in order to relate this second situation to his partner.

Summary of language skills. John's Signed language was much more advanced than his spoken language. In spoken English, he used primarily telegraphic messages of one or two words. Whereas his Signed utterances were longer. Table 1 below provides comparison data:

Table 1

Comparative Mean Lengths of Utterances across Modalities

Modality	Mean Length of Utterance
Spoken English alone	1.9 words
Simultaneous Sign and speech	1.9 words 2.1 Signs
Sign alone	5.1 Signs

From the informal language samples analyzed, it appears that John did not readily attempt to check his understanding, repair communication breakdowns or extend the conversation when using spoken English. Both John and his conversational partners had to rely on context clues to supplement their understanding of the other's speech. When using Sign, John was able to express his thoughts in simple form and to repair some breakdowns in communication. He was able to ask and respond to simple questions and continue a topic for a number of turns.

Data Collection

The data to be analyzed were collected as language samples by the researcher in the course of teaching during the 1992-1993 school year. Approximately one-and-three quarters hours of videotape were made of John working with his interpreter in a pull-out situation. Just over seven hours were

made of John interacting with his peers, teachers, or interpreter during lunch hour and part of his afternoon classes.

### Site

Pull-out room. When John was pulled out of class to work individually with his interpreter or itinerant teacher, they worked in a small room off the school Resource Class. This small room, which was partially carpeted, held a table, three chairs, and a sink, as well as many of the materials commonly used by John and work that he had done. When the Resource classroom was not being used, the Itinerant Teacher, interpreter and John often chose to work in this larger, more comfortable classroom.

Cafeteria and playground. John stayed at school for lunch and ate in the cafeteria with the other primary students. The cafeteria is a very noisy environment, with the children sitting at long tables (see Appendix B). Conversations usually occur with immediate neighbours or with children sitting across the table. After eating, the students play outside in a special area of the school grounds designated for primary students, which includes a large grassy field with a jungle gym and small covered area (see Appendix C).

Classroom. Observations of in-class interactions occurred primarily in John's regular classroom during afternoon academic subjects. The exception to this routine was the day that the teacher of the visually impaired visited and she, the interpreter, and John worked in the Resource Room. During the afternoons, the precise subjects observed varied because of the rotating nature of the classroom timetable.

In order to provide the best acoustic environment for John, the classroom had been carpeted. There were 22 students in the class, seated at ten desks and six tables (see Appendix D for diagram of classroom layout). The teacher usually stood at the blackboard at the front of the class when teaching the whole group. The interpreter stood on the teacher's right. John sat at the front on the teacher's right side, from which vantage point he was able easily to see the interpreter, teacher, other students and board. He remained in this seat all year. When the seating arrangement was changed for other students, he was able to choose which student sat beside him. He always chose students whom he liked, although these were not necessarily students with whom he interacted in Sign.

The role of the Sign Language interpreter was to facilitate overall communication between John and the hearing people at school. She interpreted teacher-directed lessons, students' comments during group work, and written English on the board into Sign. She interpreted John's comments, responses, and questions into spoken English. When John did not understand the work being taught, she tutored him. She also taught Sign in class for 20 minutes every day. When John was working independently and did not need help, she was available to assist other students.

The primary teaching method in the classroom was teacher-directed lessons. Group work and work in pairs occurred primarily in Math class. Students occasionally worked on independent projects.

#### Observations and Recording of Interactions

The researcher acted as an observer during the pull-out time and during the lunch hour and as a participant-observer during class time. A video camera was used during all observations. The video camera was carried by the researcher at all times except in the regular classroom and Resource Room, when it was

mounted on a tripod and directed at John's primary area of interaction. In the regular classroom, the video camera was located primarily at the side of the room closest to John because there was not room to record from the front. When John moved into a small group or around the room the video camera was relocated, provided this could be accomplished with minimal disruption to the rest of the class. On the playground, the researcher held the camera and attempted to stay within 30 feet of John. However, in several instances, this was not possible and, on occasion, the recording was interrupted because John was too far away.

Many of the students in John's class were familiar with video recording because they had seen the researcher using one many times over the previous 3 years. The majority of the students in the class had also developed some rapport with the researcher. The teacher, the interpreter, John, and the other students knew that the researcher was observing and videotaping John to collect language samples. Because this procedure had occurred many times over the previous three years in the lunchroom, on the playground and in the classroom, few students displayed unusual behaviours or interest in the taping. However, it is possible that the videotaping may have precipitated a higher than normal level of interaction with John as others tried to facilitate the collection of language samples.

### Triangulation: Interviews

The validity of the researcher's interpretations of the nature and quality of social interactions between John and his hearing partners were correlated with video-taped interviews. The researcher used open-ended questions to interview John's classroom teacher and interpreter (see Appendix E for the listing of the questions). It was anticipated that the interviews might also provide the researcher with valuable information about the perceptions that the classroom teacher and interpreter had of their interactions with John. By interviewing the

classroom teacher and interpreter, the researcher was able to gather several points of view regarding the nature of John's interactions. Interviews had been planned with some of John's hearing classmates; however, following John's unexpected death, these were deemed inadvisable.

### Triangulation: Other Data Sources

The researcher also referred to her own notes, kept as part of her teaching activities, about incidents that occurred, to the "team book," used for informal communication among the classroom teacher, interpreter and teacher of the deaf, as well as to the home-school communication books and to incidental conversations with the interpreter and classroom teacher. These data sources were used to provide background information to the videotapes and to corroborate patterns seen on the videotapes.

### Data Analyses

The videotapes were viewed by the researcher, with a view to identifying patterns of activity. Once these data were compiled, problems and issues that emerged were examined. Field notes, interviews and descriptions of the interactional processes that occurred were used to search for patterns of activity in the nature and quality of the semiotic mediation that occurred. In addition, the researcher reflected on the value of the individual case study as a tool for teachers working with integrated deaf children.

The researcher has been using Sign in her teaching for six years and was well acquainted with John's individual Signing. John's interpreter, because she was more familiar with Signs the children themselves created, was asked to view any interactions or Signs that were unclear to the researcher.

Some transcription was done to clarify and remember particular interactions. Notes on these transcriptions included utterances involving Sign alone, voice alone and Sign and voice together. Following convention, capitals were used to transcribe Signs.

For the purposes of this research, a social interaction was considered to have been initiated between John and someone else when one partner directed a vocalization, Sign, gesture, gaze, or body contact toward the other. When there was no response to an initiation, it was necessary to decide if the initiation was received and ignored, not understood, or not received. For example, if a student signed "good morning" to John when he was possibly out of John's range of vision, and John showed no indication of having seen the student, this was not considered an interaction. However, if the student was within John's visual field and John did not respond, this was considered an initiation to interact with no response. It is acknowledged that some degree of subjective judgement was required in these cases.

Following the system used by Meadow and her colleagues (1981), a "bout" of interaction was considered to have occurred when one partner initiated an interaction and the other responded with a related interactive behaviour. For example, if a student signed "COME HERE" to John, that student was considered to have initiated an interaction. If John then moved toward the student or signed "no," a bout was considered to have occurred. Looking at the initiator with no other behaviours was not considered a response. Also following the specifications of Meadow and her colleagues (1981), a bout of social interaction was considered to have ended after 5 seconds with no interactive behaviours. A complete change in topic was deemed to be a new interaction.

Although the teacher's lesson, itself, was considered social interaction between the teacher and class, the actual interpretation of the lesson was not

considered a social interaction between the interpreter and John.<sup>1</sup> A comment or question directed to the interpreter or teacher by John was considered an interaction between him and the person to whom the initiation was directed. A comment or question originating from the teacher or interpreter and directed to John was considered an interaction between John and the originator of the interaction.

### Limitations of Study

The research design employed in this study necessitates that caution be exercised in the interpretation of the findings. Yin (1989) suggests case study tactics for minimizing difficulties concerning the four design tests of any research (i.e., construct validity, internal validity, external validity and reliability). Each of these will be discussed separately, except for internal validity which Yin suggests is not necessary for descriptive case studies.

An attempt has been made to establish construct validity by using a number of sources of evidence, including direct observation, participant observation, written documents, and interviews. External validity is usually developed through replication (Yin, 1989). Because this study neither replicates an earlier study nor is a multiple-case design, the findings are not generalizable and are limited to the

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<sup>1</sup> Although students learn part of their culture from teacher-initiated interaction, it was not coded in the data collection. In this situation, what was said by the teacher and what was signed by the interpreter were often very different. The interpreter often modified what the teacher said to make it more understandable to the deaf student, given his experiences and background knowledge. When the pace of interaction was very fast, the interpreter often changed teacher questions into statements. She sometimes stopped interpreting to tutor the student when he didn't understand an important concept. Further research into the effects of the differences between teacher-hearing class interaction and teacher-interpreter-deaf student interaction would be useful.

immediate case. In addition, external validity may have been compromised further by the particular health and physical problems of John.

Yin (1989) suggests that tactics for establishing reliability in a case study include complete documentation of the procedures followed. Accordingly, documentation has been as precise and detailed as possible.

In spite of the limitations caused by the choice of research design, it is anticipated that a descriptive case study approach may provide more in-depth insights into the research questions under investigation than would a more quantifiable approach, and, moreover, may allow for ample unexpected findings to emerge. In addition, the researcher's reflections on the effectiveness of the case study as a tool in this instance may be useful for teachers working with deaf students integrated among hearing children.

### Summary

A case study design, focussing on direct observation, participant observation and interviews, was used to examine the interactions in a school setting of a fully integrated Grade 3 dchp. Video-taped footage of these interactions, made previously for language sampling, was analyzed by the researcher, in an attempt to uncover patterns of activity, problems, and issues. Field notes, interviews and descriptions of the interactional processes that occurred were used to describe in more detail the forms of semiotic mediation that occurred. Throughout the data analysis process, the researcher reflected on the usefulness of the case study design as a prescriptive tool for teachers working with deaf children integrated among hearing peers.

## CHAPTER IV: DATA AND ANALYSIS

This research has a two-fold purpose: first, a description of the nature and quality of the social interactions experienced by a fully integrated deaf child of hearing parents (dchp) in the school setting, and second, a reflection of the case study approach as a prescriptive tool for educators working with deaf children isolated among hearing peers.

The researcher analyzed approximately nine hours of videotape footage which had been collected as language samples during the school year. The videotapes included the following five footages:

- (1) Interaction between the deaf child and his Sign Language interpreter during a pullout time when the child was practicing giving accurate directions (1 hour),
- (2) Interaction between the deaf child and his Sign Language interpreter during a pullout time when they were having an informal conversation (45 minutes),
- (3) Interaction between the deaf child and others in the cafeteria on four occasions (1 hour, 10 minutes),
- (4) Interaction between the deaf child and others on the playground on four occasions (1 hour, 50 minutes),
- (5) Interaction between the deaf child and his interpreter, classroom teacher, teacher of the visually impaired , teacher of the deaf and hard of hearing, or peers during afternoon classes on four occasions (4 hours, 6 minutes).

A total of 5 hours and 50 minutes of interaction during instructional time and 3 hours of interaction during social (lunch and playground) time were analyzed.

The home-school communication books, informal conversations with the classroom teacher and interpreter, and interviews with them about their interactions with the deaf child were used as data also. Notes kept during the year

about incidents that had occurred and the "team book," used for informal communication among the classroom teacher, interpreter, and teacher of the deaf were used as background sources of information.

In addition, the classroom teacher and interpreter were interviewed about their interactions with the deaf child.

Three formal questions guided the analysis of the data:

(1) With whom do fully integrated deaf children of hearing parents interact in the school setting?

(2) What forms of semiotic mediation occur between deaf children and their hearing partners as they attempt to create a shared situation definition?

(3) What is the nature of the individual case study in the educational context and in what ways may it be used as a prescriptive tool for teachers of integrated deaf students?

Due to the nature of the data and the patterns that unfolded, the organization of the following sections is holistic and guided by the patterns and issues that emerged. The predominant patterns that arose were related to: 1) the frequency and amount of interaction with hearing partners, 2) the kinds of interactions that occurred, 3) the means of communication, 4) the importance of context for understanding, 5) the use of eye contact, and 6) the repair and avoidance of communication breakdown. The data related to the deaf child's participation in teacher-directed group discourse and his tutoring by the interpreter were unexpected findings and are discussed separately. The appraisal of the usefulness of the case study methodology for educators will be reflected upon in Chapter V. To preserve anonymity, the names of the deaf child (John) and his communication partners have been altered.

## Patterns of Interaction

### Background Factors

Some of John's hearing classmates had been with him in previous years and, therefore, had prior experience with Sign; many were new to him this particular year and had little, if any, prior experience with Sign. The year of data collection, the interpreter and John taught the students in his class Sign for twenty minutes a day, focussing on vocabulary acquisition and fingerspelling. The interpreter reported that the children also invented a number of Signs for games and lunch foods. These Signs were known also to, and used by, John. Some of the students who had been in John's class in previous years had ended those years with a good knowledge of Sign and many still attempted to use it. It seemed to the interpreter and teacher of the deaf that, in general, the girls usually made more attempts than the boys to practice Sign and to sign with John. Several of the boys seemed to be capable in Sign during Sign class, but seldom used it outside of the actual class time.

The year the data were collected, the teacher of the deaf taught a unit on Deafness to the hearing students in John's class. (John chose not to participate and worked with his interpreter during this time.) The students were involved in this unit for forty-five minutes per week from September until the end of April. Work done by the students during this unit indicated to the teacher of the deaf that most of them had a good understanding of deafness and understood Sign to be a genuine means of communication. The stories written by the students showed that most of them understood the importance of vision for communication by Deaf people. Only one student expressed overtly that Deaf people were less capable than hearing people. This particular student wrote that Deaf people were slow to

understand Math. When questioned, she indicated that John was slow to understand Math.

Each year, John's classroom teacher participated in Sign class with her students, but other adults in the school did not learn Sign. With the exception of John's classroom teachers, no formalized inservice took place on interacting with deaf students. However, these topics were discussed informally with individual teachers and staff by both the interpreter and the teacher of the deaf.

#### Frequency and Amount of Interaction

Similar to his hearing peers, John's social interactions occurred primarily on the playground and in the cafeteria with children of approximately the same age. In these settings, interaction with adults was limited for all students. However, there is some data to suggest that, given the opportunity, John may have preferred to interact with an adult who could sign well rather than with a peer. On one occasion in the cafeteria, an attempt was made to reduce the intrusiveness of the video camera. The camera was held at waist level instead of at shoulder level. Instead of making the camera less intrusive, this change allowed John to see the face of the teacher of the deaf. Despite having requested a seat beside his neighbour and having consistently indicated a preference for interaction with this girl, John attempted on this occasion to interact predominantly with the teacher of the deaf. Each time John made eye contact with her, he initiated interaction. When an attempt was then made to avoid all eye contact with him, he began to wave and use his voice to get her attention. During this session, he interacted only four times with his neighbour; three of these were initiated by this peer. The fourth initiation was a request by John for a chip to be passed to him. As well, the peer shifted slightly in her seat so that she was turned more toward her other neighbour and seemed less ready to interact with John.

