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Social Communication of Preschoolers Who Are Deaf and Hard of Hearing

by

Stephanie Robinson

A thesis

submitted in partial fulfillment

of the requirements for the degree of

Master of Science in Speech Language Pathology

Idaho State University

Summer 2019

SOCIAL COMMUNICATION OF PRESCHOOLERS WHO ARE DHH

To the Graduate Faculty:

The members of the committee appointed to examine the thesis of STEPHANIE ROBINSON find it satisfactory and recommend that it be accepted.

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SOCIAL COMMUNICATION OF PRESCHOOLERS WHO ARE DHH

Human Subjects Committee Approval

November 21, 2018

Stephanie Robinson
College of Rehabilitation Comm Sciences
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RE: regarding study number IRB-FY2019-50: Stephanie Robinson Thesis: Peer Entry of Preschoolers Who are Deaf and Hard of Hearing

Dear Ms. Robinson:

Thank you for your responses from a previous expedited review of the new study listed above. This is to confirm that I have approved your application.

Notify the HSC of any adverse events. Serious, unexpected adverse events must be reported in writing within 10 business days.

You may conduct your study as described in your application effective immediately. The study is subject to renewal on or before November 21, 2019, unless closed before that date.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Contact Tom Bailey (208-282-2179; email humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

SOCIAL COMMUNICATION OF PRESCHOOLERS WHO ARE DHH

Human Subjects Committee Modification Approval

March 4, 2019

Stephanie Robinson
College of Rehabilitation Comm Sciences

RE: study number IRB-FY2019-50: Stephanie Robinson Thesis: Peer Entry of
Preschoolers Who are Deaf and Hard of Hearing

Dear Ms. Robinson:

I have reviewed your application for revision of the study listed above. The requested revision involves adding Vida Landa as personnel to the study.

You are granted permission to conduct your study as revised effective immediately. The date for renewal remains unchanged at 11/21/19, unless closed before that date.

Please note that any further changes to the study must be promptly reported and approved. Contact Tom Bailey (208-828-2179; email humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

Dedication

This Thesis is dedicated to my selfless and loving husband. Thank you for all your support throughout my stress, joys, tears, and celebrations.

This is also dedicated to my father. His unwavering support throughout graduate school has been priceless.

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List of Abbreviations

DHH	Deaf and Hard of Hearing
NH	Normal Hearing
Dir	Direct Initiation
Rel	Related Activity
Unre	Unrelated Activity
W&H	Wait and Hover
Disr	Disruption
Par	Parallel Play
Adj	Adjacent Social Attention
Verb	Verbal
Gest	Gestural
Combo	Combination
ASL	American Sign Language
TC	Total Communication
LSL	Listening and Spoken Language

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Social Communication of Preschoolers Who Are Deaf or Hard-of-Hearing

Thesis Abstract—Idaho State University (2019)

Little is known about the peer entry skills of preschoolers who are Deaf or Hard of Hearing (DHH) when they are playing with other same-aged, familiar peers who are also DHH. It is also unknown how these interactions and skills differ from those of children who are NH when they are playing with other same-aged, familiar peers. This study compared the initiations, modalities, and success of children who are DHH with children who are normal hearing (NH) during choice time group play at their respective preschools for two fifteen-minute sessions. DHH children are no less successful at entering into play with their same-aged familiar peers with the same hearing status as NH children, although differences in the use of initiation strategies and modalities were identified,

Key words: deaf, hard-of-hearing, peer entry, preschool, pragmatic language assessment, social communication, play,

Social Communication of Preschoolers Who Are Deaf and Hard of Hearing

Social communication, or pragmatics, can be defined as, “an individual's ability to use language skills appropriately in social contexts” (Goberis et al., 2012, p. 298).

