EXAMINING INTERACTIONS BETWEEN A MOTHER AND HER CHILD WITH HEARING LOSS: A COMPARISON OF HOME AND CLINIC

by

CHRISTINE NICOLE SCHMIDT

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Texas Christian University
Fort Worth, TX

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ENVIRONMENTAL IMPACT ON PARENTAL INTERACTIONS WITH CHILDREN WITH HEARING LOSS: A COMPARISON OF HOME AND CLINIC

Thesis approved:

Helen Morrison, Ph.D., CCC-A, Cert. AVT
Major Professor

Jennifer B. Watson, Ph.D., CCC-SLP
Committee Member

_____David Cross, Ph.D._____
Committee Member

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Chapter One

Introduction

Over the past few decades, with the emergence of new technology, we have become skilled at identifying numerous diseases and impairments at birth. Anomalies such as hearing loss, which were once not diagnosed until long after a child had left the hospital, are now diagnosed as early as the first 24 hours of life through universal newborn hearing screenings. With the emergence of early identification of hearing loss, families are now beginning intervention within the first six months of life (Yoshinago-Itano, 2003).

In general, the outcomes of early intervention have been good for children with hearing loss. Numerous studies have shown that children enrolled in intervention in the first six months of life have better language outcomes than those that are enrolled after the first 6 months of life (Calderon & Naidu, 2000; Moeller, 2000; Yoshinaga-Itano, Sedey, A., Coulter, D. & Mehl, A., 1998). A primary component of many early intervention programs for children with hearing loss is parental education and training. Nearly all early intervention programs acknowledge the parent as a key player in the therapy process (Matthews & Hudson, 2001). Some evidence indicates that changing parental behavior can produce better outcomes in children across a variety of disabilities (Mahoney & Bella, 1998).

Nevertheless, despite evidence in favor of parental training in early intervention, there is lack of evidence that determines how to measure the many variables that could contribute to the outcomes of a parent training program. Specifically, there is a lack of evidence to show how parents' behavior should be assessed. In order to obtain a baseline of parent behavior prior to training or to measure changes over time subsequent to training, there must be some form of assessment of parent/child interaction within the environment that reveals the most

representative sample of the parent's abilities. There is, however, little evidence to show which environment may be the most appropriate for sampling parental behaviors, and there continues to be a need for more information about the behaviors elicited in each setting.

Chapter Two

Review of the Literature

This chapter is organized to describe the theoretical basis and current evidence for family-based intervention and parent training, available family-based intervention programs for the hearing impaired child, existing tools used for evaluating parental behaviors, current understanding of parental and child behaviors in the home and clinic settings, and typical behavioral profiles of parents of children with hearing impairment.

Family-Based Intervention

In recent years with the rise of early identification of various ailments, there has been a shift in the definition of early intervention from more of a professionally mediated form of intervention to providing services in collaboration with parents and families. This emphasis is evident in family-centered approaches to intervention and the implementation of early intervention based on Individualized Family Service Plans (Mahoney, et al. 1999). In family-centered interventions, parents are being called upon to elicit responses from the child and use learned behaviors to facilitate the child's development of targeted skills. With the changing role of the parent in intervention has come an increase in the need for parent training and a need to measure the effectiveness of this training

There are several reasons researchers have favored more family centered intervention models. One theory is that the parent spends the most time with the child and has the opportunity to elicit a behavior in a natural context (Sweet & Applebaum, 2004). Others claim that the unique bond between a parent and a child allows for a more meaningful experience with the target skill and that the parent's knowledge of the whole child has the potential to make them a better facilitator of a new skill (Russo & Owens, 1982). Although there are programs in almost

every area of early intervention that offer a parent training component, a large number have not evaluated the effectiveness of the training (Matthews & Hudson, 2001). There is evidence that suggests that children who had parental involvement in their therapy tended to have better reading and language skills (Carney & Moeller, 1998). Additionally, there is some evidence that indicates changing parental behavior can produce better treatment outcomes than the more traditional child-only training across a variety of disabilities, but overall findings are mixed (Baxendale & Hesketh, 2003; Mahoney & Bella, 1998).

The reason for mixed findings has been attributed to the many dimensions that can be considered as evidence for success of a parent training program, and each researcher employs their own convention for deciding which variable to use to determine that the treatment was effective. Matthews and Hudson (2001) argue that parental knowledge of training principles, parental abilities to use the skills, parental satisfaction with skills being taught, parent behavior change, child behavior change, and parental satisfaction of outcomes are all dimensions that should be considered when deciding if a parent training program is effective.

Family-Based intervention for the Child with Hearing Loss

In the area of hearing impairment and speech and language development there are a rising number of programs that incorporate parent training. Many of the early intervention programs for children with hearing loss that have a parental training component claim superior outcomes, but the evidence is limited, and tends only to show outcomes and not effectiveness (Eriks-Brophy, 2001).

Examples of early intervention for children with hearing loss that advocate for or provide parent training to help facilitate child development include: Auditory-Verbal therapy (Estabrooks, 2005), *Learn to Talk Around the Clock* (Rossi, 2001), and the John Tracy Clinic parent correspondence course (John Tracy Clinic, 2006).

The Auditory-Verbal Approach has been widely used as an intervention method since as early as 1940 (Eriks-Brophy, 2001). In this approach, the child is taught to use all of his or her listening potential and residual hearing to facilitate learning to talk by listening to allow the child to participate in mainstream society (Estabrooks, 2005). Overall, the Auditory-Verbal approach's long term goal is to have the children grow up and participate in the mainstream society through the use of early spoken language intervention, and to have hearing be integrated into the personality of the child no matter what their degree of hearing loss might be (Wu & Brown, 2001).

The parents are encouraged to be a part of the therapy in an Auditory-Verbal approach, are taught to serve as full time therapists in the home to help integrate listening into the child's daily life (Easterbrooks, O'Rourke & Todd, 2000). At each level of therapy there is a focus on teaching the parent to integrate listening into the daily routine (Pollack, Goldberg & Calffee-Schenck 1997). In fact, six of the ten Guiding Principles for Auditory-Verbal therapy specifically advocate that the professional "guide and coach the parent." (AG Bell Academy for Listening and Spoken Language, 2006).

Until recently there was very little research done to support the rationale for Auditory-Verbal therapy, or show the effectiveness or efficacy of Auditory-Verbal therapy (Eriks-Brophy, 2001). Over the past few years, however, there have been several articles published that examined the rationale, outcomes, and effectiveness of the approach.

One of the first studies that specifically examined the outcomes of auditory verbal therapy was a study in 1993 by Goldberg and Flexer. This study used a survey of graduates from Auditory-Verbal programs and asked them questions about how they functioned in the hearing world. The findings in this study showed that the graduates felt that they functioned well as members of the hearing society (Goldberg & Flexer, 1993). This survey was updated in 2000 and there were similar findings of up to 87% of the graduates identifying themselves as members of the hearing world, and over half of them employed and earning at least $20,000 a year (Goldberg & Flexer, 2000). This evidence helps support the claim participation in mainstream society is a primary part of auditory-verbal therapy.