In the classroom, most of John's interactions occurred with adults. He often worked one-to-one with his interpreter in as well as out of the classroom. However, even when he was working independently on seatwork, he interacted infrequently with peers.

### Interactions with Peers

John's interactions with hearing peers seem less frequent and more brief than those among the hearing peers themselves; nonetheless, like hearing children his age, on the playground and in the cafeteria, he interacted primarily with peers. However, John seemed to have engaged in little social interaction with peers in the classroom. Although the classroom was primarily an instructional environment, the large amount of social interaction that occurred between peers is revealed on the videotapes. On two of the classroom tapes, there is no evidence of any interaction between John and his hearing peers. In contrast, throughout the tapes, other children can be seen and heard interacting with their neighbours .

As shown in Table 2, John interacted 153 times with hearing peers on the playground and in the cafeteria. The hearing children initiated 113 of these interactions; girls initiated 73 and boys only 40. John initiated only one-quarter of the total interactions (40) with peers.

John ignored only eight of the 73 initiation attempts by girls (less than one-tenth), but one-quarter (10 of 40) by boys (see Table 2). One-half of the total ignored initiations were pats and waves from other children on the playground, the main purpose of which appeared to be social contact. Nine of John's 40 initiation

Table 2

Frequencies of Initiated Communication Attempts in Social and Instructional Settings Between John and Hearing Peers

Initiator	Frequency	Success	
		Ignored	Acknowledged
Social settings			
Girls	73	8	65
Boys	40	10	30
John	40	9	31
To girls	25	4	21
To boys	14	4	10
To unknown (off camera)	1	1	0
Overall	153	27	126
Instructional Settings			
Girls	18	0	18
Boys	8	2	6
John	18	1	17
To girls	13	0	13
To boys	5	1	4
Overall	44	3	41

attempts were ignored--six of these were pats and slaps at older children who passed him during line-up.

On the playground, there are numerous instances of boys initiating interaction with John physically, by patting him on the head, grabbing his hand and shaking it, saying "hi," taking his hat, or pushing him. Many of these initiations were not age-appropriate and John appeared to attempt to ignore them, although this often proved impossible. For example, on one occasion a boy waved in John's face until he responded and at a different time another boy grabbed his hand and did not let go until John shook hands. As well, there are several examples of students from other classes initiating social contact in Sign, but inappropriately. For example, a younger boy, Dan, wanted to interact with John on the jungle gym at lunch:

Dan: (waves above John's head for several seconds, then waves in John's face)

John: (turns away and then moves hand very quickly in a low wave while looking away)

[a few moments later]

Dan: (waves to John again)

John: (no response)

Dan: (touches John's arm)

John: (no response)

Dan: (follows John onto slide and waits till John is turned sideways towards him) STOP YOU!

John: (goes down slide)

Dan: (to John's back) ME LOVE

Dan appeared to want to make social contact with John. It did not appear that he saw John's wave in response to his first initiation. After attempting a

physical initiation, Dan tried using the Signs that he knew. Perhaps he simply wanted to practice the Signs he knew. John chose not to respond. However, in her interview, the interpreter reported that John was generally accepting of peers' inappropriate attempts to practice Sign and seemed very patient with them. For example, he nodded and smiled when a student walking towards him down the hall signed "MERRY CHRISTMAS" in February.

Most of the children spent much of their time in the cafeteria talking with their neighbours. John interacted with peers approximately 25% of the time while he was in the cafeteria. However, the actual amount varied from day to day depending on who sat next to him. For example, when he was sitting between Katlyn, a relatively quiet girl who enjoyed interacting with John, and a girl from another class, there were 16 brief interactions for a total of two minutes. Another day, when he was sitting beside Teri, whom he liked a lot but who appeared to tire quickly of him, there were only three interactions for a total of less than one minute. On yet another occasion, Cathy, Rita (both of whom signed very well), and John interacted 24 times for a total of 10 minutes. This latter occasion included more Signing and longer bouts than his interactions with Katlyn or Teri.

On the playground, John played with other children 50% of the time. They usually played tag, "Monkey in the Middle," or on the jungle gym. Only 25% of his time playing with other children was spent in actual face-to-face interactions (i.e., interactions that were not part of the routine of the game--catching the ball, throwing it, tagging someone). This means that only approximately 14 minutes of interaction occurred in approximately 55 minutes of play.

As previously stated, there is little videotape footage showing John interacting with peers in the classroom, and only one example of working on a project with a peer. As shown in Table 2, in over four hours of classroom data, John interacted with his peers only 44 times, and initiated only 18 of these

interactions. Although there are data demonstrating that the hearing children interacted with each other during the independent work of a teacher-directed lesson, there is no evidence of John interacting with peers during these times. All of John's peer interactions occurred during loosely structured activities when the children were working on projects and moving about the room or viewing a video, or during highly structured activities such as playing a Sign Language game or the routine of giving compliments to students after they presented their projects to the class.

Most of the interactions between John and his peers were not maintained past one bout (question-answer; comment-response). Hearing peers' responses to John's initiation attempts, and his responses to their initiations, were often not conducive to further communication. For example, when he and David were working together in class to make a picture, John pointed to something he had drawn and voiced, "Hey! Lookit!". David stopped drawing and looked at the picture to which John was pointing. He then smiled at John and nodded. In the cafeteria, John showed Katlyn, who was quite a good Signer, his fruit treats. Katlyn nodded but did not expand. At another time, when Teri showed him a cut on her finger, he signed "So?" but did not expand and Teri finally looked away.

Interactions of more than one bout occurred predominantly in Sign or Sign and gesture. Often these were filled with attempts to repair communication breakdown or involved some silliness or game. For example, in the cafeteria, Teri pointed to John's sandwich:

Teri: SMELL

John: (points to Teri's food) SMELL

Teri: (points to John's food) SMELL

John: (points to Teri) SMELL

Teri: (points to John) SMELL

This game continued for two more bouts at which point they were interrupted by the collection of the garbage. When asked during the interview about interactions between John and his peers, the interpreter stated that she saw them engage in a great deal of immature silliness.

Cathy was the most proficient student Signer in the school and had been close friends with John for three years. In some ways, John's conversations with her were an exception to the above pattern. On the one hand, as he had with other peers, John initiated few of their bouts in the cafeteria (3 of 20). On the other hand, their bouts were longer and more reciprocal than those between John and other peers. One of their conversations continued for 10 1/2 bouts.

Interactions with boys vs. girls. John said that he preferred to sit beside girls in the cafeteria and to play with them on the playground. This is corroborated in the data, in which many more interactions with girls than boys are evident in all settings. He had two favorite partners in the cafeteria--Teri, who was in his class and whom he called his "girlfriend," and Cathy, a prior "girlfriend." In the classroom, he shared a table with a boy, but was not seen to interact with him on any of the videotapes.

As shown in Table 2, only eight of the 26 initiation attempts by peers in the classroom were by boys and for his part, John initiated only five interactions--four of these attempts being with the same boy while they were working together on a project. In the cafeteria, there are only two examples of John interacting with boys, neither interaction initiated by John. Many of John's interactions with boys appeared unsuccessful. For example, in the cafeteria, John was watching the boys across the table when the following interaction occurred (it is not clear on the videotape what the other boys were talking about or doing):

Boy: (points down table)

John: (smiles)

Boy: (points toward ceiling)

John: (shrugs)

Boy: (continues to look at John then finally looks down at sandwich and begins to eat)

John's interactions with girls seemed generally more successful. For example, when playing tag with the girls, he was chased to the end of the school building. When the girl did not return, he signed to another girl:

John: WHERE?

Girl: ME IT

John: HER (points away)

Girl: ME IT

John (sign and voice): THERE (point) AGAIN TIME OUT

On the playground, John spent one-and-one-half of the four videotaped sessions with the same boys, playing catch and "Monkey in the Middle." On one of these occasions, he went back into the school to get his baseball glove so that he could join them. The interpreter reported that these three boys were the only ones with whom John played outside and, because they were known in the school as having behaviour problems, she had been quite concerned about John playing with them. She said she had asked if John could choose any boy, with whom he would play. He gave her the names of a number of the high-achieving, well-liked boys. When asked why he did not play with these, he reportedly shrugged. The boys with whom John did play used little language and a lot of physical contact when playing. For example, when playing "Monkey in the Middle" there was some controversy about who should be in the middle:

John: (yells something unintelligible)  
Jamie: YES HERE  
John: (grabs for ball and pushes Jamie)  
Jamie: (pushes back, then walks away)

### Interactions with Teachers

As shown in Table 3, in four hours of videotape, John and his classroom teacher engaged in only 23 interactions, 18 of which were initiated by the teacher. Thirteen of these teacher initiations occurred on one day, when she was helping John to share his report with the class. John initiated interaction with his teacher only five times, on each occasion to ask a question about his work or permission to do something. The teacher corroborated this finding during the interview, stating that she thought that she usually initiated their communication. As shown in Table 3, John initiated interactions slightly more frequently when working one-to-one with the teacher of the visually impaired (7 of their 26 interactions). With this teacher, he initiated communication to tell her that he was finished his work or to request continuation of an activity.

On the videotapes, the classroom teacher often appears to have been hesitant to initiate interaction with John. Although she once expressed this hesitation as a fear of not being able to communicate with him, in her interview she stated that she believed that she communicated very effectively with John. In one scenario, the teacher watched John doing seatwork for one-and-one-half minutes without saying anything, whereas when she moved on to Richard, she talked him through the problem he was having. When John handed in work the teacher usually made a short evaluative or directive comment to him, but any longer explanation she made to the interpreter. For example, during Math class, John worked on a sheet of Math facts while the other students practiced word problems.

Table 3

Frequency of Interactions between John and Hearing Adults in Social and Instructional Settings

Initiator	Frequency
Social settings	
Teacher of Deaf	1
Non-signing supervisor	3
John	17
To Teacher of Deaf	15
Non-signing supervisor	2
Overall	21
Instructional settings	
Classroom teacher	18
Teacher of Deaf	3
Teacher of Visually-Impaired	19
Interpreter	52
John	27
To classroom teacher	5
To Teacher of Deaf	1
To Teacher of Visually-Impaired	7
To interpreter	14
Overall	119

When he was finished, the interpreter told him that he had done the questions in six minutes. John then handed the paper in to the teacher. To John, she said, "All done? Good." and then she asked the interpreter how long it had taken him. After the interpreter responded, the teacher said to John, "Six minutes, that's wonderful. You did a good job," which then was interpreted to him.

There is only one example of the classroom teacher actually attempting to correct John while he was working. In this situation, she pointed to a question and then to his numberline. As he began to erase his answer, she realized that it was actually correct and indicated to him through a hand movement on his paper that he should not erase it. He looked up at her, with a very puzzled face. The teacher then explained to the interpreter what had happened and why she had thought that the answer was wrong. She said nothing more to John but continued to watch him for almost another two minutes, at the end of which she told the interpreter that John was doing good work.

In contrast to the above data and pattern, and perhaps more noticeable because of it, the classroom teacher was seen to interact relatively normally with John on one occasion when the interpreter was not in the room. In this instance, the students were working independently on their project booklets and the teacher was circulating, encouraging them to finish. As she walked past John's desk, she looked down at his booklet and said, "OK, John, I think you're all done, aren't you? So let's take yours." She then gathered all his papers together and indicated with her finger that he was to follow her to the back of the class, where he would get his booklet punched and strung with wool. The teacher was more directive than she may have been with a hearing student, gathering up John's papers and telling him to follow her, and John probably did not understand what was actually said to him, but the language she used and the nature of the interaction itself was very similar to her interactions with hearing students.

### Interactions with the Interpreter

Of all the people in the classroom, John interacted most frequently with the interpreter. Not only was she the medium through which teacher-directed lessons came, but she tutored him under the direction of both the classroom teacher and the teacher of the deaf. Because she was the person in the classroom who was the most fluent in Sign Language, John signed with her at more length and more quickly than with anyone else.

Sixty-six of the 119 adult-John interactions in the classroom occurred with his interpreter when she was acting as a tutor. As shown in Table 3, only 14 of these 66 interactions were initiated by John. During her interview, the interpreter stated that in the school setting, she usually initiated their communication, because it was usually work-related. She noted that John occasionally interrupted what they were working on in order to introduce his own topic (e.g., "My dad went hunting yesterday") or to ask a question (e.g., "Can I visit you on the weekend?"; "Do we have music today?"). These interruptions were not related to the subject matter and were often questions about future or past objects and events, the interpreter's life and feelings, or questions related to events that had occurred. The interpreter was the only person in the school with whom he could interact on these kinds of topics.

The most extended conversations between John and a hearing partner occurred with his interpreter. Although many of their interactions were tutorial in nature and, therefore, often of the "question-response-evaluation" type, there were several longer conversational interactions. One of these, about the interpreter's new cats, extended over 40 bouts; another, about the dog John's family had owned previously, lasted 22 1/2 bouts. Both of these interactions ended only because John changed the topic.

### Kinds of Interactions

John was well-liked and it appeared that on the playground many children wanted to make contact with him, even though their contact may not have been appropriate. As shown in Table 4, a frequency count of the 90 interactions between John and hearing peers on the playground indicates that for 27 (almost one-third), social contact was the primary purpose. Social contact included such behaviours as pretending to throw a ball, physical contact in passing, pats on the head, "high fives," and handshakes.

Directives and closed questions (yes/no or single response questions) predominated throughout John's interactions with all his conversational partners. On the playground alone, more than one-third (39 of 98) of John's interactions involved directives, as shown in Table 4. Most of these directives involved only single gestures or Signs, meaning such things as "look at that," "go there," or "don't." In the classroom as well, many of John's interactions with other children were directives--other children telling him not to do something, where to go, or where to look. Some of the children attempted to comment upon an object by labelling it, or to ask John simple questions in Sign. The interpreter stated that John, although usually patient at attending to these classroom interactions, often responded in a non-committal manner, such as a quick nod or smile. He may have realized that the initiations themselves were not age-appropriate. For example, one day when John was coloring with a group of children, Teri and Christina stood up and moved closer to him to look at his picture. Teri signed and mouthed, "THAT-point LOOK GOOD...F-O-R YOUR MOM, DAD[?]" John nodded and Teri signed something unintelligible that included "MOM, DAD...(point)." John began to color again and she picked up his loop scissors. John looked up and pulled off the end cover of the scissors. Teri held the scissors up to Christina and made a face

Table 4

Kinds of Interactions between John and Hearing Partners on the Playground

Kinds	Frequency		
	Peers	Adults	Total
<b>Directives</b>			
Initiated by John	12	0	12
Initiated by hearing partner	24	3	27
<b>Total</b>	<b>36</b>	<b>3</b>	<b>39</b>
<b>Social contact</b>			
Initiated by John	10	0	10
Initiated by hearing partner	17	0	17
<b>Total</b>	<b>27</b>	<b>0</b>	<b>27</b>
<b>Questions</b>			
Initiated by John	1	3	4
Initiated by hearing partner	9	0	9
<b>Total</b>	<b>10</b>	<b>3</b>	<b>13</b>
<b>Comments</b>			
Initiated by John	1	2	3
Initiated by hearing partner	9	0	9
<b>Total</b>	<b>10</b>	<b>2</b>	<b>12</b>
<b>Other</b>			
Initiated by John	5	0	5
Initiated by hearing partner	2	0	2
<b>Total</b>	<b>7</b>	<b>0</b>	<b>7</b>
<b>Overall</b>	<b>90</b>	<b>8</b>	<b>98</b>

with big eyes, appearing to say "WOW." John looked up at her and then down again at his work. Teri then tapped him repeatedly until he finally looked up again. She pointed to his picture and then signed, "THAT-point SAY SNOW SHOE RABBIT." John again looked down at his work and returned to coloring. In this whole scenario, John barely acknowledged Teri's attempts at communication. Each time she signed, he nodded quickly and then turned back to his coloring.