Positive social interactions in childhood are associated with factors related to increased psychological well-being that can be protective factors against life stressors and developmental challenges faced by children who are Deaf or Hard of Hearing (DHH) such as self-esteem, emotion regulation, successful adjustment in school transitions, and positive attitudes towards school (Batten, Oaks, & Alexander, 2013). However, preschool children who are DHH differ from their age matched peers with normal hearing (NH) in pragmatic language skills (Goberis et al., 2012). Without mastery of pragmatic language skills, children have significant challenges with literacy, writing, and abstract conversational skills (Goberis et al., 2012). Children who are DHH are at an increased risk for pragmatic language delay leading to potential decreased quality of social communications, interactions, and relationships. This research discusses the effects of pragmatic language on social communication and identifies a method for assessing pragmatic language abilities in preschoolers using a criterion-referenced tool. Throughout this paper, pragmatic language ability/skills and

Developmental Importance of Social Communication Success and Pragmatic Skills in Preschool

Pragmatic language skills include the reasons for communicating, communication frequency, communication discourse skills (i.e. topic maintenance, turn-taking, conversational repair), the flexibility to modify language for different listeners and social situations, and the ability to convey a coherent and informative narrative (Paul &

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Norbury, 2012). These skills are important for all children to develop for success in life both emotionally and academically (McElwain & Volling, 2005; Buhs, Ladd, & Herald, 2006). Pragmatic language abilities affect the social relationships, academic success, and emotional health of children as young as preschool.

Social Relationships

Positive peer interactions in preschool are associated with better school adjustment, successful emotion regulation, and maintaining positive peer relationships in the future (McElwain & Volling, 2005). Even when a child has age-appropriate vocabulary and syntax, that child may not yet know how to use their language in a socially appropriate manner or in specific social settings (Goberis et al., 2012). The ability to form and sustain social relationships depends on the child's foundation of appropriate language skills.

Buhs et al. (2006) conducted a longitudinal study following 380 children from kindergarten through fifth grade, with a follow-up in middle school. Both participant and teacher-completed questionnaires were used to measure peer acceptance/rejection, chronic exclusion, classroom behavioral participation, school avoidance, and changes in academic achievement. Children who were rated to have aggression or social withdrawal at the beginning of the study were significantly more likely to be socially excluded across kindergarten and through at least the fourth grade. The following were also identified as risk factors for adverse academic outcomes throughout elementary school and later school disengagement: being less accepted by classmates in kindergarten, chronic peer maltreatment throughout elementary school (sustained peer exclusion and peer abuse). These findings were equal for both males and females. This is evidence for a direct

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relationship between social communication skills and academic success starting at least as early as kindergarten.

In preschool, children begin forming social relationships in situations with many conversational partners and even more opportunities for communication. Social relationships created in preschool may include forming meaningful friendships and gaining general social peer acceptance by the group. Meaningful friendships and social peer acceptance are associated with increased academic success (Batten et al., 2013). Thus, having more positive social interactions and social relationships can increase the likelihood of a child's success in academia.

Emotional Health

The relationship between social communication abilities and loneliness is also a concern when considering the emotional health of children who have delayed pragmatic language skills. Most, Ingber, and Heled-Ariam (2011) looked at the relationship between social competence, speech intelligibility, and sense of loneliness in 64 kindergarteners who are DHH. They were given scores as perceived by their teacher in relation to the children who are NH in their classrooms. The children were integrated into a standard classroom in either a small group or individually. Twenty-two children in the individual integration group were put by themselves into a classroom with other children from their neighborhood in a mainstream classroom. The 42 children in the group integration group placed as part of small groups of children who are DHH into typical public mainstream classrooms. The children's teachers completed an adaption of the Hebrew Loneliness and Social Dissatisfaction questionnaire (Asher, Hymel, & Renshaw, 1984; Margalit, 1991). The original was self-reporting, but this scale was completed by the participants'

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teachers. The questionnaire consists of 24 items covering various areas such as “the child has nobody to talk to” and “the child likes school.” Teachers rated the participants on a 5-point scale ranging from never to always. In both groups, children who had better social competence were significantly less lonely,

Effects of Pragmatic Difficulties for Children Who Are DHH

Children who are DHH are at an increased risk for pragmatic language deficits and difficulties compared to their peers with NH. Because language plays a central role in social interactions, children with language difficulties are at particular risk for social failure (Goldstein & Gallagher, 1992, as cited in Brinton & Fujiki, 1993). Children who are DHH may have difficulties in developing effective social strategies for social competence (Preisler, Tvingstedt, & Ahlstrom, 2002). This is a major concern since peer rejection and not sustaining friendships can lead to increased emotional and psychosocial difficulties for children who are DHH.