One of the factors that researchers feel have contributed to the success of so many auditory-verbal graduates is the fact that the parents are such active participants and tend to have high, yet realistic, expectations for therapy outcomes (Wu & Brown, 2001). There is, however, little research that shows that there is a change in parent behavior as a result of Auditory-Verbal training, or the degree to which parental involvement contributes to the success of the child. Additionally, there is a lack of a study that examines how to measure parental behaviors in an Auditory-Verbal approach.

Karen Rossi's *Learn to Talk Around the Clock* (2003) is a recently published program designed for early intervention with children aged 0-4 with hearing loss. This program advocates for parental involvement through outlining a set of 8 signature parental language behaviors that are thought to facilitate language development. The program provides thematic units based on each time of the day, from morning to bed-time, to help facilitate the child's language development. A majority of the resources included in this program are specific instructions for parent training on the set of signature behaviors. Movement through the various levels of the

Learn to Talk Around the Clock program is determined by the parent's progress on facilitating language through use of the signature language behaviors. Rossi's program includes a *Parent Signature Behavior Checklist* tool that outlines the core behaviors and allows the interventionist to rate the parent on the behaviors to help determine when they have been mastered. Although the *Signature Behavior Checklist* was developed over ten years of clinical experience, it has not been subjected to a standardization nor has the most representative environment for eliciting parent behaviors (clinic *vs* home) been tested (Rossi, 2003).

The John Tracy Clinic is a private, non-profit education center that offers another form of family-based early intervention for children with hearing impairment from birth through five years of age. The services offered at the John Tracy clinic are free of charge and provided both as onsite training and distance training. The John Tracy Clinic was founded in 1942 by Louise Treadwell Tracy with a goal to help make spoken language an option for children with hearing loss around the world (John Tracey Clinic, 2006).

Onsite services offered at the John Tracey Clinic include a parent/infant program, parent education and support, and a Friday Family School for Children with Hearing Loss. The parent/infant program consists of a weekly individual parent/infant session in a "home like" setting where the parent gets hands on instruction on facilitating speech, language, and listening development. The parent education program consists of a lecture series where by the parent is educated in the areas of audiology, auditory learning, speech, cognition, literacy, and educational planning. In the Friday Family School, the parent participates in a support group, the child participates in a play group, and then both members of the dyad participate in a family session (John Tracey Clinic, 2006).

In addition to onsite services, the John Tracy Clinic also provides extensive correspondence courses. Through correspondence, they offer a baby course, a preschool course, and a deaf-blind course. The baby course is a year long course through which parent's are trained in the areas of early language and listening development, and interacting with a hearing impaired infant. Through enrollment in the preschool course, the parent receives continued training on child growth and development and on how to facilitate activities that promote auditory learning and speech and language development in children with hearing loss. The deaf-blind correspondence course also provides speech and language development information, as the other programs do, but it also includes additional information about the unique needs raising a deaf-blind child (John Tracy Clinic, 2006).

Despite the many successful years of service to over 100,000 families worldwide, the John Tracey Clinic also lacks a strong evidence base to show that its programs do in fact make the kind of change in parental behavior that they claim.

Current clinical tools for evaluating parental behavior

Although there are many programs that incorporate parent training, there are limited tools available to assess whether changes in parental behavior have occurred.

Karen Rossi's *Learn to Talk Around the Clock* program includes a *Parent Signature Behavior Checklist* tool that outlines eight signature behaviors and allows the interventionist to rate the parent on these behaviors to help determine when they have been mastered. Although the *Signature Behavior Checklist* was developed over ten years of clinical experience, it has not been

subjected to a standardization nor has the most representative environment for eliciting parent behaviors (clinic *vs* home) been tested (Rossi, 2003).

An additional tool that has been used to assess parental behaviors is the *Cert. AVT Supervisor's Evaluation- Long Form* (AG Bell Academy for Listening and Spoken Language, 2005). This checklist was originally designed to assess the skills of individuals seeking certification in Auditory-Verbal Therapy. It includes competencies and skills in the areas of parent guidance and participation, Auditory-Verbal techniques, speech and spoken language communication, and lesson planning and presentation that are expected of an Auditory-Verbal Therapist. Recently, the checklist has been used to assess parental behaviors when interacting with their child with hearing impairment in the home environment. Through use of the *Auditory-Verbal Checklist*, Lilian Flores was able to show that parents who demonstrated a larger number of skills on the checklist, had children with better therapy outcomes, than those who demonstrated a smaller set of skills (Flores, 2006).

The Sunshine Cottage School for Deaf Children provides an additional tool assessing parental behavior. The *Comfort Level Checklist for Auditory-Verbal Families (*Sunshine Cottage School for Deaf Children, 2004) is a scale designed for professionals to give parents in Auditory-Verbal programs to assess how comfortable the parent feels with implementing all the Auditory-Verbal techniques, language techniques, and explaining his/her child's hearing loss. The checklist provides parents an opportunity to rate whether they are "not," "somewhat," or "very comfortable" with each item. This tool also has not been subjected to standardization or research, but it does provide the unique opportunity for the professional to see the parents' perceptions of their skills. It is not yet known the degree to which parental perceptions on the *Comfort Level Checklist for Auditory-Verbal Families* match the parents' actual skill set.

Behavioral Profiles of Parents of Children with Hearing Loss

Even though little is known about the degree to which parental behavior changes as a result of training from the many available programs, there is research that discusses some typical behaviors present in a parent with a young child with hearing loss. Most of the literature, however, relates to maternal behavior in normally hearing mothers while interacting with their children with hearing loss.

Some data suggest that in the first two years of life, mothers of young children with hearing loss tend to use more gestures and tactile cues than a mother of a normal hearing child would regardless of whether or not the child is dependent on sign language as a primary mode of communication (Mackturk et al. 1993; Spencer, 1993). There does not tend, however, to be a marked difference in the amount of verbal output generated between the two groups of mothers (Lederberg & Everhart, 1998; Spencer, 1993). There also have been studies that indicate the speech rates of mothers are the same for those with hearing impaired and hearing children (Gallaway, Hostler, & Reeves, 1990; Henggeler & Cooper, 1983; Meadow et al., 1981; Spencer, 1993). Additionally, the way in which mothers modify their speech when speaking to their children has been shown to be same across both sets of parents (Gallaway & Woll, 1994). It also has been shown that mothers of children with hearing loss are more directive and tend more to facilitate activities where both communication partners are engaged in a task and not communication than a mother of a normal hearing child (Janjua, Woll & Kyle 2002; Spencer, 1993, Cheskin, 1981). Additionally, mothers of hearing impaired children have been shown to repeat their own utterances more often than the parent of a normal hearing child (Cheskin, 1981).

Current understanding of parent and child behavior in home and clinic settings

In addition to the limited findings in the area of parental training outcomes and assessment tools to evaluate parental behaviors, there is also a limited set of data, particularly in the hearing loss literature, that indicates which environment is best for sampling both parent abilities and child optimum behavior. A majority of the data that is available relates to language in general terms, and focuses primarily on the child's output.