John typically responded to other children's directives or questions with one Sign or gesture, without any elaboration which would continue the conversation. For example, in the cafeteria, Katlyn showed him her sandwich, he smiled and nodded; a few minutes later she pointed to his Ninja Turtle lunch bag, he smiled; a few minutes later she signed "GOOD," again he nodded. In no case did he pursue understanding of what she meant nor did he attempt to continue the conversation in any way.

Very few comments directed to John by peers or to peers by John are revealed in the data. As shown in Table 4, of the 90 playground interactions with peers, only ten were comments and included a "thumbs up," "WOW," "HAHA" and a gesture meaning "I'm better than you." Comments directed to John by peers in the classroom were primarily evaluative, such as "good."

Consistent with the pattern of the children's interactions with John, the classroom teacher's interactions with him involved many directives and closed questions. She seemed to use more directives and closed questions with him than she did with other students. For example, during a Math class about groups and sets in multiplication, the teacher erased the question from the board and readied the class for the next question. The interpreter asked the teacher to rewrite the first question ( $\underline{\quad} \times 5 = 15$ ) because John had not completed it. After she did so, the teacher looked at John and said, "Find this number, John." He responded, "TEN."

While the other children waited for the next question to be written on the board, the teacher herself coached John, her words signed by the interpreter:

Teacher: How many now?

John: (no response)

Teacher: How many in this set? (Then tells the other students to be quiet because they have started to talk to each other)

John: 5

Teacher: How many now?

John: 10

Teacher: Now look...How many in all?

John: 15

Teacher: Have you got 15?

John: (shrugs)

Teacher: What's this number?

John: (no response)

Teacher: How many should we have?

John: 15

Six bouts later, John finally answered that there were three groups.

In the above example of interaction between the teacher and John, she began with a directive and then used mostly closed questions to guide him. John's one word or one gesture responses to the teacher's closed questions were typical of his responses to much of what people said to him. The teacher's behaviour contrasts with her guidance of another student in which she used statements (e.g., "There're two things you know in this problem.") and open-ended questions (e.g., "How can you get 15 circles?").

The teacher seldom used open-ended questions during lessons themselves. Rather, she used them when the class was checking work which had

been completed independently, or when she was interacting with individual students. As a consequence, these kinds of questions were seldom interpreted for John because often he was still completing his work when the class was correcting. Also, his own correcting was slower than that of the other students because he had to look from the interpreter down to his paper and then up again. These problems prevented the interpreter from interpreting all of the question-response discussion and she often interpreted only the actual answers to the work. For example, during the group-check of a test in the nutrition booklet, the interpreter and John were several questions behind the class, and so she did not interpret many of the teacher's open-ended questions such as, "Why didn't you choose the granola bar?" During a Math lesson, the following teacher-student interaction is only briefly interpreted:

- Teacher: Why did you pick the 2 to come first?  
Katlyn: (response)  
Teacher: Why did you pick the 3 to be in the middle?  
Katlyn: (response)  
Teacher: The question is, "How many buttons?". What did you print for a sentence, Katlyn?  
Katlyn:  $2 \times 3 = 6$   
Teacher: The sentence, Katlyn. It says, "How many buttons?" What did you print for that?  
Katlyn: There are 6 buttons.  
Teacher: Anybody do it a different way?

John still was completing the question at the beginning of the teacher's interaction with Katlyn. When he finished, the interpreter signed only, "SHE-ASK-HER, KATLYN, JOT-DOWN WHAT FOR THAT-point? HOW MANY BUTTON? SHE (points to Katlyn) SAY 6." She interpreted neither the teacher's questions that

prodged the child's thinking, nor the teacher's request for different ways of completing the problem.

In her interview, the classroom teacher stated that she believed that she communicated well with John, especially through the interpreter, but also on her own. She talked, in the interview, about a conversation she had had with John just before Christmas. She described planning the Sign Language vocabulary she would need and asking the interpreter to teach it to her. She then planned a series of questions that she could ask John about Santa and the North Pole. Knowing the questions, she could predict his possible answers, thereby overcoming the likelihood of misunderstanding.

Closed questions and directives were used not only by the classroom teacher when she interacted with John, but by the teacher of the visually impaired and the interpreter during tutorials. A frequency count of John's interactions with the teacher of the visually impaired indicates that all but two of her turns were either directives or yes/no questions. During tutorials and potential independent work time, the interpreter monitored John closely. Often, she intervened to help him, using directives or questions, before he requested help. The result was a reduction in the amount of time he worked independently and an increase in the directiveness of the interpreter. For example, when tutoring him in Math, using a numberline, she watched his eye movement and noted that he was moving right to left on the numberline (subtraction) instead of right to left (addition). She asked him if the question was subtraction or addition before he made the mistake.

A few conversations that stand out because of their lack of directives and closed questions are apparent in the data. Cathy, the student with whom John engaged in the longest bouts and with whom he appeared greatly to enjoy interacting, used some comments, elaborations and open-ended questions during conversations. John contributed longer phrases and more information during

these conversations than he did with most other people at school. The following conversation is the most reciprocal of John's interactions with Cathy. Cathy introduced the topic of conversation and worked very hard to maintain understanding, and John attempted to elaborate on what she said.

Cathy: ME BRING ME BIKE TODAY  
John: WHAT?  
Cathy: ME BIKE HERE, HAVE HAND-BRAKES  
John: WHAT?  
Cathy: WHAT? HAND-BRAKES  
John: (nods) ME SAME  
Cathy: YOU? WHAT S-P-E-E-D YOU HAVE?  
John: 1 HAND-BRAKE, 1 HAVE  
Cathy: SO? ME HAVE 2  
John: NO  
Cathy : YES  
John: HAVE NEW? (makes face)  
Cathy: YES, NEW  
John: LIE  
Cathy: YES ME CHRISTMAS GET  
John: HAVE NEW BICYCLE YELLOW (makes "better than you" face)  
Cathy: HAVE BLUE, MINE BLUE  
John: BLUE BOY  
Cathy: NO BLUE, PINK  
John: WANT BIKE MAYBE SCHOOL TOMORROW  
Cathy: NO!

Although the conversation was initiated and controlled by Cathy, John contributed much more to it than was usual when interacting with anyone other

than his interpreter. Cathy's use of comments seemed to motivate him to contribute more and to initiate new information, thereby extending the conversation. As well, their history of understanding each other's Signs, as well as Cathy's ability to interpret his intentions most of the time, may have allowed them the freedom to engage in more reciprocal conversation than usual.

#### Means of Communication (Visual vs. Auditory Channels)

The children in John's class, the girls in particular, seemed to be very aware that John was not able to hear and could not speechread very well. They attempted to interact with him in Sign or Sign combined with gestures. Several of the girls, Rita and Katlyn in particular, were very aware that John would be left out if they used only their voices when he was present. Of the 31 game related interactions between hearing girls and John on the playground, 24 involved Sign or gesture and no voice; four were physical contact. The remaining three were voice interactions that occurred when girls called John's name--once to get his attention, and twice when he had intervened in a game without asking.

Occasionally, a child interpreted for John what was occurring in a game, conversation, or surrounding activity. For example, when John asked Katlyn to join a game of tag, Katlyn signed something unintelligible, spoke to another girl, and then walked away. Seeing John's confusion, Rita signed to him that Katlyn had said "no," that she had gone to help another girl do something. In the cafeteria, the girls occasionally attempted to explain events to him that were occurring in the auditory context, if these events were not within his visual field. For example, when John had his back to the rest of the cafeteria, a student told him that the garbage monitors were coming and, at another time, that the other tables were dismissed. However, when the cafeteria supervisor was speaking to individual students or making group announcements, only Cathy tried to explain to John what she was

overhearing. When the children turned toward a particular child to whom the cafeteria supervisor was speaking, John did not seem to attend.

Many of the girls in his class were so aware of John's need for Sign and his need to be included that they made a point of signing whenever he was around. The interpreter reported that she once overheard Rita say, "You have to sign, John is here." Interestingly, in the cafeteria at least, John did not appear to attend to Signed conversations occurring around him in which he was not involved. On one occasion, Rita and Cathy engaged in a Signed conversation about their lunches. John appeared to ignore this conversation until Cathy looked in her lunchbag, at which point he tried to grab her apple. There were at least three occurrences of groups of girls playing with John and using predominantly Sign and gestures. They used very little voice, even among themselves. It is noticeable, however, that there was little of the teasing or taunting that children often use when playing tag or catch (e.g., "Gotcha," "Haha, missed me."). The girls used Sign and gesture, but reduced their overall communication.

The interpreter was asked whether the amount of signing on the playground and in the cafeteria may have been an effect of the videotaping. She stated that she had often seen the girls use Sign and no voice among themselves when John was playing. She further reported that, although she had not often been in the cafeteria, it was not unusual for other students, girls in particular, to explain events to him that were not within his visual field but were occurring in the auditory context in the classroom.

In the cafeteria, although a few children attempted to sign to their neighbours when John was present, it appeared on the videotapes that the children next to John interacted less frequently overall with their hearing neighbours than did other children around them. Sufficient data do not exist to indicate whether this reduced interaction among John's hearing neighbours was

typical of those particular children or an effect of the videotaping. It is possible that, as had appeared on the playground, this pattern arose from a desire not to exclude John. However, the result was that the children who sat beside John often did not have the amount of interaction with others that one would have expected, given the level of interaction around them.

Many of the children seemed very aware that John's hand or body movements might be evidence of him communicating. There are several instances of children attending to another activity and turning to look at John when he moved his hands. After watching his movements briefly, they looked at his face, as if to make sure that he was not trying to tell them anything.

Unlike the girls, many of the boys appeared on the videotapes to have been either unaware of John's need for visual communication or unable or unwilling to meet these needs. The boys used more voice and less Sign or gesture when communicating with John than did the girls. Of the 22 game related interactions between hearing boys and John, only 12 of them included Sign or gesture. Matt, who had been John's classmate for three years, consistently came up very close to John's face and then used a very loud voice, occasionally combined with a few explicit gestures (e.g., "you, me, there"), to communicate game directions to John. John usually followed the directions that were gestured. When John misunderstood, Matt grabbed him and physically placed him or pushed him where he wanted John to stand.

Of the boys, only Jamie used primarily Sign or gestures when interacting with John during games. Jamie wanted very much to be friends with John and when John left the class for extra help in language and reading, Jamie often asked to go as well. The interpreter suggested that he had a great deal of empathy for John, perhaps because Jamie was not liked by many students and often was left out of activities. Jamie was seen a number of times on the videotape explaining to

John, in Sign and fingerspelling, what Matt or another boy had said in voice and gesture. Although Jamie knew a lot of individual Signs, he did not sign clearly and was not able to put the Signs together in meaningful phrases. He often signed very close to John's face and, on one videotape, he was seen walking backwards away from John while fingerspelling. Like many other students in his class, John avoided interactions with this child both on the playground and in the classroom and consistently ignored his Signing. However, the interpreter reported that during the spring John appeared to be more tolerant of Jamie and suggested that this may have been related to John's decreasing status in the class.

John chose to communicate primarily in Sign and gesture with some partners and orally with others. He most often used voice and gesture with boys, even though some were good Signers. With some of the girls, he used mostly Sign and, with others, mostly gesture. The interpreter stated that John often underestimated people's ability to understand Sign and often chose to gesture to those who could sign a little or chose to sign briefly and slowly to those who could sign well. In the case of Cathy, however, who used facial expressions and her body to complement her Signing in very appropriate ways, he signed almost as quickly as he did with his interpreter.

Although his classroom teacher was learning to sign, John preferred to gesture to her. For example, he would often hold up his pen, his homework or point to the pages in his book rather than sign to her. If the response was simple, the teacher responded directly to John. For example, he brought a colored pencil with a broken lead to the teacher to indicate that he wanted to sharpen it. She looked at it and said, "No," shaking her head. However, when a more complicated response was required, she explained it to the interpreter. For example, John took a homework paper to the teacher in order to ask how to do it. She took the paper

from him and walked over to the interpreter and explained to her what John was to do.

Only once was John seen to sign to the classroom teacher, using the interpreter as his voice, and this was done only at the prompting of the interpreter. On this occasion, the teacher responded directly to John with her voice, while the interpreter signed what she said. He did, however, know how to use the interpreter. He gave evidence of this knowledge when he used her appropriately during communication with the teacher of the visually impaired . When he was asked a question by the teacher of the visually impaired that required a linguistic response, he turned to the interpreter and signed his response to her, choosing, by himself, to use her as an interpreter, rather than relying on the teacher of the visually impaired to understand his voice.

John seemed to rely on gesture to communicate when people were looking at him and on his voice when they were not. He called people's names so that they would turn to make eye contact and he used short phrases such as, "Hey, what are you doing?" to communicate if they were not looking at him.

#### Being Excluded: Communication in the Auditory Channel

John's peers attempted to include him in their play and activities, but in spite of this he was excluded from their conversations much of the time. On the playground, the boys included John by giving him directions as to where to stand and to whom he should throw the ball, but he appeared quite isolated from the general banter of conversation among them. In one particular instance, Matt, Jamie, and John were playing "Monkey in the Middle" when Byron came up to Matt. Matt and Byron talked while John walked up. When John arrived, they stopped talking and went back to playing. Moments later, Matt walked over to Byron and they yelled at each other. John walked to where they were and, as he arrived, the

other two boys left and walked over to Jamie. John followed behind. A discussion between the three hearing boys ensued. Jamie pointed towards the school and the three hearing boys started to walk in that direction. John followed behind. Once at the school wall, they began to play Dodge Ball. Although John was a part of both games and was welcome to play, he was left out of the decisions they were making.

In the classroom, too, the children seemed to want to communicate with John and involve him in their activities, but he was unable to participate in the conversation that surrounded the activities. For example, when he finished his project, he was invited by Christina to color with her. He took his coloring and sat in the desk at Christina's left. By then, she had been joined by another girl who sat facing her. Moments later Teri joined the small group and sat at Christina's right. The three girls carried on a conversation while they colored. John stopped coloring occasionally and looked up at them. He did not attempt to join the conversation in any way or to begin a conversation with them. This scene continued for approximately seven minutes, interrupted only for a few seconds by Jamie who came up and interacted in Sign, mostly with Christina.