Complex Language Development

Complex language is characterized by the use of advanced language structures such as later developing adverbial conjunctions, figurative language, and metacognitive verbs. There are five of the domains of language: phonology, morphology, semantics, syntax, and pragmatics, which are all intertwined and develop together. In order to have successful verbal social interactions, a child must understand the level of language complexity within each domain being used to communicate with them. Processing complex language requires combining world knowledge with incoming linguistic and extralinguistic information while using both working and long-term memory (Malaia & Newman, 2015). One of the most significant changes in a child’s receptive language

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during the school age years is the increased demand to understand complex sentences that contain more than one main idea (Paul & Norbury, 2012). By the time typically developing children are in preschool (ages 4-5), 20% of their spontaneous speech contains complex sentence structure (Paul & Norbury, 2012). Children who do not develop the ability to comprehend complex morphology, semantics, and syntax can fall behind socially as they struggle to understand teacher instructions, classroom texts, and their fellow students who have started using more complex language. As children begin to understand their peers less, they will face barriers when attempting to form and sustain peer relationships.

Pragmatic Language Development

Goberis et al. (2012) looked at the pragmatic language skills of 126 children who are DHH and 106 with NH that are developed by the age of seven using the Pragmatic Checklist (PC) developed by Simon (1984) which was adapted to be filled out in an online platform. While the participants with NH mastered 100% of the items on the PC by age 6, the participants who are DHH only mastered 6.6% of the items. By age seven, children who are DHH mastered 69% of the items with complex language. These findings demonstrate the extent to which young children who are DHH are delayed in their pragmatic language abilities. The 14 items that were not mastered are: provide information on request, repair incomplete sentences, end conversations, interjects, apologizes, request clarification, make promises, asks questions to solve problems, asks questions to make predictions, retells a story, tells 4-6 frame picture story in right order, creates original story, explains relationships between objects-action-situations, and compares and contrasts (Goberis et al., 2012). This shows that children who are DHH do

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have a significant delay in the development of their pragmatic language abilities.

Children with NH are mastering all of the skills on the checklist by the age of six, while the children who are DHH are only getting a small portion of those skills accomplished at the same age. Without the skills used to initiate and maintain quality social communication during preschool, children who are DHH are missing out on interactions that could benefit them emotionally, socially, academically, and further their overall language development.

Forming and Sustaining Relationships

When children are DHH challenges in their ability to access language and interactions affect their communicative functions through verbally expressed language. As a result, they may face increased difficulty in forming positive relationships with their NH peers (Martin, Bat-Chava, Lalwani, & Waltzman, 2010). While social relationships are critical to a child's future development, many children who are DHH have difficulty forming and sustaining such relationships with their peers with NH.

Weisel, Most, and Efron (2005) investigated how preschoolers who are DHH initiate social interactions. They observed four preschoolers (aged 2-3 years), two boys and two girls, with prelingual bilateral sensorineural hearing loss ranging from moderate to profound. Three of the children used hearing aids and one had cochlear implants. The participants were observed in two preschool settings where spoken language was the primary communication modality, one preschool for children who are DHH and the other an educational program with NH peers. Both programs were half day and three days a week. The participants were videotaped for five minutes in each setting every day for three weeks yielding 45 minutes of video in each preschool program. Videos were

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analyzed for initiation attempts, whether the initiations were successful, and how many initiations to which each child responded.