As far as the child's behavior, child language research has shown that the home environment may produce a more representative sample of the child's language, but overall the findings are mixed (Scott & Taylor, 1978). The mixed findings in the child language sampling research could be attributed to the difference in language behaviors sampled or the age of the children in the studies. In the area of child psychology there are mixed findings about whether the home environment is superior to the clinic when sampling parental behaviors (Sweet & Applebaum, 2004; Webster-Stratton, 1985). One of the variables that could have contributed to the mixed results in these studies is the differences in the child's level of function, behavior, and type of disorder.

Outside of the general description of behavioral profiles of parents of children with hearing loss, there is little known about whether the home or the clinic yields a sample that best represents the parent's capabilities. In fact, most of the studies that profile parental behavior used samples from the clinic or laboratory setting. It may be that some parental behaviors are more contingent on the child's behavior, and others are more contingent on the environment. There is little to no data to discern whether the home or clinic environment yields a better representation of optimum capabilities when sampling the behaviors of parents of young children with hearing loss.

Based on the current review of the literature there are a number of conclusions that can be made. It is concluded that family-based programs involving parent training are widely used option for children with hearing impairment, and that more research is needed to determine the effectiveness of these programs, particularly in the area of parental changes in behavior. It is additionally concluded from the literature that there are limited clinical tools available for measuring parental behavior. Research is available to describe some behavioral characteristics of a parent of a child with hearing loss, but there are limited data to show which environment elicits optimum parental behavior for facilitating language in young children with hearing loss. Knowledge of where and how to measure parental behavior is needed so that interventionists can determine effectiveness of early intervention programs on changing parental behavior.

Purpose of the Study and Hypotheses

The purpose of this study is to pilot a tool and a protocol to examine a mother's behaviors while interacting with her child with hearing loss. Additionally, this study aims to examine if there are differences in the mother's interactions in the home and in clinic environments, and to what extent to which her behaviors may or may not be contingent upon the activity in which the dyad is engaged, the length of the sample, the child's behavior, and the mother's perceptions of her abilities. The general hypothesis states that there will be a difference in the mother's behaviors when interacting with her child in the home and in a clinic environment. It is proposed that the familiarity of the home environment will draw out more opportunities for the mother to use behaviors that are thought to facilitate communication. The possibility also exists that child communicative behaviors will be higher in the home environment, consistent with previous

reports, and that higher levels of child communication also increase facilitative parental behaviors. Additionally, it is hypothesized that there will be a difference in behaviors across each activity, and that the length of the sample will not greatly affect the behaviors the mother exhibits. It is also proposed that the behaviors that the mother exhibits most frequently will be those that she reports being most comfortable with.

Chapter Three

Methods

Participants

Participants were a mother/child dyad recruited from the current clientele at the Miller Speech and Hearing Clinic. Participation was completely voluntary, and the participants had the option to withdraw at any time without penalty by informing the investigator they no longer wished to be in the study. The participants received a summary of results after completion of the data analysis.

The mother was a 35 year old, Caucasian, married, mother of two girls, with a college education. The child was a three-year, one-month old female with a bilateral profound sensorineural hearing loss from a Conexxin 26 mutation. She was first diagnosed with hearing loss at one month of age, and was fit with hearing aids at three months of age. Her left ear was implanted at ten months, and the right ear was implanted at one year, three months of age with Advanced Bionics Clarion-HiRes 90K/HiFocus cochlear implants. The child uses Auria behind-the-ear speech processors. A complete description of the child's characteristics, including audiometric thresholds is outlined in table 1 below. The child's scores on the *Preschool Language Scale- Fourth Edition* (*PLS-4) (*Harcourt, 2002)*,* and the *Little Ears Auditory Questionnaire* (Med-el, 2005) are provided to give a picture of the child's language and listening levels.

The child was enrolled in Auditory-Verbal therapy at The Miller Speech and Hearing Clinic on September 13, 2004. Since then she has received weekly hour long Auditory-Verbal therapy sessions. At the time of data collection, treatment targets for child included receptive and expressive use of the prepositions in, out, on, off, over and under, increasing her MLU,

answering who and what questions, following directions with 2 critical elements, increasing her phonetic inventory, and using social greetings such as "Hi, How are you?"

The dyad met the requirements for use of the *Learn to Talk Around the Clock* Signature Behavior Checklist, as it is intended for use with children aged 0-3 enrolled in a therapy program with a focus on listening and spoken language development and their parents.

Table 1: Description of child characteristics.

Child Characteristics

Gender	CA	Hearing Age	Ethnicity	*PLS-4 Auditory Comrehension Standard Score*	*PLS-4 Expressive Communication standard score*	*PLS-4 total score*	*Little Ears* percentage of total items
F	3;1	2;1	white	84	88	86	97.14%

Child Audiometric Thresholds in dB HL

Condition	Ear	250Hz	500Hz	1000Hz	2000Hz	4000Hz	6000Hz
Pre-implant							
	R	[a]NR	NR	NR	NR	NR	NR
	L	NR	NR	NR	NR	NR	NR
Implanted							
	Bilateral	20	20	25	20	25	30
	R	[b]DNT	40	30	35	20	DNT
	L	DNT	30	30	45	40	DNT

[a]NR = No Response [b]DNT = Did not test
Note: All thresholds were obtained in soundfield with warble tones

Pilot Study

Prior to data collection for the present study, the transcription and coding process was piloted in order to establish a reliable protocol. Fifty utterances from two previously collected parent-child interaction sessions or different dyads were transcribed and coded by both the researcher and the ASHA certified speech-language pathologist used for reliability. The same sample segments were used for both reliability and coding. The transcripts were compared for reliability and points of disagreement were discussed so that there was agreement on at least 90% of the transcriptions and codes and so that a rule could be established to ensure agreement on future transcriptions.

Data Collection Procedures

The mother was contacted by the examiner and the purposes and elements of the study were explained. Prior to the first taping session, the mother completed the *Comfort Level Checklist for Auditory-Verbal Families (*Sunshine Cottage School for Deaf Children, 2004) to assess her comfort level with the behaviors that were examined in this study.

On eight separate dates, four hour-long samples of parent-child interaction were obtained from each dyad in a therapy room at the Miller Speech and Hearing Clinic and at the participant's home. The order of taping locale (home *vs.* Miller Clinic) was alternated, and Table 2 below presents the order of taping. During the interaction sessions, the mother was instructed to play with the child as she did at home creating the best environment to facilitate language. The researcher next left the dyad alone to play. The dyad participated in joint book reading, played with toys such as play-doh, Mr. Potato head, Little People, Matchbox cars or blocks during the

sessions. The order of the activities was randomized across taping episodes. Each session was video and audio taped using digital recorders located in the room.

Data Organization Procedures

Parent-child interactions in each session were transcribed in their entirety, and both parent and child MLUs were calculated for each session using the *Systematic Analysis of Language Transcripts Research Version 9* (SALT-RV9) (Miller & Chapman, 2005). The transcripts were formatted using the conventions for transcription in the SALT manual. The order of transcription was randomized and is outlined in Table 2.