Even when the Sign Language interpreter was present and John was part of a group lesson, he was not always a part of what was conveyed through the auditory channel. The teacher helped the children prepare for transitions in activities by statements such as "OK, now get ready for a hard one" and "You've just got a couple of minutes left." These transitions were not interpreted for John, because communication required his visual attention, which his work also required. Therefore, the change from one activity to another often occurred abruptly for him. Because he did not benefit from the teacher's transition discourse, he appeared slower than other children to make the transition to the next activity.

Teacher-class interaction continued for the hearing children when the teacher was not teaching the group actively, but circulating, commenting, questioning, and probing the students. The students were able to overhear and benefit by the interactions that the teacher had with others. However, these teacher-student interactions were not interpreted for John. He only interacted with the teacher when she was speaking directly to him or addressing the whole group. Therefore, he was not able to glean ideas of how to proceed with problems from what she said to the other students; nor was he able to compare what he knew with what the other students knew or the difficulties they were having.

In addition, the interpreter was not always able to let John know the other students' answers to questions because she had to stay a sentence or two behind the teacher when interpreting group lessons, and sometimes had to pause in order to teach him a concept or vocabulary item during the lesson. Many times on the videotape, the teacher asked one student or the class in general, "How did you know that?" or "Why didn't you pick...?" The interpreter, doing her best to tutor John and to interpret the general content of the lesson, often gave John the answers to these questions. Therefore, he was never able to "hear" the other children's thinking. This contributed to his general lack of knowledge about the students. During her interview, the classroom teacher brought up, as a problem, her concern about John's lack of knowledge about how other children thought and the kinds of difficulties the other children had with their work.

John's lack of knowledge of other children was evident also to the interpreter when she interpreted for other children. She reported that John thought she was making fun of the hearing child when she would sign slowly or haltingly, interpreting in the manner that the child spoke. He was not aware that children did not talk as smoothly as adults and would not believe her when she tried to explain this to him.

Several times the interpreter reported that John also lacked knowledge about how children played games. For example, John knew that people cheated on board games because he was taught this by his parents, as well as by the teacher of the deaf and the interpreter. However, when the children played 7-UP in Sign Language Class, in contrast to the other children he seldom was able to identify the person who touched him. When questioned by the interpreter about this, it was discovered that he did not know that children cheated in 7-UP and was fascinated that they would want to do this. He told the interpreter that it wouldn't be any fun to guess who touched you if you cheated.

During her interview, the interpreter alluded again to John's lack of knowledge about how things worked or how people thought, saying that she did not believe that John knew that all games had rules. She suggested that he may not have understood that there were specific rules for baseball, basketball, hockey, or "Monkey in the Middle" and that this may have contributed to his occasional difficulties playing with children. An excellent example of one of these difficulties is revealed in one of the home-school communication books. Usually when John hit the ball in baseball, the boys allowed him to run around the diamond back to home base, calling it a "home run." Jamie reported that they often let him play by his "rules." One day, the boys decided he should play by the proper rules:

"John hit a ball, he should have stopped at 2nd, the play was over but John kept going to home. All of the children tried to explain to John but he didn't understand. Jamie physically tried to move him back to the base. None of the kids knew that John was upset. The 2nd time he went up to bat the bell rang. John did not understand what happened, why he did not get a turn. Seems to me the problem is communication between him and other children. John thinks the kids are being mean to him." (interpreter's entry,

March 31, 1993)

John was so upset by this incident that he complained of leg pains until, finally, he was allowed to go home and he did not want to return the next day. Wanting to miss school was unheard of for him. At home, he told his mother that "he hit a homerun but that Jamie said he didn't" (parent's entry, March 30, 1993). Children's games are often created in the playing, rules of sports are talked about during play, and misunderstandings are cleared up by talking. John's peers did not know enough Sign language to explain rules and misunderstandings about rules to him.

#### The Importance of Context for Understanding

The topics of conversation between John and his hearing peers were limited very much by the hearing children's miming ability, the Signs that they knew, and the Signs that John thought they knew. Therefore, their conversations were limited usually to present objects or events so that the context of their remarks was transparent. In the cafeteria, food was the predominant topic of conversation; on the playground, it was the game they were playing; in the classroom, with peers, it was the animals on the video or the coloring they were doing. Everyone used a lot of gestures in these interactions, pointing to the object, nodding, smiling, and occasionally using single Signs or short Signed phrases. For example, John's neighbour got his attention and then they conversed about their juice boxes:

Barbara: (points to the number on the bottom of her juice box)

John: (nods, picks up his juice box and looks at the bottom) FOUR

Barbara: (smiles, nods)

Because they relied on contextual clues, John and his hearing peers were able to understand each other even though they used telegraphic messages. Usually others initiated the interactions, and John responded with only one Sign or gesture. However, even when John introduced the topic, peers often responded

with only one Sign or gesture. Directives and labels for present objects and events seemed most readily understood. More complicated messages, such as asking for favors or identifying preferences, proved more difficult because the larger context of the message was not easily identified. In these situations, John and his partners had to work very hard to understand what the other was trying to express--John because the partner knew a limited number of Signs and his partner because John tended to use single words to connote entire meanings. For example, at the beginning of the lunch period, John showed Katlyn the plastic wrap from his straw:

John: GARBAGE

Katlyn: (makes a questioning face, then pushes up her sleeve)

John: GARBAGE

Katlyn: (makes a questioning face)

John: GARBAGE, Garbage.

Katlyn: (nods, starts to put up hand) YOU?

John: ME

Katlyn: (puts up hand)

(John wanted Katlyn to ask the cafeteria supervisor if he could take the garbage around at the end of lunch period.) In order to understand what John wanted, Katlyn had to guess from his voice and Sign what word he was saying (i.e., he was not telling her to push up her sleeve), and then use the larger context to understand what he meant--the cafeteria rules meant that he couldn't be asking to put his plastic in the garbage right now; therefore, what else could he mean? From previous experience, she may have known that he liked to be a garbage monitor and this may have helped her to understand. However, without the context of being in the cafeteria, and without background knowledge, the communication would likely have failed.

During their interviews, both the interpreter and the classroom teacher noted John's ability to communicate with others who could not sign. The teacher, in particular, mentioned that she had sat beside John, working with him to color a picture and they had communicated well, although neither had signed at all. She said that he knew what she meant without her having to sign anything, as if he "had ESP." He appeared to be an adept user of context for understanding other people's communication. There is at least one instance of John overusing the context and therefore miscommunicating. In that situation, he was coloring at a desk with three girls when Jamie came up. John, probably using his background knowledge that Jamie always wanted to work with him and that he was coloring, indicated to Jamie to sit beside him and color. On this occasion, however, Jamie simply signed to the girl next to John and did not even want to communicate with him.

#### The Role of Background Knowledge in Mutual Understanding

Several of the videotaped interactions between John and Cathy were qualitatively different from those between him and other children. John and Cathy knew each other quite well from past years and from out-of-school time. John seemed to use more multi-Sign phrases with Cathy and signed at a faster rate than with other students. Although John and Cathy talked mostly about present events and objects, they also used their knowledge of each other to have a few brief conversations about family, bicycles and sports. For example:

Cathy: MY DAD BASEBALL H-O-C-K

John: HOCKEY

Cathy: HOCKEY. YES. MY DAD

John: WIN?

Cathy: YES, ALL HAVE T-R-O-F-Y, KNOW?

John: (nods, glances away then looks back) YOU WATCH?

Their background knowledge of each other was essential to the maintenance of this conversation about an absent event. Cathy could not remember the Sign for hockey and was able to use the strategy of signing "baseball" and then fingerspelling "hockey" to ask John to tell her the Sign. He was able to understand this only because he had seen her father playing hockey. They were able to maintain a degree of understanding because of this background knowledge. It is unlikely that John understood the fingerspelled "trofy" but, again, because he knew that she probably was interested in talking about the game, he was able to continue, asking a question after a pause.

However, even Cathy and John were not able to carry on conversations about absent objects without background knowledge. Cathy attempted to tell him about getting her ears pierced and about her rollerblades, but the conversations each lasted only 1 1/2 bouts.

Cathy: GET 2 EAR 2 (mimes one piercing in each ear)

John: MOM?

Cathy: NO. LITTLE H-O-L-E-R-Y KNOW? HAVE 2 EAR (mimes piercing) SHE 3 LITTLE (looks away)

John: (looks down at lunch)

Cathy: MAYBE HAVE ME SISTER HAVE R-O-L-L-E-R-B-L-A-D-E-S  
TOMORROW

John: YOU?

Cathy: NO, MY SISTER, SISTER "H" (looks around and points behind her)

John: (looked down at his lunch as soon as the eye contact was lost)

The pattern of these conversations was similar to that between John and other children: one child initiated a topic, the other child nodded or asked a one-Sign question, the first child responded and then one of the children looked away, ending a conversation that was not progressing well.

John's interactions with non-Signing, hearing adults also relied on mime and background knowledge. Once, when he was slow to leave the cafeteria, he held up his cookies to show the cafeteria monitor that he was still eating. She walked to his table, put the cookies in his bag and mimed that he was to zip it up and leave. On another day on the playground, he was misbehaving by standing up on the slide. The playground supervisor mimed that he was to sit down, then pointed to his shoes, put her flat hand on the slide and moved it down the slide. In both these situations, John and the hearing adult communicated reasonably effectively, but would not have been able to do so without the background knowledge of the school rules.

The interpreter stated in her interview that although she and John communicated very well, the information she obtained through the home-school communication book was essential to her understanding. John often communicated in telegraphic messages or had an incomplete understanding of a concept and, therefore, could not express fully what he meant. This background information from the home-school communication book allowed her to ask him questions so that they could both understand more fully. For example, in the fall, he told her "DADDY HOUSE." Having read the home-school communication book, she knew that he meant that his father had come home from hunting. After Christmas, John told her that he had received a boy doll with a baby in its stomach. Through the communication book, the interpreter asked the parents what he meant and discovered that that he had received "a small treasure troll doll that [had] a

jewel in it's tummy" (parent's entry, January 5, 1993). The interpreter was then able to increase John's understanding and vocabulary knowledge.

The interpreter also used her background knowledge of John's life to create a bridge between his present knowledge and the new concepts they were learning in class. For example, during a lesson about nutrients in food, the interpreter used the concept of taking pills to stay healthy, which John was doing, to help him to understand the idea of iron supplements.

#### The Role of Redundant Information for Mutual Understanding

Most of John's hearing partners had been taught to use Sign without simultaneous voice. Their ability to provide sequential linguistic and gestural redundant information was evident on the videotapes. For example, Rita touched John to get his attention, pointed to the video and then signed, "BEAR." However, to obtain all the redundant information, John had to look back and forth from the video to Rita. The interpreter, also, was very aware of John's need to connect the Signs with the object about which they were communicating. When combining gesture and Sign, she gave him time to look toward where she was gesturing and return to her before she continued to sign. In addition, she was skilled at using small Signs in order to sign on the object about which she was communicating. For example, when tutoring John about sets and groups in multiplication, she signed the first equation on his paper, indicating exactly how to write the equation. She then asked him how he should begin, again by signing just above the paper, and then pointing to the paper to aid his understanding. In these instances John did not have to look back and forth as the linguistic communication was embedded in its context.

### The Use of Eye Contact

Eye contact seemed to play a key role in all of John's interactions. The hearing children appeared to be very aware of John's need for eye contact and there are few examples of children signing when John was not attending. There also appears to have been a compelling urge to communicate when John and a person made eye contact. Sometimes eye contact resulted in reciprocal smiles but, more often, one child would point to or hold up an object, initiating an interaction beyond the eye contact itself. The students and John broke eye contact when they did not understand what was being communicated, as occurred in the previous examples of Cathy and John attempting to converse about pierced ears or rollerblades. If the hearing child was distracted and broke eye contact, John appeared to assume that the interaction had ended. Occasionally, John would glance away and then look back to continue the topic, as he did when Cathy fingerspelled "trophy." More often, however, when one child broke eye contact, the interaction would end and another would not begin for several minutes.

John's classmates made sure that they had his visual attention before beginning to communicate with him. The few examples of children signing when he was not looking occurred mostly with children who were not in his class. In all of these cases, the children had begun to sign when John was watching, but continued after he had looked away.

Eye contact also appears to have played a major role in determining the true participants in an interaction. For example, the class was expected to watch the teacher during group lessons and when she was speaking to one student, the teacher made eye contact with that student. Because of the mediation of language through the interpreter, this did not always occur with John. During class lessons, John made eye contact with the interpreter, seldom with the teacher. John and the teacher interacted only when they made eye contact with one another, and without

it they interacted through the interpreter. The one time in the videotapes that John was prompted to use the interpreter to ask a question of the teacher, he made eye contact with the teacher and signed directly to her while the interpreter voiced his question. The teacher in turn spoke directly to John, who watched her face and then, when she was finished, turned to the interpreter for the Signed interpretation. During her interview, the teacher reiterated the importance of eye contact in her communication with John. She stated that John had made no eye contact with her at the beginning of the school year. Finally, a situation was staged in which he had to interact directly with her because the interpreter was not in the room. After that, he made more eye contact with the teacher than he had previously.

The same pattern of eye contact dictating who was really interacting was very evident when John worked with the teacher of the visually impaired . This particular teacher was very conscientious about looking at John when she spoke and then pausing while John watched the interpretation. Whenever she did this, John always replied directly to her, usually by gesturing or through facial expression. He only replied to the interpreter, instead of the teacher of the visually impaired , when the answer required a Signed response. Occasionally, however, the teacher of the visually impaired made eye contact with the interpreter and began to tell her what to say to John. When this occurred, John seemed very confused and looked from one to the other and then at the researcher. On these occasions, the teacher of the visually impaired would notice his confusion, touch his arm, apologize to him and begin to speak directly to him once more.

### Repair and Avoidance of Communication Breakdowns

Although John and his hearing partners talked mostly about present objects and events, many communication breakdowns are evident in the videotaped data. Some breakdowns were caused by either John or his peers not understanding the partner's Signs; others were caused by an inability to express intent or to understand the partner's intent. For example, Teri pointed to her grilled cheese sandwich and initiated a conversation about it:

Teri: YOU LIKE LIKE LIKE (point)

John: WHAT?

Teri: YOU LIKE (point)

John: WHAT?

Teri: YOU LIKE (point)

John: NO...YES

Teri: WHAT?

John: YES

At this point, Teri turned away from the conversation but John continued to watch her, perhaps waiting for her to continue or offer him the sandwich. Although they both knew the object about which they were talking, the intent was not expressed, and so the communication broke down. Neither attempted to repair it; perhaps neither knew how to repair it.

Although it is apparent in the data that conversations broke down consistently, John often did not indicate that he did not understand what had been communicated. He often smiled or nodded and then looked away quickly when he did not understand other children. He seldom asked what was meant. The interpreter reported that she thought John pursued understanding only when he really liked the person and was interested in what that peer was saying or in continuing the interaction. This suggestion is corroborated on the videotapes by

John's use of "WHAT" with the two girls he considered girlfriends and few others. In contrast, his peers usually pursued understanding--often by signing "WHAT" or making a face. Unfortunately, even when one partner signed "WHAT," the conversations often were left unrepaired.