Results revealed that the participants utilized different initiation strategies depending on which peer group they were playing with. The DHH participants used more vocalizations and initiated more with their peers who are NH than peers who are DHH. However, it is possible that in the NH preschool the participants repeated their failed initiations and/or the interactions did not last as long which created a larger need for more initiations than with the DHH group. However, all participants had low success rates when playing with the NH group as compared to the DHH group. All four participants succeeded about 24% of the time when with the NH group but had success rates between 41-70% when with the DHH group. These contrasts show that positive peer relationships between children who are DHH and their peers with NH do not develop sufficiently through mutual exposure, and interaction difficulties may prevent the group from having effective social interactions (Weisel, et al., 2005).

Bat-Chava and Deignan (2001) surveyed the parents of children who are DHH between the ages of 6-10, who have had cochlear implants for at least two years, concerning their child's relationships with peers who have NH. Seventy-two percent (18 of 25) of the parents reported at least one limitation related to their child's cochlear implant that they felt impeded their DHH child's peer relationships. Eight of those eighteen parents stated that the patience their child's conversational partner had was an important factor in the success of the relationship. Peer communication partners need to be willing to take additional time and effort to communicate in order for that relationship

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to be successful, which may warrant training or intervention for common communication partners as well.

Peer Entry

Despite these concerns, little is known about how children who are DHH begin or manage conversational exchanges with peers. Because pragmatic language skills are some of the most abstract developmental language skills, they are some of the most difficult to measure. Evidence of this can be seen in the lack of standardized and criterion referenced tests commercially available to measure pragmatic skills. While pragmatic language abilities may be difficult to assess, they are no less important than any other domain of language (Bouton, 1996). One way that has been researched to measure pragmatic language abilities is peer entry. Peer entry was originally a behavioral measure used for examining NH children's social competence (Putallaz & Gottman, 1981, as cited in Martin et al., 2010). A peer entry task for children can be set up or observed in a natural setting. It is observing how a child inserts themselves into play or conversation with their peers. Peer entry is an effective and efficient way to measure pragmatic language skills because it is the beginning of all interactions, diagnostic, and based on objective data.

Begins Interactional Exchanges

A peer entry task is used in research to determine how children initiate and respond to interactional/social exchanges. An examination of a child's ability to initiate and respond to peer interactions is important to understanding a child's foundation for pragmatic language abilities (DeLuzio & Girolametto, 2011). The rationale for using a peer entry task to measure pragmatic abilities refers to how initiation and the required

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appropriate response must take place in order to be considered social communication. These initiations and the consequential reactions can be observed and measured by clinicians to aid in assessment decisions.

Diagnostic Qualities

Clinicians need a method for measuring pragmatic language abilities that provides information which can be used to determine if there is an impairment or not, and if further evaluation is required. A peer entry task is diagnostic because children typically have difficulty entering peer groups and it captures a crucial skill that is used to gain access further socialization opportunities (Martin et al., 2010). Since peer entry is a skill pivotal to future social relationship success by providing access to further opportunities, it is a skill that is a foundation for pragmatic language development. Clinicians may observe peer entry tasks to aide in their diagnosis of pragmatic language deficits.

Parent Reports

Peer entry skills must be measured by direct observation and not subjective parent reports. An observation of peer entry interactions yields objective information about child functioning and interactions not easily or reliably reported by the parents (Brotman, Gouley, & Chesir-Teran, 2005). Brotman et al. (2005) conducted a study using peer entry during free play at a preschool. The 84 participants were preschoolers enrolled in a prevention trial for conduct problems. Participants were taken to a preschool arriving shortly after routine free-play began and told them they were there to play. Each child was then observed for 30 minutes, no specific instructions were given to the classroom children about the visiting child. Additionally, children were observed during free play with their parents. Parents also completed a parent version of the Penn Interactive Peer

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Play Scale (PIPPS) developed by Fantuzzo and Hampton (2000) during an interview.