The mother's behaviors in both the in-clinic interaction and the in-home interaction were coded for behaviors thought to facilitate language development in young children with hearing loss. The behaviors were chosen from those included on *Parent Signature Behavior Checklist* (Rossi, 2003) and the *Cert. AVT Supervisor's Evaluation- Long Form* (AG Bell Academy for Listening and Spoken Language, 2005). Both of these checklists are currently used to examine the behaviors of parents of children with hearing loss. The behaviors that were coded were those that are included on both the Rossi checklist and the A-V checklist. The codes encompass Auditory-Verbal techniques, general language teaching techniques and modality of the response. Some of the codes are contingent upon the child's behavior meaning that in order for the mother to have an opportunity to use some of the codes, the child had to display a certain behavior. For example, in order for the mother to have an opportunity to use expansion, the child had to first provide the mother with an utterance to expand. Additionally, some of the codes were opportunistic meaning that they were coded both when the mother did and did not do the behavior. For opportunity behaviors there was a code used for when the mother had the

opportunity to use the behavior or technique and implemented it, and a code for when she failed to use the behavior in the presence of an opportunity. Codes that were not opportunistic were used only when the behavior occurred as a way to determine the frequency of the behavior. Non opportunistic behaviors were those that there was no literature to indicate a valid way of indicating what constituted an opportunity or those that an overt indicator of an opportunity could not be determined. Appendix A of this document operationally defines each code used, indicates which were opportunistic, and outlines which codes fell under each major category (Auditory-Verbal Techniques, Language Techniques, and modality of Response), as well as which codes were contingent upon the child. The order of coding was also randomized and is outlined in Table 2.

Table 2: Randomization of Data

Data Randomization Schedule			
Session	Collection	Transcription	Coding
Home			
1	1	3	4
2	3	7	8
3	5	5	6
4	7	1	2
Clinic			
1	2	6	7
2	4	2	3
3	6	4	1
4	8	8	5

The procedure for coding was as follows:

1) Each parent/child interaction transcript was coded for behaviors outlined in Appendix A of this document using *SALT*.
2) A sum of each behavior was determined for each session in each environment
3) The proportion that each behavior contributed to the total number of utterances in each environment was determined by dividing the incidence of that behavior by the total number of utterances.
4) A percentage of opportunity was calculated for codes that were opportunistic in each environment by taking the total number of times the behavior occurred and dividing it by the number of opportunities there were for that behavior.
5) All codes were collapsed into three categories: Auditory Verbal Techniques, Language Techniques, and Modality of response and the percentage of the total utterances represented by each category was calculated in each setting to help examine home vs. clinic.
6) Opportunistic codes were collapsed into three categories: Auditory Verbal Techniques, Language Techniques, and Modality of response and a percentage of opportunity was calculated for each category in each setting.

Once steps 1-6 were completed, all 8 coded transcripts were collapsed and divided into halves so that the first 30 minutes of the sessions could be compared to the second 30 minutes. The percentage of the total utterances was calculated for all codes individually and for the larger code categories in each half for all samples for both opportunistic and non-opportunistic codes.

To allow for comparison between activities, each activity from all 8 samples was placed in the larger play categories of pretend play (i.e., little people), constructive play (i.e., coloring), and joint book reading, and percentages of total utterances across code categories were calculated. Next, the percentage of total utterances for child contingent codes was calculated for each session across setting to be compared to the child MLU so that the extent to which the parent performance was contingent upon the child. Finally, the percentage of total utterances across all samples for all codes and those that were opportunistic was calculated so that it could be compared to the parent's comfort level with the behavior to test the extent to which parental perceptions related to parental performance.

Reliability

Twenty-five percent of the interactions were re-transcribed and re-coded by an ASHA-certified speech-language pathologist who was trained in the coding procedure during the pilot study. The portions of the data that were re-transcribed were different than those that were re-coded and both sets of reliability samples were randomized for section of the sample that was checked and is shown in table 3 below.

Table 3: Randomized Portion of the Sample used for Reliability

Sequence of Reliability Samples		
Session	Transcription	Coding
Home		
1	Q [a] 2	Q3
2	Q4	Q2
3	Q1	Q4
4	Q3	Q1
Clinic		
1	Q1	Q4
2	Q3	Q1
3	Q2	Q2
4	Q4	Q3

[a]Q = Quarter of Sample

The reliability of transcription was calculated as a percentage of utterances and codes that match. Two utterances were counted as a transcription match when they were exactly the same, if they differed only on the basis of a function word, or spelling. Examples of matches that differed only in spelling include “wheee” vs. “wee” and “ya” vs. “yeah.,” while examples of matches that differed only in function words include “there it is,” vs. “here it is,” and “there it goes” vs. “there he goes.” For two utterances to match for codes, all codes had to match exactly. Table 4 reports the reliability results for home and clinic transcription and coding.

Table 4: Reliability Shown as a Percentage of Codes and Transcriptions that Matched

Reliability % Matched Utterances				
	Transcription		Coding	
Session	n[a]	% match	n	% match
Home				
1	143	99.30%	261	98.47%
2	162	94.44%	269	98.88%
3	179	92.74%	272	99.26%
4	124	95.16%	232	99.57%
Clinic				
1	152	96.71%	248	98.39%
2	126	97.62%	231	99.13%
3	115	98.26%	242	98.76%
4	146	95.21%	269	99.61%

[a]n = Number of utterances

Chapter Three

Results

Data Analysis

A descriptive comparison was made:

1) between environments for all codes and code categories for both opportunistic and non-opportunistic codes and parent and child MLU in each session across settings to examine differences between home and clinic environments.
2) between the first and second half of the entire data set for all code categories both opportunistic and non-opportunistic codes to examine differences between the first and second half of the sample.
3) between the activities for the entire data set for all codes collapsed into code categories to examine differences in behaviors across activities.
4) between percentage of total utterances across the data set for codes contingent upon the child and the child MLU and number of utterances across sessions to examine the extent to which maternal behaviors may be contingent upon child behaviors.
5) between parental comfort levels and percentage of total utterances from the entire data set for all behaviors to examine the relationship between maternal perceptions and maternal behaviors.

Table 5 below compares the home and the clinic settings showing the percentage of the total utterances across each code in each environment for each individual session. The "listen" cue, hand cue, expansion by order, visual only, auditory and visual, and auditory sandwich codes did not occur in either the home or the clinic. The three most frequently occurring codes from greatest to least across both settings were audition only utterances (range 694-1040), naming objects (range 68-277), and parallel talk (range 48-175). The positioning codes (at ear level and away from noise) were also of low frequency. This was due in part to the fact that once the mother positioned the child at ear level at the beginning of the session, there was rarely a time that the dyad ended up in a situation where the child needed to be repositioned at ear level. The most that the positioned at ear level code was used in a sample was three times in the third home sample and two times in the second clinic sample. In all the other samples the position at ear level code was used once.