During her interview, the interpreter stated that she had attempted to teach John to nod when he was following a conversation but that he seldom did this. She said that she relied on his blank face to indicate that he did not understand the vocabulary or concept. In this regard, she also used her own understanding of his knowledge base. For example, in a lesson about nutrition, the interpreter asked him which picture was a "W-A-F-F-L-E." He looked down at his paper but did not respond. She finally asked him if he understood the fingerspelling--"W-A-F-F-L-E." He then shook his head.

Unlike John's hearing peers, the interpreter was fluent enough in Sign to be able to use the language flexibly in order to repair breakdowns. For example, before watching a video, the interpreter asked John if he wanted her to interpret it simultaneously or if he wanted to watch it first, and then talk about it later with her. (John had difficulty watching both the video and interpretation at the same time.) She began by asking him this question with two options using placement and classifiers. When he didn't understand, she kept the two options but dropped the classifier and clarified the language. He still didn't understand, and so she asked him a single yes/no question.

Interpreter: MRS. A. SAY STAND GIRL, BOY. THERE GO. MOVIE WILL  
HAVE ABOUT BEAR. WANT ME INTERPRET (1 classifier to  
left indicating person standing to left of T.V.), (moves body to  
right) OR NO. IF FIRST WATCH, ME TALK LATER ABOUT  
THAT-point. WHICH?

John: (no response)

Interpreter: UNDERSTAND?

John: (shakes head)

Interpreter: ME ASK-YOU I-F WATCH-WATCH VIDEOTAPE ABOUT BEAR  
WATCH-WATCH, (moves body to left) WANT INTERPRET ME  
SAME TIME OR LATER INTERPRET FOR YOU?

John: (no response)

Interpreter: MUST HURRY DECIDE.

John: NO.

Interpreter: NO WHAT?

John: VIDEOTAPE (uses different Sign than interpreter).

Interpreter: PEOPLE?

John: NO VIDEOTAPE ME. DON'T-KNOW (2-handed).

Interpreter: WANT WATCH FIRST YOURSELF?

John: (misunderstands) NO.

Interpreter: MUST SEE IT-point MUST. ME ASK-YOU IF WANT ME  
INTERPRET SAME TIME?

John: (nods)

Interpreter: YES? SAME TIME INTERPRET?

John: (nods)

Interpreter: GO SIT THERE

The girls, in particular, repaired by guessing what John meant, given the context. For example, after showing Christina his coloring, John asked on whose chair he was about to sit, and who had been sitting on the other side of Christina:

John: WHO?

Christina: ANNA

John: (points to chair he is about to sit on)

Christina: YES

John: SIT TERI? (points to chair on Christina's right)

Christina: WHAT?

John: TERI SIT? (points again to chair on Christina's right)

Christina: TERI SIT (points to chair on her right and then gets up and walks to Anna at back of room...returns a few moments later)

ANNA SAY YOU SIT (points to chair on her left)

It is likely that Christina's only means of repairing this communication breakdown was to use the context of the interaction and guess what John meant. Although a good Signer, she probably did not know enough Signs to negotiate the meaning with John.

When hearing people indicated to John that they did not understand, his primary means of repair was to repeat his Signs exactly, or if his Signs or gestures were not understood, to add his voice. However, this was not always a reliable strategy because his oral vocabulary was small and his voice was unintelligible. If the partner still did not understand, he said the word louder and louder. For example, he used this strategy when talking with the interpreter about the dog that his family had owned previously. The interpreter asked him if he sometimes went in the car to visit his dog. Instead of answering the question, John signed "BEN MISS MOM" (Ben missed his mom). The interpreter did not understand and he repeated the Sign, "MISS," and then added voice. When she still did not understand, he said the word louder and then louder still. Finally the interpreter looked at the teacher of the deaf who was videotaping and the teacher of the deaf told her that the word/Sign was "MISS." Had the teacher of the deaf not been able to understand, this breakdown might have not been repaired at all because John's statement was not related to the question asked and therefore the interpreter could not use context to help her understand.

On one occasion, John was seen to change the order of his Signs to a more English order. However, this may have been coincidental. There is no evidence of him using different Signs or more Signs to negotiate meaning.

When the hearing students noticed that John had not understood them, they usually attempted to repair communication by adding more gestures or by adding physical communication when possible. For example, when John did not understand what Matt had voiced, Matt pushed John to where he was to stand.

It is possible that many potential communication breakdowns were avoided because the hearing partners chose not to engage in communication when they thought they could not communicate. John used this avoidance to his advantage and was seen to break many of the playground rules within view of both the student monitor and adult supervisor. He was seldom disciplined. On the first video, both of these people walked by John several times when he was going down the slide standing up. The student monitor finally came to the teacher of the deaf, who was videotaping, and said, "He shouldn't be doing that." The teacher of the deaf suggested that he tell John to stop. The student monitor walked away. Later, the adult supervisor told the teacher of the deaf that John should not be standing up on the slide. The teacher of the deaf suggested that she tell John to sit down. The adult supervisor then went to John and mimed that he should sit to go down the slide, watched him do it properly one time and then nodded her head, indicating that he had done it correctly. After lunch break in the line-up, the adult supervisor told the students to get into a straight line, inside of the poles, and to be quiet. John continued to stand where he was and to throw his ball in the air. The adult supervisor ignored his behaviour, perhaps because she did not believe she would be understood. On the other hand, when encouraged, she was able to use mime to communicate effectively with him.

Hearing children, especially those who were in John's class and knew some Sign, may not have avoided interaction, but they often seemed to have to think about how they would explain something, and whether they could sign it. There were several instances where Anna, in particular, acted as though she had something to communicate, stopped and looked around, puzzled. Once, she pulled John to where she wanted him to stand and indicated that he should stay there. By doing this she avoided the potential communication breakdown that would have occurred with the use of language.

Another time in the classroom, Anna had been asked by the teacher to help the other children punch holes in their project booklets and tie them together. This activity, unfortunately, took place out of clear videotaping range, and so some of what occurred is unclear. However, it appears that Anna helped John constantly, whereas she explained to the other children what they were to do and then they continued by themselves. On two occasions, Anna started to explain to John how to do something and stopped. The first time, the interpreter was nearby and Anna asked her to tell John to make three holes in his booklet. The second time, she signed to him and he indicated something on the booklet. She signed "NO"; he signed "YES." Anna appeared not to know how to deal with this obvious misunderstanding and she looked around, seemingly for help. She finally signed, "ME C-A-N. YOU A-S-K (girl's name Sign), (point to side of booklet), OK?" She looked around and John moved off to find the girl she had suggested.

In the above interaction, Anna realized that she was unable to explain to John how to complete the activity. She did not have sufficient Sign to explain what he had to do, nor could she think of another strategy to explain without misunderstanding. Therefore, she used other strategies in an effort to avoid the potential communication breakdown. The interpreter reported that the hearing students sometimes came to get her, both in and out of the classroom, if they were

having difficulty making John understand something that was important, or if they felt they did not have enough Sign to explain something.

### Unexpected Findings

The collection of data on videotape allowed unexpected findings to emerge. Patterns and issues that were not the focus of the original observations became apparent when the videotapes were replayed. Reviewing the videotapes allowed the researcher to focus on both the spoken and Signed utterances and to compare them, when appropriate. It also allowed the researcher to attend to voices in the background and to compare John's behaviour and responses with those of the hearing students.

Specific patterns and problems arose in the classroom setting because teacher-class discourse was mediated for John through the interpreter. His participation in class was different when the class was taught orally and interpreted for him than when it was taught in Sign. The only time that John was able to take part directly in a group lesson was during Sign Language class, which was taught entirely in Sign with little or no voice.

### Participation in Interpreted Group Lessons

Although one of the roles of the interpreter was to facilitate John's participation in group lessons and interaction with the teacher, the data are suggestive that the result was often less than ideal. In order to understand fully the teacher's message before interpreting it, the interpreter usually stayed several sentences behind her. This amount of interpreter lag affected John's participation in class and his interaction with the teacher during group lessons. For example, he raised his hand to respond to a question in Math at the same time that another student responded incorrectly. He had just raised his hand when the teacher

asked the children to put up their hands if they agreed with this student. John's hand was still up, and so he appeared to be agreeing with the incorrect answer, rather than simply responding to the question.

Because John regularly raised his hand after questions had already been answered by other children, he was seldom called on by the teacher to answer questions. In addition, he often directed his response to the interpreter rather than raising his hand. Therefore, much interaction with the teacher was precluded because she was less able to monitor his understanding while monitoring the understanding of the hearing students.

Interpreter lag also contributed to John's overall slowness in class. The data are indicative that he repeatedly received the first instruction of a lesson moments after other children and, therefore, still was getting his materials ready when the other children were hearing the second instruction. The cumulative effect was that he was usually the last to finish his work or to move to the next activity area. It may be that this appearance of slowness caused at least one of his peers to believe that he was slow to understand some things.

The presence of the interpreter in the classroom changed the dynamics of the teacher-John interaction. The teacher stated on a number of occasions that she would not have been able to teach John without the interpreter. However, the interpreter also affected her ability to monitor John's moment-by-moment understanding of the lesson because he was always responding to what had occurred several sentences previously. The classroom teacher stated that she relied heavily on the interpreter to monitor John's understanding, because she herself could not, and to explain work to him because she often felt unable to do this. The teacher allowed the interpreter the freedom to decide that John was not following a lesson and to make immediate modifications. The teacher attempted to

monitor this by watching the work John was doing and waiting for indications from the interpreter that John was not following the lesson or that it had been modified.

The teacher's group lessons were directed at John, as well as at the other students. However, because the lesson was mediated by the interpreter, the interaction appeared to be more between the interpreter and John than between the teacher and John. The interpreter tried to help John interact with the teacher during group lessons by changing her body language. When she was tutoring John, she moved close to him and often knelt at his desk. When she was interpreting, she moved back, closer to the teacher, and often looked at the teacher. However, John appeared to see his interaction as being with the interpreter most of the time. There are a number of examples of him giving an answer to the interpreter rather than raising his hand. In fact, on one occasion, when the teacher had asked the class, "How do you write this equation?" and other children responded by raising their hands, John signed to the interpreter, "YOU KNOW."

Overall, there was a difference in the amount of adult-directed time experienced by John and by the other members of the class. Because the interpreter often had to stop and tutor John in unfamiliar concepts or vocabulary, he participated in fewer minutes of teacher-directed lessons than did his hearing peers. On the videotaped data, only approximately 70% of the teacher-directed lesson time was interpreted for John. On the other hand, he worked independently or with neighbours for much less time than his peers did; sometimes up to 50% of his potential independent work time was used in tutorials with his interpreter. This increased amount of interaction with his interpreter may have reduced the amount of potential interaction with his peers. However, the increased interaction with his interpreter and reduced participation in teacher-directed discourse meant that although he was receiving more individual help, it was not from a person trained as a teacher. The interactions between the interpreter and John may not have been

as beneficial to his overall learning as interactions with a trained teacher might have been.

### Sign Language Class

The data from Sign Language Class appear to be in contrast to those collected during other subject areas. The class was taught by the interpreter in silence, with only Sign or gesture allowed. She reported that John was a fully participating member of Sign Language Class and this was indeed evident on the videotape. The interpreter also reported that in Sign Language Class other students asked to be John's partner. Sign Language was the only class in which John consistently raised his hand to answer or ask questions and was ready to work at the same time as the others. He was seen to respond to class-directed questions more quickly than many of the other students. During Sign Language Class he was able to participate fully and still had time to look around to see which children did not answer or responded incorrectly.

### Summary

The present case study was undertaken in an attempt to describe the semiotic mediational processes used between a deaf child of hearing parents and the hearing teachers and classmates who surrounded him. A number of patterns of interaction emerged from the 9 hours of videotaped data. These patterns related to 1) the frequency and amount of interaction with hearing partners, 2) the kinds of interactions that occurred, 3) the means of communication, 4) the importance of context for understanding, 5) the use of eye contact, and 6) the repair and avoidance of communication breakdown. There were also unexpected findings connected to the deaf student's participation in teacher-directed group discourse.

It was found that the deaf student interacted primarily with his hearing peers, mostly girls, in the cafeteria and on the playground, and with adults in the classroom. In the cafeteria and on the playground, he spent much of the time either not interacting or playing games that required a minimum of language. Only with a few, particularly good student Signers, did the deaf student interact for more than two conversational bouts. In the classroom, he spent much of his time interacting with his interpreter and had less independent work time than did his hearing classmates. The deaf student initiated less than one third of the interactions that occurred between him and his hearing peers.

Directives and closed questions accounted for most of the interactions, both those initiated by the hearing partners and by the deaf student. The classroom teacher, the interpreter, and the teacher of the visually impaired also interacted with the deaf student using a preponderance of directives or closed questions. The interpreter occasionally omitted the teacher's open-ended questions while she interpreted. The deaf student typically responded to the directives or questions of others with only one Sign or gesture. However, one student, who was a skilled Signer, used comments and open-ended questions during a conversation with the deaf student. This conversation proved more reciprocal than most in which he participated and he contributed more to it than he usually did.

Many of the hearing girls in the deaf student's class appeared to be very aware of the need to use the visual modality when communicating with their deaf peer. They were seen trying to interpret for him occasionally, and sometimes tried to use Signs among themselves when he was present. The deaf student often used gesture and single Signs or short phrases with the girls. Communication between the deaf student and most of the boys, on the other hand, tended to occur orally, explicit gestures being used when possible.

However, although the students attempted to use Signs and a Sign Language interpreter was available in the classroom, the deaf student was excluded from much of the cafeteria, playground, and classroom interaction. The deaf student's hearing peers were not able to sign well enough to involve him fully in all of their conversations or decisions. Likewise, much of the teacher's informal comments and instructions were not interpreted, nor were many of the other students' comments or responses during lessons.

The topics of conversation between the deaf student and his peers who signed minimally were limited to present objects and events, context being essential to their mutual understanding because of their limited mutual linguistic understanding. Those partners who knew the deaf student more fully than the others were able to communicate with him using their background knowledge as a base of understanding. Even the interpreter relied on her background knowledge of the deaf student because of his use of telegraphic messages.

It appears that eye contact played a major role in beginning and ending conversations, as well as in the determination of the primary communicating partners. There seemed to be a compelling urge to communicate when the deaf student and another person made eye contact. When misunderstanding occurred, eye contact was often broken immediately. During communication that involved an interpreter, it was found that the two parties communicated directly only if they made eye contact. If they both looked at the interpreter when speaking/signing, they then used phrases such as "tell him," indicating that they were speaking to the interpreter, not to the other party.

Neither the deaf student nor his conversational partners, with the exception of the interpreter, seemed to have many strategies to express or repair communication breakdowns. The deaf student seldom expressed a lack of understanding. When he did, he usually signed "WHAT." This was the strategy

used by most of his hearing partners as well. The deaf student's primary means of helping his partner to understand was to add his voice to his signing or gestures. His hearing partners used physical directives and clues when possible, occasionally asking the interpreter to intervene.