This version of the PIPPS asks parents to rate their child on 32 different behaviors they have observed during play at home or in the neighborhood in the past two months on a 4-point scale (Fantuzzo & Hampton, 2000; Brotman et al., 2005). Comparing the objective observation during play and the parent's reports showed that parents did not reliably report their child's interaction abilities. This may have been due to the differences in behavior observed in children when they were playing with their parents vs. when playing with other children, without their parents in sight. Since children change how they play when they are not with their parents, peer entry needs to be observed directly rather than researchers relying on parent's subjective reports of their child's abilities (Brotman et al., 2005). Additionally, Brotman et al. found that observations of parent-child play captured behaviors not necessarily associated with those commonly used on parent report questionnaires. This shows that it is not necessarily bias or lack of education on the part of the parents to not reliably report their child's peer entry skills, but the complexity of categorizing and measuring it makes it hard to report peer entry subjectively.

Predictors of Peer Entry Success for Children Who Are DHH

In order to research the peer entry success of children who are DHH, it is critical to know what other factors can alter research results. While the list below is not all inclusive, it contains some predictors most relevant to the research of pragmatic abilities, peer entry, and preschoolers who are DHH.

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Gender

Young female girls consistently display higher rates of peer competence and prosocial behaviors than boys (Martin et al., 2010). This includes both girls with NH and girls who are DHH. In a study by Martin et al. (2010) the peer entry success of 5-6-year-old children was researched by observing both children who are DHH and with NH for 30 minutes when tasked with entering into play with one other child and again for 30 minutes with two already established peers. While children were being observed, parents completed The Child Behavior Scale which is designed to assess a child's prosocial, withdrawn, and aggressive behaviors (Ladd & Profilet, 1996). The children completed a self-esteem measure to reveal feelings about their own performance in perceived physical and cognitive competence, and perceived peer and maternal acceptance (Harter & Pike, 1984). Their play was analyzed using the Interaction Quality Index and the Prosocial Behavior Index (Miller et al., 2003; Boyd et al., 2000). Out of the eleven girls (both NH and DHH), 64% were successful in entering the one-on-one peer situation, while only 9% failed to enter entirely. In contrast, none of the five boys (both DHH and NH) entered the one-on-one peer situation successfully, and 60% of them did not enter at all. There was also a positive correlation for higher self-esteem and confidence in the girls in this specific study than the boys. This may have affected the data as it is unknown if this was a confounding factor. It is important for researchers and clinicians to be aware that boys who are DHH are more likely to have trouble with peer entry than their female counterparts.

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Number of Peers

The number of peers included in an interaction directly impacts the success of peer entry. As discussed above, Martin et al. (2010) compared the peer entry success of a child when entering 30 minutes of play with one child versus two children. They found that children who are DHH were just as successful as their NH peers in one-on-one interactions. However, peer entry for DHH children into an already established dyad of unfamiliar NH peers yielded a decrease in verbalizations, an increase in solitary activity engagement, and 40% of the children overall failed to enter at all. This illustrates how peer entry can be significantly affected by the number of peers a child is tasked with initiating or responding to in a social exchange. This is a factor that warrants consideration when measuring peer entry success with the intention of it being a measure of pragmatic abilities. If clinicians and researchers want to assess pragmatic language abilities in DHH children to rule out pragmatic language delays, the DHH children should be observed in an environment where they are tasked with entering into play with more than one peer.

Measuring Peer Entry

Due to the complexity of measurement and the wide range of pragmatic abilities, several different methods for measuring peer entry have been used in the past. Some have looked at pragmatic behaviors, some recorded the quality and quantity of both initiations and responses, some placed peer interactions into social and cognitive play categories, and others identified the types of initiations. A universal method for measuring peer entry has not been established, and different methods for how it can be measured will be discussed below. These varieties of assessments all measure peer entry but yield different

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types of data. Clinicians need to know what type of data each way to measure peer entry yields in order to choose the most appropriate assessment method for the client they intend to observe.