When codes were collapsed and categorized into Auditory-Verbal techniques, language techniques, and auditory only messages the percentage of total utterances was compared. Table 6 shows the collapsed categories for home and clinic settings. Every utterance in both the home and the clinic was delivered through audition only and Language techniques appeared more frequently than the Auditory-Verbal techniques. In general the home environment created a greater raw count of the behaviors, but the proportion of those behaviors to the total utterances was relatively the same across the settings.

When percentages of opportunities were calculated for all codes that were opportunistic, the mother took at least 80% of opportunities for all codes with the exception of linguistic preferencing, I hear that used appropriately, recognizing sound occurred, visual only utterances, and auditory and visual utterances. It should be noted that a low percentage of opportunities for

some codes may be more appropriate than a higher percentage of opportunities. For example, this mother never had utterance delivered through only a visual modality such as sign language indicating that she is adhering to Auditory-Verbal principles of maximizing the use of spoken language as the primary mode of communication. So in this case, it is more appropriate for the mother to not take the opportunity to use sign language than it would be for her to sign and not speak.

Table 5: Grand Summary of Clinic and Home Session by Session Percentage of Total Utterances All Codes Included

Percentage of Utterances by Code Home vs. Clinic

Session	n[a]	Utterance Code																			
		Position at ear Level	Position away from noise	Model language	Name objects	Check Comprehension	Self Talk	Linguistic Preferencing	Audition only	Audition and visual	Visual only	Listen	I hear that used appropriately	Recognize sound occurred	Hand Cue	Recognizing Signals	Parallel Talk	Expand length	Expand order	Expand Complexity	Auditory Sandwich	Acoustic Highlighting
Home																						
1	694	0.1%	0.1%	1.2%	26.2%	-	1.6%	0.1%	100%	-	-	-	-	-	-	2.0%	13.1%	1.2%	-	-	-	0.4%
2	1040	0.3%	[b]-	1.0%	22.5%	0.1%	4.3%	-	100%	-	-	-	-	-	-	2.2%	12.0%	1.0%	-	-	-	0.2%
3	967	0.2%	-	3.4%	16.6%	-	3.2%	-	100%	-	-	-	0.1%	0.1%	-	3.4%	8.6%	0.5%	-	0.2%	-	0.1%
4	735	0.1%	0.1%	0.5%	37.7%	0.3%	4.2%	-	100%	-	-	-	0.1%	0.1%	-	4.8%	6.5%	0.5%	-	-	-	-
Total	3436	0.2%	0.1%	1.6%	24.8%	0.1%	3.4%	-	100%	-	-	-	0.1%	0.1%	-	3.1%	10.1%	0.8%	-	0.1%	-	0.2%
Clinic																						
1	719	0.1%	-	0.7%	23.5%	-	2.3%	-	100%	-	-	-	-	-	-	1.4%	11.1%	0.3%	-	-	-	0.3%
2	928	0.1%	-	0.4%	19.7%	0.1%	1.1%	-	100%	-	-	-	0.5%	0.7%	-	1.1%	8.0%	0.5%	-	0.11	-	-
3	807	0.3%	-	0.3%	8.4%	-	3.8%	-	100%	-	-	-	0.3%	0.4%	-	1.5%	13.0%	0.1%	-	0.1%	-	-
4	880	0.1%	-	0.3%	26.8%	0.1%	2.5%	-	100%	-	-	-	0.3%	0.3%	-	1.8%	8.6%	2.5%	-	-	-	0.3%
Total	3334	0.2%	-	0.4%	19.7%	0.6%	2.4%	-	100%	-	-	-	0.3%	0.4%	-	1.4%	10.1%	1.0%	-	0.1%	-	0.2%

[a]n = Number of Utterances [b]- = 0%

Table 6: Condensed Categories Home vs. Clinic Comparison

Percentage of Total Utterances by Code Category All Codes Included				
Session	n[a]	Code Category		
		Auditory-Verbal Techniques	Language Techniques	Auditory Only Messages
Home				
1	694	2.9%	43.2%	100%
2	1040	2.7%	40.8%	100%
3	967	3.9%	32.5%	100%
4	735	5.3%	49.8%	100%
Total	3436	3.6%	40.9%	100%
Clinic				
1	719	1.8%	38.0%	100%
2	928	2.4%	30.0%	100%
3	807	2.4%	25.8%	100%
4	880	3.0%	40.9%	100%
Total	3334	2.4%	33.6%	100%

[a]n = Number of utterances

Some codes did not appear in each sample, and therefore, a percentage of opportunity could not be calculated for these codes in every sample. For example, this mother chose an exceptionally quiet environment for the home interactions, so she never had the opportunity to position the child away from a noise source in the room. The exceptionally quiet environment also contributed to the low frequency of the "I hear that" codes. With limited environmental sounds, the mom was limited on opportunities to call the child's attention to sound. Table 7 shows a session by session layout of percentage of opportunities for each session and setting.

Code categories were created for opportunistic codes and when compared across home. In both settings all the utterances were delivered through audition only, and language techniques were more frequently occurring codes than the Auditory-Verbal techniques. Table 8 provides the percentages of opportunities across home and clinic for those codes that are opportunistic.

Table 7: Percentage of Opportunity for Each Opportunistic Code in the Home and Clinic

Session	Percentage of Opportunities Home vs. Clinic by Codes with Opportunities: Utterance Codes											
	Position at ear Level	Position away form noise	Name objects	Self Talk	Linguistic Preferencing	Audition only	Audition and visual	Visual only	I hear that used appropriately	Recognize sound occurred	Recognizing Signals	Parallel Talk
Home												
1	100%	100%	95.8%	84.6%	6.7%	100%	-	-	N/A	-	100%	82.7%
2	100%	N/A[a]	97.5%	97.8%	[b]-	100%	-	-	N/A	-	100%	73.1%
3	100%	N/A	94.7%	100%	-	100%	-	-	100%	16.7%	100%	76.9%
4	100%	100%	97.2%	100%	N/A	100%	-	-	100%	16.7%	100%	84.2%
Total	100%	100%	96.5%	97.5%	4.8%	100%	-	-	100%	12.5%	99.1%	77.8%
Clinic												
1	100%	N/A	92.9%	100%	N/A	100%	-	-	-	N/A	100%	N/A
2	100%	N/A	92.4%	100%	N/A	100%	-	-	83.3%	85.7%	100%	80.4%
3	100%	N/A	90.7%	93.9%	-	100%	-	-	66.7%	50.0%	100%	100.0%
4	100%	N/A	94.0%	100%	-	100%	-	-	100.0%	27.3%	100%	81.7%
Total	100%	N/A	92.9%	97.6%	-	100%	-	-	76.9%	50.0%	100%	87.2%

[a]N/A = No opportunity for that behavior in the sample

b - = 0%

Table 8: Condensed Category Percentages of Opportunity Comparison Home vs. Clinic

Percentage of Opportunity by Category Opportunistic Codes only						
Session	Code Category					
	Auditory-Verbal Techniques		Language Techniques		Auditory Only Messages	
	n[a]	% opportunity	n	% opportunity	n	% opportunity
Home						
1	33	51.5%	313	90.7%	694	100%
2	31	83.9%	457	88.4%	1040	100%
3	46	80.4%	308	89.0%	967	100%
4	44	88.6%	373	95.4%	735	100%
Total	154	77.3%	1451	90.8%	3436	100%
Clinic						
1	12	91.7%	293	90.8%	719	100%
2	23	95.7%	300	89.0%	928	100%
3	24	79.2%	213	95.8%	807	100%
4	45	51.1%	366	91.3%	880	100%
Total	104	72.1%	1172	91.4%	3334	100%

[a]n = number of opportunities

As an additional comparison between the home and clinic, child and parent MLU were calculated for each session. Differences between the mother and child MLU indicate that the mother was staying within the child's zone of proximal development by remaining within 2 words of the child's utterances. The table below shows the child and parent MLU and the difference between the parent and child MLU across sessions and settings.