An unexpected finding relating to the use of a Sign Language interpreter in the classroom was evident in the videotaped data. The mediation of teacher discourse through the interpreter affected the ability of the teacher to monitor the understanding of the deaf student during class lessons. In addition, interpreter lag time appeared to inhibit the student's ability to respond to, or respond appropriately to, class-directed questions. These two factors seem to have contributed to the teacher-class discourse often becoming interpreter-deaf student discourse, thereby reducing the amount of time the deaf student was able to benefit from a teacher's instruction. The only time when this pattern was not consistently apparent was during Sign Language Class, which was taught entirely in Sign, with no voice allowed.

## CHAPTER V: DISCUSSION AND RECOMMENDATIONS

From the Vygotskian perspective, knowledge of one's cultural norms and processes are acquired incrementally during social interaction with others who are more knowledgeable in the culture (Vygotsky, 1978, 1987). Semiotic mediation appears to be the process through which intersubjectivity and a shared situation definition are achieved, allowing cultural transmission to occur (Wertsch, 1984). The present research was undertaken in order to examine more fully the nature and quality of the social interactions experienced by a fully integrated deaf child of hearing parents (dchp) in the school setting. A case study design was used in an attempt to delineate some of the specific conditions which may inhibit or promote the reciprocity necessary in social interactions for cultural transmission.

Three questions guided the analysis of the data:

- (1) With whom do fully integrated deaf children of hearing parents interact in the school setting?
- (2) What forms of semiotic mediation occur between deaf children and their hearing partners as they attempt to create a shared situation definition?
- (3) What is the nature of the individual case study in the educational context and in what ways may it be used as a prescriptive tool for teachers of integrated deaf students?

These research questions were found to be very complex and interrelated. In the following section, the findings related to each of the research questions will be addressed, followed by findings that were unexpected, but, nevertheless, related to the purpose of the research. In subsequent sections, the instructional usefulness of the case study design will be discussed and recommendations arising from the present research will be presented.

Question 1:

With Whom do Fully Integrated Deaf Children of Hearing Parents Interact  
in the School Setting?

Whereas previous related research has examined, primarily, the interactions of groups of deaf children who are integrated among hearing peers, the aim of the present research was to examine the interactions of a single deaf child who was isolated from deaf peers and adults in his school and his community. The partners who were available to this child were further limited by the instructional and social settings in the school. For example, adults were seldom available in the cafeteria or on the playground as potential partners for communication and, therefore, he interacted primarily with hearing peers in these settings. However, when a hearing adult who was able to sign was available, he appeared to prefer interaction with her to interaction with his peers. In the classroom, where adults were available, he interacted little with peers. On two afternoons, in fact, he did not interact with them at all.

Even on the playground and in the cafeteria, less interaction seemed to occur between the deaf child and his hearing peers than among his peers themselves. In these settings, he spent much of his time alone or engaged in single-bout interactions, often using non-linguistic communication (e.g., mime, gesture). The deaf child preferred to interact with girls rather than boys. The girls were more proficient communicators and appeared more successful in including the deaf child. The preference for interaction with girls has been documented previously in extracts from the home-school journal of another isolated deaf child ("Mainstreaming," 1993).

In the classroom, the deaf child interacted very little with his peers or with the classroom teacher. He communicated most frequently and at most length with his

Sign Language interpreter. Because the interpreter frequently found it necessary to stop interpreting teacher-directed lessons in order to tutor the deaf child in concepts and vocabulary, the actual time he experienced teacher-directed lessons was less than that experienced by the hearing children in the class. The deaf child was frequently tutored by the interpreter during independent work time as well; the cumulative effect being that the deaf child spent almost as much time interacting individually with his interpreter as he did being taught by the teacher in group lessons.

The above findings are similar to previous research showing that deaf children interacted more frequently with adults in the classroom than with peers (e.g., Antia, 1982; McCauley, Bruininks, & Kennedy, 1976). However, in past research, the adults with whom deaf children interacted most frequently were teachers. In the present study, the deaf child interacted most frequently with his Sign Language interpreter. The amount of classroom interaction between deaf children and their interpreters has not been documented, reflecting the lack of research into fully integrated deaf children who sign.

In the present study, the hearing children initiated more than two-thirds of their interactions with the deaf child. In the regular classroom setting, the interpreter initiated over two-thirds of her interactions with the deaf child. However, during a conversation following a tutorial session in another room, the deaf child initiated half of the topics. In her interview, the interpreter acknowledged that the deaf child interacted more frequently with her than with others in the classroom and that, in the classroom setting, she initiated most of the topics. However, she stated strongly that this occurred only in the instructional setting.

The findings of the present study are also congruent with and extend the previous findings relating to preschoolers (e.g., Arnold & Tremblay, 1979; Higginbotham & Baker, 1981; Vandell & George, 1981). These researchers found

that deaf preschoolers spent significantly less time in interaction and more in solitary play than did the normally hearing children of the same age with whom they were compared. Vandell and George also documented the brevity of interactions between deaf and normally hearing children, findings that correspond to those of the present study.

The deaf child in the present study seldom ignored the initiation attempts of his hearing peers. Initiations that he did ignore usually involved social contact that was not appropriate given his age. Likewise, the hearing children ignored very few of the deaf child's age-appropriate initiations. The hearing children, especially those in his class, seemed adept at recognizing his initiation attempts, both vocal and gestural. In addition, they tried to use interaction strategies that met his need for visual communication. These findings contrast with those of Vandell and George (1981), who found that for almost one-third of deaf preschoolers, initiation attempts were rejected by hearing partners and that the hearing partners did not vary their interaction strategies to meet the needs of the deaf children. However, the present findings are congruent with the work of Lederberg, Ryan, and Robbins (1986). These researchers suggest that hearing children interact more successfully with familiar deaf children than with unfamiliar deaf children. The deaf child in the present study was quite familiar to most of the hearing children at his school; they recognized his initiations and attempted to vary their interaction strategies to meet his needs.

Question 2:  
What Forms of Semiotic Mediation Occur between Deaf Children  
and their Hearing Partners?

The overall lack of sophisticated mediation in a modality accessible to the deaf child was the most striking feature of the semiotic mediation between this deaf child and his hearing partners . Vygotsky (1978) considered language to be primary among the intellectual tools of mediation, the one most able to build the necessary bridges between the known and the new. In the present study, consistent linguistic semiotic mediation was available to and used by the deaf child only through or with the interpreter.

Contextualization of Semiotic Mediation

Most of the hearing partners with whom the deaf child communicated in the school setting knew a limited number of Signs or no Signs at all. Therefore, the most common means of mediation experienced and used by the deaf child was non-linguistic, such as pointing, gestures, and mime. The deaf child and his hearing partner sometimes used single Signs, but these Signs were seldom embedded in meaningful linguistic structures. The interactions between the deaf child and his hearing partners were found to be highly contextualized in order to create a shared situation definition and achieve intersubjectivity without linguistic tools. Generally, the topics of conversation were limited to present objects and events or topics for which both partners had a great deal of background knowledge. The interactions were very brief, one or two bouts, and seldom elaborated.

This type of non-linguistic interaction is similar to that found between caregivers and infants, where the creation of a shared situation definition requires

only that gestures be linked to the context (Bouvet, 1990; Wells, 1986). The findings from the present case study corroborate those of Lederberg, Ryan, and Robbins (1986) regarding the predominance of object-related behaviour between deaf-hearing playmates and the importance of nonlinguistic communicative competence to facilitate interaction between such playmates.

In addition, the findings of the present research extend those of Cheskin (1981) who found that hearing mothers responded to their deaf children's initiations as attempts to label objects or events in the immediate environment. In the present research, it was found that the deaf child and his hearing peers often responded to the partner's initiations as attempts to label. Similar to Cheskin's findings, the partners seldom engaged in reciprocal dialogue to achieve intersubjectivity or to negotiate new understandings.

Only the interpreter and one hearing peer interacted with the deaf child primarily through linguistic semiotic mediation. These interactions were maintained by means of linguistic mediation for more bouts than were those relying on non-linguistic mediation. However, contextual knowledge was still essential for the achievement of intersubjectivity between these partners--either through background knowledge of each other's families or through the work at hand. When communication broke down between the deaf child and his peer, they were not able to re-negotiate meaning if it was not apparent immediately. When communication broke down with the interpreter, she was able to use her adult knowledge and more flexible semiotic mediation to repair the breakdown.

### Interactional Control through Semiotic Mediation

The present research found that semiotic mediation was used predominantly to direct the partner's attention and behaviour through directives, labels or closed questions (yes/no or known-answer type), such as "move," "apple," "Look, what number is that?", "What team's on your shirt?". Even the interpreter, who communicated with the deaf child the most easily of anyone in the school setting, used this directive style predominantly. The deaf child seldom responded to a directive, label, or closed question with more than a single Sign or gesture. However, one hearing girl, who signed quite well, and the interpreter in one general conversation, attempted to use more comments and elaborations than directives. In these instances, the deaf child contributed more to the conversation and elaborated more on what was said than he did with those using a more directive style. These findings corroborate previous documentation by Wood and his colleagues (1986) who have stated that directive styles of conversation increase control by the more capable partner and decrease child initiative. The extensive use of directive styles of interaction by hearing mothers and hearing teachers of deaf children and the resulting conversational control also has been documented previously (e.g., Cheskin, 1982; Meadow et al., 1981; Wedell-Monnig & Lumley, 1980; Wood et al., 1986). However, there does not appear to be previous research documenting the directive styles and conversational control of hearing peers in interaction with deaf children.

The findings in the present study are indicative that, even when the deaf child had initiated the conversational topic and hearing partners attempted to use elaboration and comments with him, the contributions to the conversation made by the hearing partners were still longer than those of the deaf child. It seemed almost that a kind of self-reinforcing loop occurred--the hearing partner controlled the conversation, allowing the deaf child to participate minimally using telegraphic

messages, causing the hearing partner to control the conversation. This circular pattern corroborates research by Brinich (1980) and Jamieson and Pedersen (1993) who suggested that the disruption of reciprocal interactive processes may cause hearing mothers to become more controlling in conversation and instruction, respectively.

In the present study, the interpreter was seen to intervene when the deaf child was working independently, although her help was often not requested by the deaf child. The independent work time of the deaf student was sometimes one-half that of the hearing students. This high frequency of interpreter intervention may have meant that her interventions were not always contingent on the deaf child's need for help and reduced his opportunities to take initiative to solve problems. The directive style of semiotic mediation used by the interpreter and the deaf child's lack of use of linguistic semiotic mediation may have made it more difficult for her to diagnose his need for help and to guide him through problem solving. This pattern of directive and intrusive instructional style corroborates previously documented findings during interaction between hearing mothers and deaf children (Jamieson & Pedersen, 1993) and between hearing teachers and deaf children (Wood et al., 1986).

#### Accessibility of Semiotic Mediation to the Deaf Child

In the present study, as in previous research (e.g., Wood, 1991; Wood et al., 1986), "divided attention," or the need to look back and forth between the semiotic mediation and the object of communication, proved a problem for the deaf child with some of his hearing partners. However, the interpreter attempted to use small Signs within the visual space of the deaf child, eliminating divided attention whenever possible and embedding the linguistic semiotic mediation in its context. Most hearing partners of the deaf child in this study had been taught not to use

Sign Supported Speech, that is, not to use voice and Sign simultaneously. Therefore, most information occurred only through the visual channel and it occurred sequentially, making redundant information available to the deaf child (e.g., pointing to the picture and signing "BEAR"). These findings are in contrast to previous research with hearing adults and deaf children (e.g., Mather, 1990; Swisher & Christie, nd) who found that gesture and language often were provided simultaneously in different modalities, preventing the deaf child from benefitting from redundant information. However, in both of these previous studies, the hearing participants used their voices in combination with Signs. In the present research, the hearing partners attempted not to combine voice and Sign.

The hearing partners of the deaf child in the present research seemed to be very aware of his need for communication in the visual channel. They seldom began to communicate with him without making eye contact. However, although many hearing children knew sufficient Signs to direct his behaviour and label common school objects and events, they were unable to communicate fluently in Sign and did not tend to use it for communication among themselves. Semiotic mediation that was not directed toward the deaf child (e.g., when hearing partners talked among themselves or made decisions), occurred through the auditory channel and, therefore, was not accessible to him. In these situations, the creation of a shared situation definition or the achievement of intersubjectivity was impossible between the deaf child and his hearing partners. Because he could not "overhear" the semiotic mediation, he was left out completely from most of their discussions and decision making. Although he had a Sign Language interpreter in the classroom, some of the discussions, questions, answers, and transitions were not interpreted for him. The deaf child exhibited huge gaps in his knowledge about his peers' thinking strategies, their abilities, their reasons for action, and their rules for games.

Previous research by Lederberg, Ryan, and Robbins (1986) is suggestive that hearing playmates may be sources of information about cultural traditions for deaf children. The present research, however, is contradictory in that it is suggestive that this information about cultural traditions was not fully accessible to this deaf child who was isolated among his hearing peers. The semiotic mediation through which these traditions were passed on was not fully accessible to him.

### Flexibility of Semiotic Mediation

In the present research it was found that neither the deaf child nor most of his hearing partners had strategies to repair conversations when misunderstanding occurred between them. The deaf child and hearing partners had limited flexibility in their use of semiotic mediation. If they were unable to achieve or maintain intersubjectivity through a few Signs and gesture, they used more explicit and more directive gestures. Often the misunderstanding remained. Only the interpreter was able to use linguistic semiotic mediation with enough flexibility to maintain intersubjectivity while explaining information to the deaf child or repairing communication with him. Previous research has documented the lack of repair attempts by deaf children (Wood et al., 1986), the unsuccessful use of repetition as a form of repair between deaf preschoolers (Beattie & Kysela, 1992), and the tendency of hearing mothers (Jamieson & Pedersen, 1993) and hearing teachers (Wood et al., 1986) to use pointing and manipulation of materials to explain instructions to deaf children. However, there has been little research on the ability of deaf and hearing partners to maintain understanding through flexibility of linguistic semiotic mediation.

The deaf child was acquiring a pidgin (Pidgin Sign English) as his main means of communication. Lack of flexibility in semiotic mediation and the contextualized reciprocal communication are congruent with the socio-

communicative nature of pidgins (Samarin, 1971). Interactions between the deaf child and his hearing peers, who were learning PSE as an additional language, would lead to further pidginization, resulting in even more restriction in communicative functions and even less flexibility.

### Occurrences of Reciprocal Communication

Although most of the interactions between the deaf child and his hearing partners were short, contextualized, and lacked sophisticated linguistic mediation, there were some examples of successful reciprocal communication. These instances of reciprocal communication occurred with one hearing classmate who signed well and with the interpreter in a conversational context. There were several factors that were present during all of these instances of reciprocal communication: the topics included absent objects or events and were initiated by, or of interest to, the deaf child; linguistic communication was prevalent, and the hearing partners used comments and elaborations during their turns. Questions which were asked during these instances of reciprocal communication required the real exchange of information; the answers were not known by the person asking the question.