Pragmatic Behaviors and Interaction Quality

The Martin et al. (2010) peer entry study discussed earlier measured the success of peer entry by looking at the pragmatic behaviors and interaction quality of ten 5-to-6-year-old children who are DHH. To measure the success of peer entry, they used the Interaction Quality Index (IQI) and the Prosocial Behavior Index (PBI; Miller et al., 2003; Boyd et al., 2000). The IQI is a behavioral scale in which the participants are timed for the length of time they engage in different qualitative levels of play. The levels are, 1: conflict, 2-solitary nonplay, 3-solitary constructive, 4- social attention, 5-interaction, and 6-collaborative play. These scores are combined into a single IQI score. The Prosocial Behavior Index (PBI) describes behaviors that contribute to successful peer interactions. It has 9 questions that rate each child on a scale of 1-3 for skills such as peer group entry, entry bids (offers to enter group), success of entry bids, response rate to entry bids, new play initiations (offers to begin play), success of new play initiations, response rate to play initiations, and communication breakdowns. Using these methods to measure interaction quality in addition to measuring peer entry objectively would give a clinician both qualitative and quantitative data on their client's pragmatic language abilities which could be used to aid in the diagnosis of a pragmatic language delay as well as gauge the severity.

Play Type

Rubin, Watson, and Jambor (1978) examined peer entry and social play behaviors through observing at the participant's preschools and coding their play according to cognitive play and social play categories. They used Smilansky's (1968) four cognitive play categories which are: functional, constructive, dramatic, and play and games with rules. They also utilized Parten's (1932) six sequential social play categories which are: unoccupied behavior, solitary play, onlooker behavior, parallel play, associative play, and cooperative play. Definitions of the cognitive and social play categories used in this study are located in Table 1 and Table 2 respectively. Each participant was observed in their usual preschool classroom while the entire class had free time play. Each participant was observed for 1 minute on 30 consecutive school days with the order of observation between students being randomized daily. During each minute of observation, the researchers recorded the number of seconds (to the nearest 5 seconds) of engagement in each category for both social and cognitive. It is noted that associative play and cooperative play were collapsed into one group after data was reviewed. This was due to kindergarteners being consistently coded as engaging in cooperative play and preschoolers consistently being coded as engaging in associative play.

Table 1. Cognitive Play Categories

Cognitive Play Categories (Smilansky, 1968)	Definition (Rubin et al., 1978, p. 534)
Functional	"Simple, repetitive, muscle movements with or without objects."
Constructive	"Create Something."
Dramatic	"Substitution of imaginary situations to satisfy one's wishes or needs."
Play and Games with Rules	Any play and games that have rules associated with them.

Table 2. Social Play Categories

Social Play Categories (Parten, 1932)	Definition (Rubin et al., 1978, p. 534)
Unoccupied Behavior	Watching anything with passing interest
Solitary Play	Walking around room
Onlooker Behavior	Playing with body
Parallel Play	Playing alone with materials different from children within speaking distance; no conversation with others
Associative Play	Playing with other children no role assignment or organization of activity
Cooperative Play	Playing in an organized group

Fantuzzo et al., (1996) used a peer play observational coding system based which was also based on Parten's (1932) basic preschool social play categories. Forty-six socially withdrawn African American children in the Head Start program participated in the study. All participants were in 10 different classrooms that had two teachers and 19 children each. All participants were not receiving special education services but were identified as the most socially withdrawn children in the Head Start centers as measured by teacher ratings and classroom observations by the researchers. Parten's original categories were unoccupied, solitary, onlooker, parallel, associative, and cooperative play. These are defined above in Table 2. Fantuzzo et al., modified Parten's basic categories to describe the concrete characteristics of dyadic play interactions. The revised categories were nonrelating activities, social attention, interactive play, and negative play interactions. These revised categories and their respective subcategories are defined in Table 3. This study also included an intervention component called resilient peer treatment. Duration of videos analyzed was not specified.

Table 3. Modified Social Play Categories

Modified Social Play Categories (Fantuzzo et al., 1996; Parten, 1932).	Definitions (Fantuzzo et al., 1996, p. 1380)
Nonrelating Activities	Includes nonplay and solitary play.
Nonplay	“Unoccupied behavior. (sitting or standing without playing) or watching without playing”
Solitary Play	“Child plays independently without looking at or talking to the other child.”
Social Attention	The child plays independently but shows awareness of what the other child is doing; child does not speak to the other child.
Independent Play	“The child shows some awareness of what the other child was doing (i.e. looked at the other child)”
Interactive Play	Includes associative play and collaborative play.
Associative Play	“Child talks to, smiles at, or exchanges, toys with the other child, but does not adjust own behavior to what the other child is doing.”
Collaborative play	“Child collaborates with other child in play activity in a mutual, complementary way; child may take on a reciprocal role that is distinctively different than that of the other child and adjust his or her behavior according to the actions of the other child.”
Negative Play Interactions	“Child hits, pinches, or otherwise attempts to physically injure other child, or grabs an object from other child; child maliciously insults, teases, curses, screams at, or threatens other child.”