Table 9: Session by Session comparison of the Parent and Child MLU

Child vs. Parent MLU Comparisons			
Session	MLU		
	Parent	Child	Difference
Home			
1	3.26	1.63	1.63
2	3.11	1.74	1.37
3	2.85	1.88	0.97
4	2.83	1.38	1.45
Average	3.01	1.66	1.36
Clinic			
1	3.05	2.02	1.03
2	3.00	1.70	1.30
3	2.83	1.98	0.85
4	2.75	1.73	1.02
Average	2.91	1.86	1.05

An analysis of variance was applied to test the null hypothesis that home and clinic sessions would not differ across the variables Auditory-Verbal Techniques, Language

Techniques, Auditory-Only Messages and parent and child MLU. No statistical difference was obtained between home and clinic sessions across these variables at the .05 significance level.

A comparison was next made between the first half and second half of all the samples in the home and clinic combined for each code individually. Just as with the sample as a whole the three most frequently occurring codes from greatest to least in each half were audition only utterances (range 390-553 first half, 244-517 second half), naming objects (range 43-170 first half, 32-138 second half), and parallel talk (range 25-26 first half, 2-44 second half). The positioning codes did not occur in the second half of the sample, but that was due to the fact that the child was usually positioned at the start of each session, and rarely moved to a place were she was far away from her mother or not at ear level.

Table 10 displays the percentage of the total utterances across categories in each time bin. Just as with the entire sample, all of the utterances were delivered through audition only across each half of the samples and Language Techniques were used more frequently than the Auditory-Verbal Techniques in each half of the samples. The average frequency of Auditory-Verbal techniques in the first half was 12, while the average frequency of Auditory-Verbal techniques in the second half was 13. For language techniques the average frequencies were first half 165, and second half 143.

Table 10: First Half vs. Second Half Comparison for Code Categories

Percentage of Total Utterances by Half and Category - All Codes Included

Half	n[a]	Code Category		
		Auditory-Verbal Techniques	Language Techniques	Auditory Only Messages
1	3590	2.6%	36.7%	100%
2	3180	3.3%	36.0%	100%

[a]n = Number of Utterances

The dyad participated in a variety of activities throughout the samples including playing with Little People, dolls, Play-Doh, play food, blocks, and Mr. Potato Head, stringing beads, coloring, and book reading. The most frequently occurring activities were playing with Little People (8 occurrences), and coloring (5 occurrences). Activities were collapsed across settings into the categories of pretend play (i.e little people), constructive play (i.e. coloring), and joint book reading. Table 11 shows the percent of total utterances that each type of activity represented. Regardless of activity, the mother's most frequently occurring codes remained to be auditory only messages, naming objects, and parallel talk.

Table 11: Code Category Comparison across Activity

Percentage of Total Utterances by Code Category and Activity All Codes Included

Activity	n[a]	Code Category		
		Auditory-Verbal Techniques	Language Techniques	Auditory Only Messages
Pretend Play	3759	3.3%	34.0%	100 %
Constructive Play	2442	4.0%	39.9%	100%
Book Reading	454	2.0%	50.0%	100%

[a]n = Number of Utterances

A number of the codes were contingent upon the child's behavior. The percentage of total utterances for each child contingent code was compared to both the number of child utterances and the child's MLU. These numbers are displayed in Table 12. It was difficult to determine the degree to which the child contingent behaviors were in fact contingent upon the child because the child's behavior was consistent across all sessions.

The mother's behavior remained just as consistent as the child, but the degree to which the consistency was related to the child could not be determined.

Table 12: MLU vs. Child Contingent Behavior Comparison

Percentage of Utterances Home vs. Clinic by Codes Contingent upon Child

Session	n[a]		Child MLU	Utterance Codes					
	Parent	Child		Model language	Recognizing Signals	Parallel Talk	Expand length	Expand order	Expand Complexity
Home									
1	694	545	1.63	1.2%	2.0%	13.1%	1.2%	[b]-	-
2	1040	653	1.74	1.0%	2.2%	12.0%	1.0%	-	-
3	967	659	1.88	3.4%	3.4%	8.6%	0.5%	-	0.2%
4	735	592	1.38	0.5%	4.8%	6.5%	0.5%	-	-
Total	3436	2449		0.4%	1.4%	9.7%	0.9%	-	0.1%
Clinic									
1	719	524	2.02	0.7%	1.4%	11.1%	0.3%	-	-
2	928	552	1.7	0.4%	1.1%	8.0%	0.5%	-	0.1%
3	807	633	1.98	0.2%	1.5%	13.0%	0.1%	-	0.1%
4	880	708	1.73	0.3%	1.8%	8.6%	2.5%	-	-
Total	3334	2417		1.6%	3.1%	10.4%	0.8%	-	0.1%

[a]n = Number of Utterances [b]- = 0%

Note. Percentages were calculated from number of parent utterances

The parent responses to items on *Comfort Level Checklist for Auditory-Verbal Families* that corresponded to behaviors coded in the present study were compared to the percentage of total utterances and percentage of opportunities of each code. Table 13 below outlines each behavior it's reported comfort level and corresponding percentages from the total sessions. On the checklist, the mother was asked to report if she was very, somewhat, or not comfortable with each item. She reported that she was very comfortable with every behavior examined in this study with the exception of checking for comprehension, which she felt somewhat comfortable with. The mother was very comfortable with all the high frequency and high percent of opportunity behaviors such as naming and parallel talk, but she also reported that she was very comfortable with using acoustic highlighting and expansion which were of low frequency, and linguistic preferencing which was of low occurrence and low percentage of opportunity.