Both of the hearing partners in the above exchanges knew the deaf child well and were able to communicate on many topics of interest to him through Sign. For his part, the deaf child signed quickly and naturally with both these partners, as if he knew that intersubjectivity was achievable. The use of comments, elaborations and real questions in response to the deaf child's contributions seemed to encourage him to take an active role in the conversation. His contributions were more lengthy and the conversational bouts more extended than with other partners.

The above factors found in the reciprocal communications between the deaf child and these two hearing partners are consistent with those noted by Wood and his colleagues (1986) in the instructional context. These researchers found that a change in teaching style to one which emphasized reciprocal communication by the teacher, such as elaborations and personal contributions, resulted in long and interesting contributions by the deaf children. In spite of the bulk of the data being to the contrary, there are encouraging signs in the present research that a similar change in conversational style may result in long and interesting conversational contributions by deaf children.

#### Unexpected Findings Related to Question 2

At least two unexpected findings arose from this research. These findings were related to the purpose of the research and concerned the effects of having a Sign Language interpreter in the classroom with a deaf child who is unable to communicate directly with his classroom teacher.

Teacher-class discourse. Bloome and Knott (1985) suggest that hearing teachers create a shared situation definition with their class through semiotic mediation. They state that teachers rely on students' cues, both verbal and non-verbal, as they work to create a shared situation definition with their students. In the present case study, teacher-class discourse was mediated to the deaf child through the Sign Language interpreter. Given this situation, the creation of a shared situation definition and the achievement of intersubjectivity with the teacher was unlikely.

Bloome and Knott (1985) consider teacher-student discourse part of teacher-class discourse because hearing children have passive interactions with teachers when they overhear the teachers' semiotic mediation with individual

children. These passive interactions may affect the children's understanding of their own work and may also give them insights into the thinking and knowledge of other children in the class. The deaf child in the present study did not have access to this form of semiotic mediation because teacher-student discourse was not interpreted for him when he was working. Therefore, he did not gain the same insights into other children's thinking or into their abilities in class.

Lesson construction is part of the classroom's cultural rules hearing children learn (Bloome & Knott, 1985). For example, they recognize when to raise their hands and when the teacher is about to make a transition in a lesson. The deaf child in the present study did not seem to be fully cognizant of all classroom discourse processes. He seemed not to know if questions came from the interpreter or the teacher. He was seen to sign "YOU KNOW" to the interpreter when she interpreted a question and raised his hand at inappropriate times because of interpreter lag. In addition, lesson transition discourse was never interpreted for him, and so lessons ended and began abruptly for him.

Although there exists a body of research into teacher-class discourse processes between hearing teachers and hearing students (e.g., Cazden, 1988; Green & Wallat, 1981), hearing teachers and classes of deaf students (e.g., Kluwin, 1981, 1983), and deaf teachers and deaf students (e.g., Kluwin, 1981, 1983), there does not appear to be any previous research into the area of teacher-class discourse involving a deaf child learning from a hearing teacher through an interpreter.

Tutorials by interpreter. The other unexpected finding in this research concerned the amount of time the interpreter tutored the student. Because the deaf student did not know some of the concepts and vocabulary understood by the rest of the class, the interpreter occasionally found it necessary to tutor the deaf student

during teacher-directed lessons. Therefore, the deaf student participated less frequently in teacher-directed lessons than did his hearing classmates. Again, there has been no research examining the educational effect for deaf students of reduced teacher-directed time.

**Question 3:**  
**Use of the Case Study Research Design**  
**as a Prescriptive Educational Tool**

The purpose of the present research was to gain some insights into the cultural acquisition of a deaf child of hearing parents who was fully integrated in his school and isolated among hearing peers. The social interaction processes that occurred between the deaf child and his hearing partners were examined because cultural norms and processes are acquired, in part, during social interaction with others more knowledgeable in the culture. The choice of a case study research design allowed the researcher to attempt to gain a holistic and in-depth understanding of the processes used (Merriam, 1988). As well, it was hoped that the case study approach would be conducive to the emergence of understandings that might improve the practices of educators in similar settings .

Within the Vygotskian framework, social interaction is the medium through which cognitive and cultural learning takes place (Vygotsky, 1978, 1987). Therefore, all learning in the school setting, such as cultural processes for interaction and cognitive and academic skills, are developed through social interaction. Because most children enter school with their language and conversational skills in place and with a knowledge of many cultural processes, teachers develop their academic lessons using the social interactive and cultural processes they expect the children to know (Cazden, 1988; Griffith, Johnson, &

Dastoli, 1985). By contrast, deaf children of hearing parents often enter the school system with limited language and conversational skills (Griffith, Johnson, & Dastoli, 1985; Stevens, 1980). These children must, then, learn language, conversational skills, and the academic content of the lessons while learning about the format of classroom discourse and teacher lessons. Although they may share the physical context with their hearing peers, deaf children may not share the situation definition with their hearing teachers and hearing peers or achieve complete intersubjectivity with them. Without the knowledge of culturally appropriate processes of social interaction, deaf children may not be able to participate fully in the academic or social settings or reach their full potential.

In the present research, the individual case study design required an in-depth and in-context examination of social interaction of the dchp. Because of the use of this approach, some crucial social processes were illuminated that had not been noticed previously by adults working with this deaf child. For example, the deaf child in the present situation was well-liked and appeared to be included in the activities of his hearing peers. It had previously seemed to his teachers and interpreter that he participated in Signed conversations and games with his peers. The case study brought to light the ways in which the deaf child was not included in much of the decision-making and conversations of his peers or in the general child-culture of the playground. It became apparent that the interactions that occurred were very limited and controlled by his hearing partners. The Signed conversations that had been noted were now seen to lack depth and substance.

The deaf child's lack of conversational competence (i.e., his ability to negotiate, maintain, and end conversations and to change topics), as well as his peers' lack of conversational competence when using Sign, became apparent through the case study. Whereas it had been known that the deaf child was able to have lengthy conversations with the interpreter and teacher of the deaf, it had not

been apparent that neither the deaf child nor his peers had strategies for negotiating, maintaining, or repairing conversations. Whereas the hearing peers were able to use these strategies when speaking, the deaf child had not had the opportunity to acquire fully these cultural routines.

The case study design, along with the use of videotape, also allowed the researcher to notice the amount of pertinent classroom learning that occurred through the spoken channel alone, rendering that learning largely inaccessible to the deaf child. The difficulties of including a deaf child in the flow of classroom discourse were highlighted. The classroom teacher was often unable to achieve intersubjectivity with the deaf child along with the hearing children; the deaf child's lack of knowledge of social interaction processes meant that he became a passive participant in his learning.

However, many of the positive aspects of the deaf child's interactions were also illuminated through the use of the case study. It became apparent that the deaf child had, indeed, learned a great deal about classroom routines and interpersonal interactions. He observed everything around him and, consequently, appeared to have a great deal of social knowledge. He was an adept user of context for understanding what was meant and he had developed an ability to communicate very well non-linguistically.

The use of videotapes to view and review data allowed comparisons to be made between the socialization of the deaf child and that of his peers. For example, it could be seen that even the least socialized of his peers talked to their neighbours in the cafeteria and participated in decision-making about games. Although the deaf child was marginalized in these situations, he was accepted as a playmate by many different groups on the playground and sought after as a partner in Sign Language class. His place on the continuum of marginality appeared to change from setting to setting and activity to activity.

The use of a case study approach enabled the researcher to remove herself somewhat from the subjectivity of the situation. Rather than having a moment-by-moment perspective as one does when teaching, the case study allowed a more longitudinal perspective. Ongoing patterns and issues emerged which may not have been apparent without the case study. Similarities and differences in interaction between partners and across settings came to light.

All mainstreamed deaf children are unique, in part because of their backgrounds and their instructional contexts. This uniqueness, which made the single case study approach useful, is also its limitation. The findings from this study are not generalizable; they are limited to the immediate case. However, there may be some similarities in the situations of deaf children who are isolated among their hearing peers and, therefore, it is anticipated that the approach to research, and at least some of the general findings of the case study, will be relevant and useful to teachers of deaf children isolated among hearing peers.

The researcher found the case study design very useful and recommends it as a tool to other teachers. The intense observation of the interaction patterns that was required yielded insights into the deaf child's knowledge of the norms and processes of the culture surrounding him. Some of the child's learning problems became apparent, as did the complexity of the issue of mainstreaming deaf children. The patterns of interaction that were found might lead directly to revised pedagogical programming. As well, further research into the interactions between deaf children and hearing partners using the approach described in this study and comparing the results with other case studies may provide a body of information that would be very useful to many educators working with deaf children who are isolated among their hearing peers.

## Implications of Findings

According to sociocultural theory, adult control of interaction normally decreases as children appropriate more responsibility for their own role (Vygotsky, 1978, 1987) and as they practice their control of interaction with peers. Therefore, it would be expected that the deaf child in the present study would be starting to appropriate conversational control. Yet, the findings indicate that all hearing partners continued to initiate more interactions, to make more lengthy contributions and to recognize and repair more communication breakdowns than did the deaf child. Vygotsky suggested that children internalize the language and the social processes used in interaction and that these become their thinking patterns and ways of organizing the world. Many of the deaf child's partners did not use language, or a language that was accessible to him, and therefore many of the social processes were not accessible to him. The interaction patterns between this deaf child and most of his hearing partners included the predominance of telegraphic and contextualized messages, in which others controlled the conversation and in which reciprocal processes were not expected. The deaf child was, in effect, learning how to interact through mislearned rules of social interaction because of mislearned rules of semiotic mediation.

This deaf child was an extremely adept user of context clues for understanding that which was being communicated to him by partners who knew limited Sign. Spencer and Gutfreund (1990) found that the topics initiated by hearing mothers were not necessarily based on the deaf children's visual attention, so that the deaf children had to modify their own situation definition to achieve intersubjectivity with the adult. This may be a skill developed by dchp from a very early age. In fact, the deaf child in the present research, at age eight, appeared to use context so well in order to understand his partner's situation definition that

often he seemed able to perceive what was wanted before it was expressed, leading his classroom teacher to claim that he "had E.S.P."

Wertsch (1984) has stated that semiotic mediation "sets the level at which intersubjectivity is to be established" (p. 14). The overwhelming use of inaccessible, non-linguistic, or directive semiotic mediation by many of the hearing partners of this deaf child may have prevented him from working and learning from these partners at his potential level. Without linguistic interaction, the important cultural messages that children learn from more capable partners may not be acquired fully. Because the primary purpose of a pidgin is the practical exchange of information on a limited range of topics and contexts which do not reflect general socialization (Samarin, 1971), it may not be conducive to the kinds of semiotic mediation necessary for full cultural transmission and acquisition.

The dchp in the present situation did not have access to incidental knowledge or learning. He was unable to "overhear" conversations between his peers or between the teacher and his classmates. The present case study is indicative that the deaf child may not have had as many opportunities to gain and use the same amount of cultural knowledge as had his hearing peers. In fact, he directly learned some inappropriate rules for behaviour and interaction through the processes of social interaction in which he engaged.

### Recommendations

Vygotsky (1978, 1987) stated that cultural norms and processes are appropriated during social interaction with others more knowledgeable in the culture. Obviously, a deaf child of hearing parents, growing up isolated among hearing people, and with little or no contact with deaf people, will not learn Deaf cultural norms. From this research, even given its methodological limitations, it

appears that the deaf child of hearing parents may also not learn the cultural norms of the surrounding hearing culture at the same rate as hearing children because of the lack of opportunity to engage in the social interaction processes that are conducive to cultural acquisition.

One of the roles of educators is to enable students to become competent members of a culture, increasing their feelings of self-esteem and self-confidence as they do so. Therefore, it is of concern that some deaf children of hearing parents may be isolated, in their schools, from the kinds of social interaction conducive to the full acquisition of cultural norms and processes.

The researcher is led by the findings of the present research to make the following eight suggestions:

(1) A concerted effort should be made to make teacher-class, teacher-student, and student-student discourse as accessible to deaf children as it is to hearing children. Much incidental learning was seen to occur in the auditory environment when the children were working independently. As educators, we must find ways to make this important incidental learning accessible to deaf children.

(2) The integrated deaf child should have the opportunity to interact with other deaf children and Deaf adults. It appears from this research that deaf children of hearing parents who are isolated among hearing peers may not have the opportunity to engage in reciprocal conversations with peers and adults. One possibility may be to regionalize programs for deaf students so that they can learn with and from each other, while still taking some classes with hearing students.

(3) There should be structured interactional opportunities between deaf children and their hearing peers. It appears from this research that although deaf children and their hearing partners may be motivated to communicate, they do not have the conversational or language skills to engage in lengthy linguistic

interaction. In conjunction with this, direct teaching should be provided for both the deaf and hearing children on how to initiate, maintain, elaborate, and repair conversations with their differently hearing partner, and how to use an interpreter to facilitate communication, when necessary. In addition to direct instruction in these areas, there must be time provided when the deaf children and hearing peers can practice, without adult intervention, the communication skills they are acquiring.

(4) Interaction with Deaf adult role models and Deaf peers or near-peers is crucial for the linguistic growth of deaf children. From Deaf adults and children who are native signers, dchp could begin to acquire a more complex code appropriate for a full range of social and linguistic interactions. These Deaf role models could provide appropriate and flexible semiotic mediation to dchp and would be a source of information on Deaf cultural norms for the deaf children and for the hearing people that surround them.

(5) For deaf children who are isolated among hearing peers, qualified Sign Language interpreters with knowledge of education are essential. Course work for interpreters planning to work in educational settings should include the development of interpreting skills that facilitate reciprocal communication between deaf and hearing partners in all settings.

(6) Teachers of the deaf would be wise to spend more time videotaping their deaf student in the classroom and on the playground in order to plan programming goals that will facilitate reciprocal interaction and cultural acquisition.

(7) More case studies examining the social interaction and cultural acquisition of deaf children of hearing parents should be conducted, in an effort to allow comparison of data and lead to improved pedagogical programming for these children.

(8) Overall, there needs to be more research into the educational and social effects of isolating deaf children of hearing parents among hearing peers in the school setting.

## Summary

In spite of the methodological limitations that have been mentioned previously, some patterns of interaction between the deaf child and his hearing partners did occur. These patterns reflected many of the problems that have been highlighted by previous researchers, including limited interaction, control of the conversation by hearing partners, context-bound topics, and unrepaired conversational breakdowns. Although some of these problems have been noted previously during interactions between deaf children and hearing adults, they have not been documented between deaf children and their hearing peers.

In addition, a number of behaviours that supported interaction between the deaf child and his hearing partners were revealed in the case study. These behaviours included the simultaneous use of gesture and semiotic mediation, the appropriate use of eye gaze and eye contact, and the use of comments, elaborations, and real questions to extend conversation. The deaf child was seen to be adept at non-linguistic communication. An unexpected finding arose concerning the mediation of classroom discourse by the Sign Language interpreter. As well, the implications of the individual case study as a prescriptive educational tool were discussed.