Initiation Type

Weisel et al. (2005) examined the initiations of social interactions of four preschoolers who are DHH who attended a special preschool program for children who are DHH half the day and a regular preschool program the other half. Each participant was videotaped for five minutes three days a week for three weeks yielding 45 minutes of

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video in the special program and 45 minutes in the regular program. Each child's play was coded using 15 categories. Eleven were taken from Vandell and George's (1981) list of communication behaviors, and four additional behaviors were added. The original initiation types were: vocalization, neutral touch, prosocial touch, aggression, gesture, sign, object-related social act, large body age, positive affect, facial expression, and head shake or nod. After the first stage of coding four more initiation behaviors were added: head turning in search of partner, imitations of other children's play or movement, direct entrance into play or interactions of other children, and moving closer to playing children. After coding was completed, any strategy used more than three times was analyzed. An initiation strategy was successful if it elicited a response from the targeted partner within five seconds. Rather than only focusing on the success of initiations, Weisel et al. (2005) recorded the types of initiations that DHH participants used and which of those initiations were most successful. This method yields information on how children are actually entering into peer groups in addition to their rates of success. This information could be used to guide therapy to teach pragmatic skills. For example, the client could be taught to replace or supplement unsuccessful strategies they already use, with more successful peer entry strategies. Additionally, depending on the cognitive development of the child, a clinician could help them understand which strategies they already use that would help them be successful more often, and why.

DeLuzio and Girolametto (2011) recorded the number and type of initiation strategies, number of responses, and the length of interactions of 12 children aged 3-5 who were matched for age, sex, parent's education level, and number of siblings with a child with NH from their preschool classroom. Their matched peers served as a

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comparison. Two matched children (one DHH and one NH) were put into play groups of with 2-3 other classmates. Each group was given the same farm set to play with and was recorded in two separate 15-minute sessions. All communicative initiations attempted by or directed toward each target child were transcribed using the Systematic Analysis of Language Transcripts (SALT) created by Miller and Chapman (2002). DeLuzio and Girolametto coded each initiation for strategy type, modality, and outcome using an adaptation and combination of existing coding systems developed by Corsaro (1979), Roberts et al. (1995), and Messenheimer-Young and Kretschmer (1994). Six initiation codes were used: direct initiation, related activity, unrelated activity, wait and hover, disruption, or none. These are defined in Table 4 below. Each strategy, except for wait and hover, was then coded for modality: verbal, vocal, gestural, or a combination. The outcomes were coded as response, ignore, or reject. This method of measuring the success of peer entry would benefit clinicians who have DHH children who also need a language sample since the SALT analysis would also be applicable to that assessment type without additional work. However, this method could also be used without the SALT software, and simply used for identifying each strategy used by the DHH child during a peer entry task. The data could be used for knowing what strategies the child knows, uses the most, and which strategies are ignored or rejected by their peers. This information could provide valuable information when assessing pragmatic language abilities.