Table 13: Parental Comfort Levels Compared to Overall Percentages

Parent Perceptions			
Code	Comfort Level	% total utternces	% opportunity
Position at ear Level	very	0.2%	100%
Position away from noise	very	0.1%	100%
Model language	very	1.0%	N/A
Name objects	very	22.3%	94.9%
Check Comp	somewhat	0.1%	N/A
Self Talk	very	2.9%	97.5%
Linguistic Preferencing	very	0.1%	2.8%
Audition only	very	100.0%	100.0%
Audition and visual	N/A	0.0%	0.0%
visual only	N/A	0.0%	0.0%
Listen	very	0.0%	N/A
I hear that used appropriately	very	0.2%	80.0%
Recognize sound occurred	very	0.2%	35.0%
Hand Cue	very	0.0%	N/A
Recognizing Signals	very	2.3%	99.4%
Parallel Talk	very	10.1%	82.2%
Expand length	very	0.8%	N/A
Expand order	very	0.0%	N/A
Expand Complexity	very	0.1%	N/A
Auditory Sandwich	very	0.0%	N/A
Acoustic Highlighting	very	0.2%	N/A

Chapter Four

Discussion and Conclusions

The purpose of this study was to determine if there is a difference in a mother's behaviors during interactions with her deaf child in the home and in a clinic environment and to what extent these behaviors may or may not be contingent upon the activity in which the dyad is engaged, the length of the sample, the child's behavior, and the parent's perceptions of their abilities. Results indicated that this mother's behavior was essentially the same across settings, and was not contingent upon activity or length of sample. This was true for opportunistic and non-opportunistic behaviors. The mother reported that she was very comfortable with all but one of the coded behaviors, including those which were of low frequency and low percentage of opportunity. Due to the consistency of the child's behavior, it is difficult to conclude whether or not this mother's behavior is contingent upon her child.

Although there was no marked difference in this mother's behavior across settings, it is difficult to conclude that the clinic may be an adequate setting to sample the parent's optimum behavior. The particular mother that participated in this study had spent numerous hours in the clinic with her child in their parent-centered Auditory-Verbal therapy sessions. The mom's preexisting comfort level with the clinic setting and communicating with her child in that particular setting could have made the clinic a less sterile environment than it is theoretically considered to be. Her level of comfort with the clinic setting poses a potential threat to the internal validity of the present findings. The activities also pose a threat to the internal validity of this study. This particular dyad had a routine of engaging in pretend play and coloring on nearly a daily basis. Although the

activities were randomized, the parent and child had a pre-established script for a number of the activities. The dyad's previous interactions with the materials and activities could have inflated the language of both the parent and the child. There is also a possibility that order of taping could be a threat to internal validity. The first data collection occurred in the clinic, so the parent was able to use the clinic set up, and activity choices as a model for how she chose to set up the home environment. It could be that the mother simply "recreated" the clinic in her home through replicating the activities that the dyad had engaged in when they participated in the initial data collection.

In addition to the consistency of the mother's behavior in the home and the clinic, the child's behavior (MLU, number of utterances) was consistent across settings. This is contrary to the findings of Scott and Taylor who suggest that the home may elicit a higher MLU in young children (1978). It is also not in agreement with the theory that the home environment is a more naturalistic setting for a child, and has the potential to facilitate richer language (Sweet & Applebaum, 2004; Kaiser, 1993) One of the reasons that this particular child could have been consistent with previous findings is that this child, like the parent, had spent numerous hours in intervention at the clinic. It could also be that the mother was naturally consistent across environments, and the child's behavior is contingent upon the parent. Another reason these results differ from previous findings it the fact that the child language samples were elicited from a parent/child interaction instead of a researcher/child interaction as they are in pervious studies. It is difficult to operationally define and rank the essential components that contribute to making the home environment a true home environment. It may be more than just the four walls of a house that define a home environment for a child. Perhaps for this child, the presence of

her mother was one of the components of her understanding of home, and the fact that mother was present in the clinic, made the clinic environment more like home, and less like the traditional perception of a sterile clinic environment.

For this mother, a thirty minute sample yielded the same findings as an hour sample, and the first half of the sample, was nearly identical to the second half of the sample. The reason for this could be that a thirty minute sample is adequate, or it could mean that the child was so consistent that there was no opportunity for variability in the parental behavior. Another possibility for this finding is that this mother is very consistent, and prefers a certain repertoire of behaviors when interacting with her child, so the length of the sample does not affect the adequacy of the sample.

The fact that there was little difference between the activities in which the dyad was engaged in this study, does not necessarily indicate that the activity has no affect on the behaviors of those involved. Although the mother was given a variety of choices in activities, she had a tendency to gravitate towards pretend play with little people and coloring. In fact, there was one sample that the dyad played with Little People the entire session, and another sample in which the dyad colored for the entire session. The fact that these two activities represent such a large proportion of the samples, it makes it difficult to compare them with the less frequent activities, such as book reading. It may be that the length of the activity needs to be the same to provide a true comparison of the behaviors elicited by that particular activity.

The present findings enabled a profile of the mother's behaviors to be created. In general, the mother delivered her utterances through audition, named objects, and engaged in parallel talk. Just as described by previous research with mothers of children

with hearing loss (Gallaway, Hostler, & Reeves, 1990; Henggeler & Cooper, 1983; Meadow et al., 1981; Spencer, 1993), this mother adjusted her language to the child's language level, used a slow rate of speech. This mother never used the hand cue, but there were rare occurrences where the mother had the threat of the child reading her lips, and the child was able to interact with the mother at a level where she did not need the mother to use the hand cue to prompt her that it was her turn to talk. Contrary to the previous findings, this mother uses very few gestures, or tactile cues to get the child's attention (Mackturk et al, 1993; Spencer, 1993). The difference in findings could be attributed to the date that the previous studies were conducted. With the rise of early identification and early implantation of cochlear implants with sophisticated processing strategies, children today have hearing potential that is markedly different from that of a child fitted with amplification in the early nineties. Perhaps the difference in availability of sound to the children in previous studies and the child in the present study contributed to the difference in the amount of gestures and tactile cues used. Expansion was rarely used by this mother, but this could be attributed to the frequent focus on naming objects and activities. The mother's expectation of the child may have been to name just as she was, so she may have been less inclined to expand on the child's one word utterances. This mother also often missed opportunities to use linguistic preferencing because of her nature to first name all of the objects in the environment. After discussion of the findings of the present study with the participants, expansion and linguistic preferencing were added as parent goals in intervention.

This mother indicated that she was very comfortable or somewhat comfortable with all of the behaviors coded in this study including those which were of low frequency

and low in percentage of opportunities. For example, acoustic highlighting was of low frequency, and all of its instances were phonemic emphasis, but it may be because acoustic highlighting is used more often in the situation of a communication breakdown, or in the initial teaching of a concept or word, neither of which occurred frequently in the samples in the present study. The fact that the mother did not use some of the behaviors she said that she was comfortable with does not necessarily mean that she misrepresented her abilities. A low frequency of a behavior may simply indicate that it is naturally of low frequency, and that the mother is so comfortable with the behavior that she knows the particular situations it is used in, and does not attempt to use it at times that are not appropriate. It also may be that the *Comfort Level Checklist for Auditory-Verbal Families* is not the best way to sample parental perceptions of the behaviors used in this study. Rating a comfort level with a skill does not give information about the frequency in which the parent uses that skill, which was a primary measure used in the current investigation. A different style of parental report, perhaps a frequency of use of the behaviors, may have yielded different findings.