The findings of the present research are consistent with Vygotsky's (1978, 1987) theory of child development and Wertsch's (1984, 1991) notion of the role of semiotic mediation in the transmission of cultural knowledge. It appeared that the deaf child had limited opportunities to engage in the kinds of interactional

processes that would facilitate his acquisition of cultural knowledge. He did not have the breadth of knowledge that many of his peers had about classroom interactions, playground games, or the maintenance of social interactions. Nevertheless, he knew the general norms for classroom behaviour, for many playground games, and for interaction. He was accepted by his hearing peers as a member of the school community.

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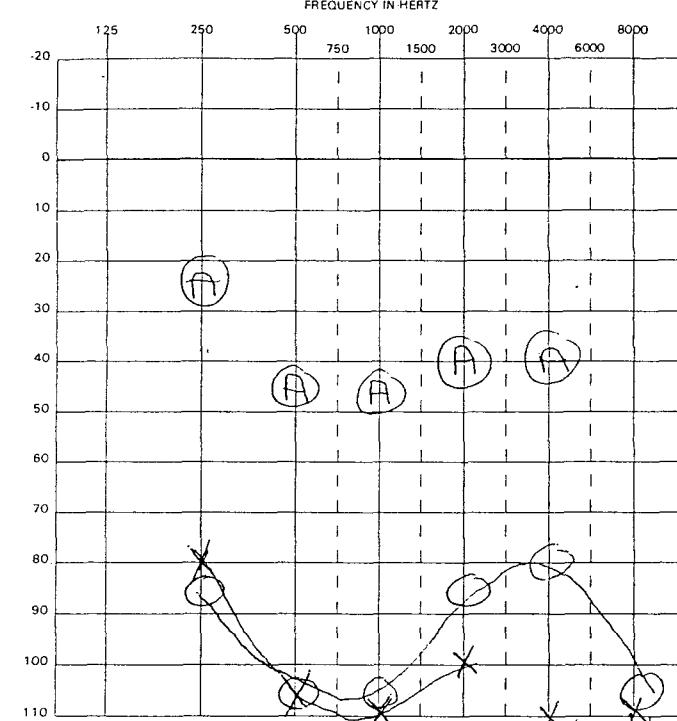
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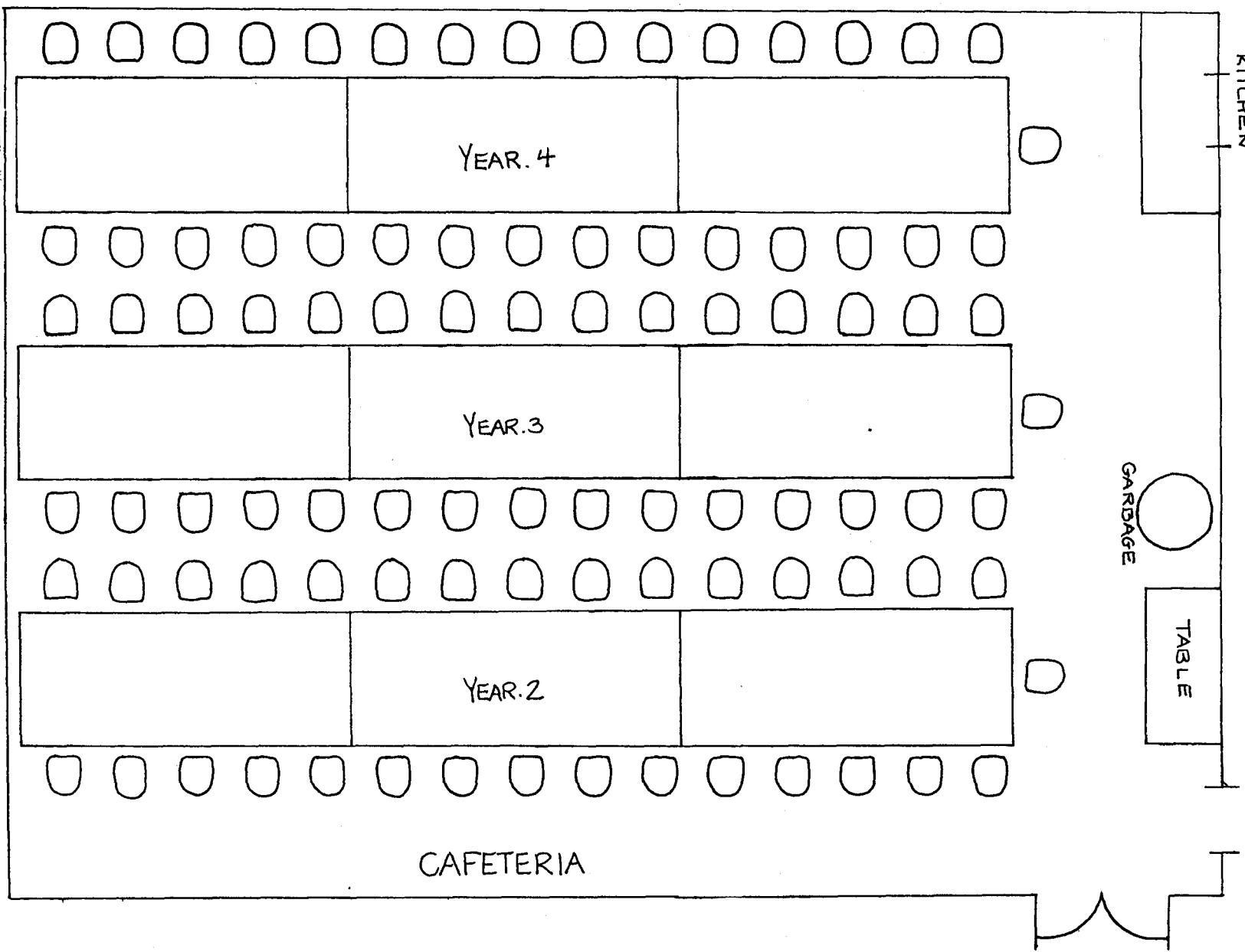
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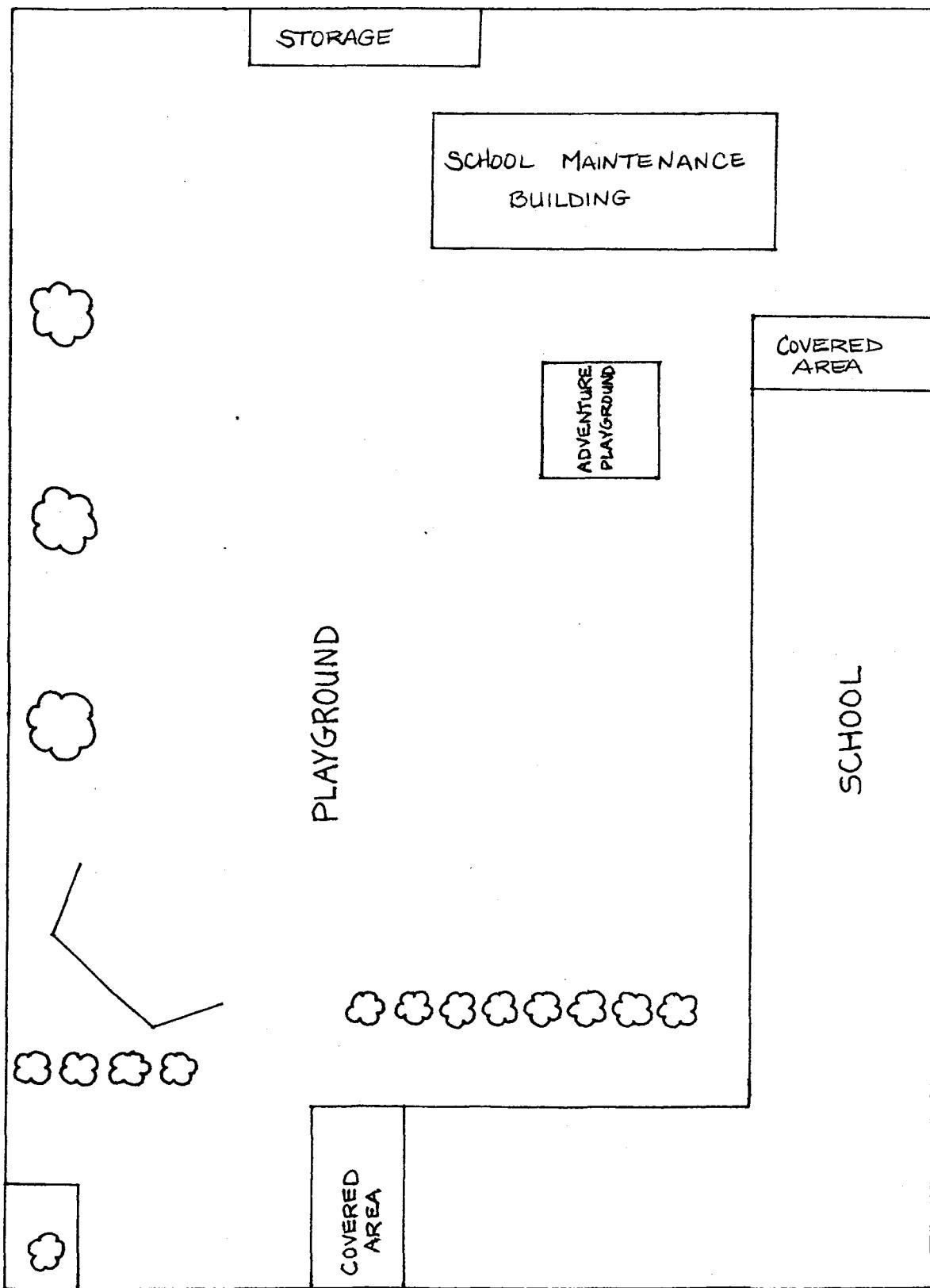
## Appendix A: John's Audiogram

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<b>CALIBRATION</b> <b>PHONES</b> <u>—</u> <b>dB SPL</b> <b>SOUND FIELD @ 45° AZIMUTH</b> <u>—</u> <b>dB SPL</b> <u>—</u>																																																														

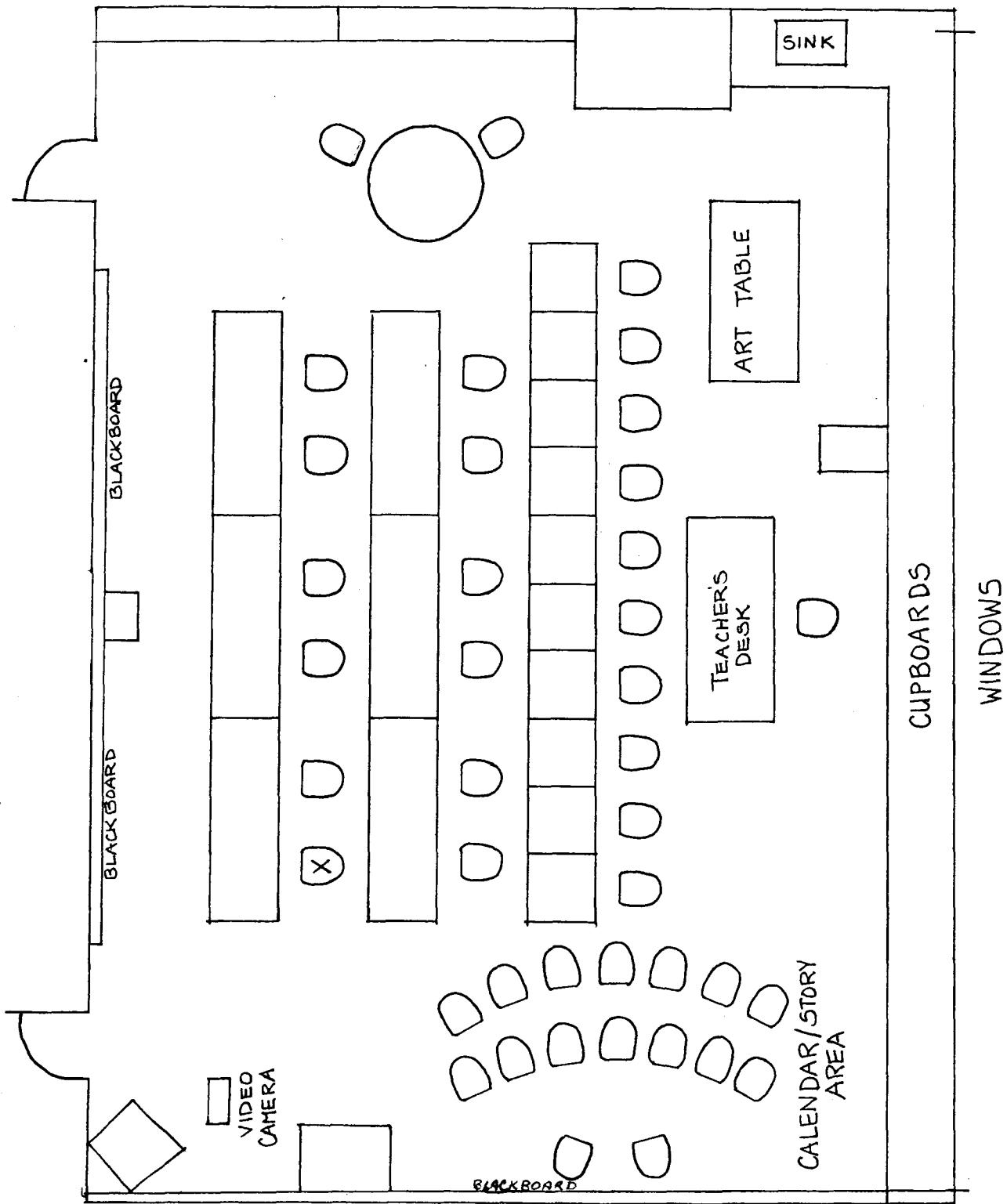
Appendix B: Cafeteria Layout



### Appendix C: Playground Layout



## Appendix D: Classroom Layout



## Appendix E: Triangulation Interviews

### Questions to Teacher

- (1) When you interacted with John, who usually initiated the interaction?
- (2) What did you and John usually talk about?
- (3) Do you think that he took his full share in the conversation? Explain.
- (4) How many turns do you think you each took in a conversation?
- (5) How did you and John deal with any misunderstandings in communication that may have occurred?
- (6) How did you usually communicate with John (e.g., by pointing, gesture, language)?
- (7) How would you rate the depth of your communication with John (when you compare it to other students in your class)?

very superficial 1	shallow 2	average 3	thorough 4	exhaustive 5
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- (8) Tell me about John's interactions with other students, from your perspective.
- (9) Do you have anything to add about your interactions with John?

Questions to Interpreter

- (1) When you interacted with John, who usually initiated the interaction?
- (2) What did you and John usually talk about?
- (3) Do you think that he took his full share in the conversation? Explain.
- (4) How many turns do you think you each took in a conversation?
- (5) How did you and John deal with any misunderstandings in communication that may have occurred?
- (6) How would you rate the depth of your communication with John (when you compare it to other students in the class)?

very superficial 1	shallow 2	average 3	thorough 4	exhaustive 5
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- (7) Tell me about John's interactions with other children, from your perspective.
- (8) Do you have anything to add about your interactions with John?