The degree to which the parent's behavior is contingent upon the child's behavior remains to be in question. It is difficult to determine what caused this dyads behavior to be so consistent. It could be the degree to which the mother's behavior was contingent upon the child, or it could be because of the familiarity that each dyad had with the activities, or that the child's behavior is contingent on the parent, or simply a unique characteristic of this particular dyad. Further research with more dyads is needed to explore the degree to which one member of the dyad's behavior is contingent upon the other member's behavior. Replication of this study with additional dyads would allow

order effects, familiarity with the clinic setting and materials to be factored out as a threat to internal validity, as well as a better picture of parent behaviors in both settings.

Additional research should also be done to determine which behaviors are most crucial to sample when attempting to get a picture of a parent's optimum behavior. It is difficult to weigh the behaviors used in this study to know what impact the presence of absence of each parental behavior has. It could be that opportunistic codes are most important, or perhaps there is a combination of behaviors that should be examined. Further research should also examine the degree to which presence, absence or frequency of these parental behaviors is related to the child's progress and abilities. Flores' (2006) study found that differences in the parent abilities in a group of parents with children with similar hearing losses, ages, and amount of intervention were related to the number of items on the Auditory-Verbal checklist that the parent was able to implement in a parent/child interaction, but it is yet to be determined which parent behaviors were the ones that separated a child who had exceptional therapy progress from a child with less than average therapeutic progress. Further investigations should also examine if training in the behaviors coded in this study can result in changes in parental behavior and if changes in these particular behaviors can result in a change in child.

Parental perceptions of their behaviors needs to be further evaluated through the use of more participants, and potentially a different tool. In future studies, parental perceptions may need to be assessed using an interview or a tool that allows for the parent to report both their comfort level with each skill and the frequency and way in which they implement the behavior. If parents are able to narrate an accurate picture of

their behaviors, it may eliminate the need for the clinician to sample and code the parent/child interactions.

Additionally, future studies could attempt to examine the components of the home environment that make it theoretically a more natural environment, and the degree to which each of these components make the home such a natural environment. This knowledge may lead to information about how to make the clinic environment a more naturalistic environment.

The low number of participants in this study makes it difficult to generalize the results to other dyads. It can be concluded, however, that just as Matthew and Hudson (2001) argued, there are many dimensions that can be considered as evidence for success of a parent training program, and each of them is in need of a way to be measured to determine that the treatment was effective. These dimensions include parental knowledge of training principles, parental abilities to use the skills, parental satisfaction with skills being taught, parent behavior change, child behavior change, and parental satisfaction. Parental behavior was the target of this study, and there remains a need to continue to empirically examine each of the many dimensions to ensure that early intervention is as effective as it can be.

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Appendix A

Coded Behaviors: Operational Definitions and Codes

Behaviors initiated by the parent

- ***Positioning at ear level** - The parent positions the child at ear level with their better ear within 3 feet of the speaker
    - Codes:
        - PE – child is positioned at ear level within 3 feet of the speaker
        - (-)PE – The child is not positioned at ear level or within 3 feet of the speaker

- ***Positioning away from noise** – the child is positioned away from a noise source
    - Codes:
        - PA- child is positioned away form a noise source
        - (-)PA- child is not positioned away from a noise source

- **Modeling Language-** The parent models language with the expectation that the child will make a vocal approximation of some kind.
    - Code
        - ML
-
- ***Naming Objects and Actions-** The parent names an object or action either in a word or phrase.
    - Codes:
        - NO- The parent names an object or action
        - (-) NO- The parent questions the child about an object or action prior to naming it

- **Checking Comprehension-** The parent does an ID task and waits for the child to respond to check comprehension
    - Code:
        - ID

- ***Self Talk** The parent narrates their own actions
    - Codes:
        - ST: The parent narrates their own actions
        - (-)ST: The parent questions the child about their actions prior to narration

- ***Linguistic Prefacing -**The parent says the name of an object or describes it before presenting it visually.
    - Codes**:**
        - LP- The parent presents object or visual stimulus through audition first

        - (-)LP- The parent fails to present an object or visual stimulus through audition first

- ***Modalities** – Codes for indicating the modality of the parent's utterance
    - Codes:
        - Aud – the parent's utterance is given through only audition
        - AVL- the parents spoken utterance is accompanied by visual cues given from lipreading
        - AVS- The parent's spoken utterance is accompanied by a sign
        - Sign- the parents utterance is given through only sign

- **"Listen" cue-** The parent utilizes the "Listen" cue
    - Codes:
        - Lis- parent uses the "Listen" Cue at an appropriate time

- ***" I heard that!" cue** – Parent utilizes the "I heard that" cue
    - Codes:
        - HTUA- Parent utilizes the I heard that cue when appropriate
        - (-)HTUA- Parent utilizes the I heard that cue at an inappropriate time
        - HTRS – The parent recognizes that a sound has occurred by saying "I hear that"
        - (-) HTRS – The parent fails to call attention to a sound

- **Hand Cue –**Parent utilizes the hand cue
    - Codes:
        - HC- Parent utilizes the hand cue at an appropriate time

<u>Behaviors contingent on the child</u>

- ***Recognizing Signals-** Parent recognizes that the child needs something through identifying some behavior that shows the child's need (vocalization, sign, facial expression etc) shown either through the parent meeting the need or responding in some way.
    - Codes:
        - RS- The parent recognizes the child's signal
        - (-)RS – the parent fails to recognize the child's signal

- ***** **Parallel Talk-** The parent describes or comments upon what the child or other third party is doing
    - Codes:
        - PT- The parent describes what the child or third party is doing in a statement
        - (-)PT – parent questions the child about their action or a third party is doing

- **Expansion -**The parent expands something that the child has said either by length or complexity
    - Codes:
        - EL – The parent expands the utterance length
        - EO- The parent changes the word order
        - EC- The parent expands the utterance by adding complexity

- ***Auditory Sandwich-** Parent uses the auditory sandwich in response to breakdowns
    - Codes:
        - AS – Parent uses the auditory sandwich in response to breakdowns
        - (-)AS- The parent fails to put a visual or tactile cue back into hearing
- **Acoustic Highlighting –** The parent uses acoustic highlighting to emphasize part of the utterance
    - Codes:
        - AH- The parent uses acoustic highlighting at an appropriate time

*These codes are opportunistic

ABSTRACT

EXAMINING INTERACTIONS BETWEEN A MOTHER AND HER HEARING IMPAIRED CHILD: A COMPARISON OF HOME AND CLINIC

by Christine Schmidt, M.S., 2007
Department of Communication Sciences and Disorders
Texas Christian University

Thesis Advisor: Helen Morrison, Ph.D., CCC-A, Cert. AVT

This study aimed to pilot a tool to examine a mother's behaviors during interactions with her child with hearing loss in home and clinic environments, and to examine what extent these behaviors may be contingent upon the activity, length of sample, child's behavior, and parental perceptions. One dyad participated in four, hour-long interactions in both environments. The proportion to which each maternal behavior contributed to the total utterances showed this mother's behavior was comparable across all settings and conditions. Maternal perception of her skills was related to her behaviors. Further research is needed to determine the extent to which these findings can be generalized.