Table 4. Initiation Types

Type	Definition by DeLuzio & Girolametto (2011, p. 1202)	Examples and Explanations
Direct Initiation	“An overt request for access into an interaction or play activity”	<ul style="list-style-type: none"> - Can I play with you? - Play with me? - Let’s play cars!
Related Activity	Making a comment or asking a question related to ongoing play activities.	<p>-Any time there is no direct request to join or invitation for others to join play but the child enters into the play already happening with a relevant comment or question</p> <p>-If some children were playing with stuffed dogs and another child approached with a dog and said, “My dog is eating his favorite food” or “What does your dog eat?”</p>
Unrelated Activity	Making a comment about objects, events, people, or feelings that are in no way related to the topic already being entertained by the other children.	<p>-Similar to related activity but comments/questions have no relevance to ongoing activity</p> <p>-if some children were playing with blocks and a child came up with a stuffed dog and said “My dog is eating his favorite food” or “I like my shirt today”</p>

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Wait and Hover	Entails a child observing and/or circling around a play area without making an attempt to join the ongoing play.	<p>-Standing around and watching other children play without any attempt to join</p> <p>-Following other children around at a short distance, watching them but making no attempts to join in.</p> <p>-Proximity to and observing play can be a clue to children with developed pragmatic language skills to invite the observer into the activity.</p>
Disruption	When a child interrupts an ongoing play activity, this typically leads to a negative social interaction	<p>-Grabbing a toy away</p> <p>-Knocking other children's blocks over</p> <p>-Generally messing up any activity they are trying to join in whatever way possible</p>

No study to date has researched how preschoolers who are DHH initiate play with other DHH children, nor how this compares to the play initiations of NH preschoolers with NH preschoolers. Knowing what DHH preschoolers do in a natural setting with their DHH peers will give clinicians insight into the status of pragmatic language skills of DHH children in preschool, and what types of initiations DHH preschoolers are more likely to make and respond to. Knowing these likelihood factors can help clinicians plan

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therapy targeting pragmatic language abilities for children in both DHH specialized school programs and mainstreamed programs.

Research Questions

1. Given the different initiation types, how does initiation type of children who are DHH compare to their same-age peers who are NH?
2. What is the frequency of success (as measured by a response from an intended peer within 5 seconds) of children who are DHH compared to their same-age peers who are NH?
3. What are the factors that are related to success of initiation for children who are DHH and children who are NH?

Hypotheses

It is hypothesized that children who are DHH will use the initiation types disruption, wait and hover, and unrelated activity more frequently than their same age peers with NH as measured by peer entry and calculated using the Friedman two-way analysis of variance.

It is also hypothesized that children who are DHH will have less success in terms of initiations (as measured by a response from an intended peer within 5 seconds) compared to their same age peers who are NH as measured by peer entry tasks and calculated using the MANN-Whitney U.

Based on previous studies, it is hypothesized that children who are female and have lesser degrees of hearing loss will have higher success rates of initiation as measured by a demographic questionnaire and the Friedman two-way analysis of variance.

Methods

Participants

Prior to initiation of the study, approval was obtained from the Idaho State University Institutional Review Board. Seven three- to five-year-old children who are DHH and use either hearing aids or cochlear implants were recruited for this study. They attend special preschool programs for children who are DHH on the same elementary school campus and are enrolled in either the Listening and Spoken Language or Total Communication classrooms. Additionally, seven four-year-old children were recruited from a preschool with children with NH. Each child's parents/guardians filled out the consent form in Appendix C. Each child had a demographic form to be filled out by their parents/guardians. The demographic form for participants who are DHH is located in Appendix D. The demographic form for NH participants is located in Appendix E. It is noted that some of the parents/guardians only signed consent forms and did not fill out demographic forms for both groups. Three of the seven parents/guardians of the participants who are DHH only signed a consent form and did not fill out a demographic form. Gender and hearing amplification technology were filled out for these participants if apparent in the videos taken. One of the parents/guardians of the participants who are NH did not fill out a demographic form and that participants gender and age was completed by the preschool teacher.

Each child who participated in the NH group either had a report of no hearing concerns or passed a hearing screening conducted at 20 dB HL at 1000, 2000, and 4000 Hz. The form used to record result during their hearing screening is located in Appendix F. This is the general form used by Idaho State University (ISU) for pediatric hearing

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screenings. One child's parents did not indicate if they passed a newborn hearing screening nor gave permission to check the child's hearing. However, the child's preschool teacher reported that the participant hears her consistently and attends to small/quiet noises in the classroom. Another parent did not give permission to screen their child's hearing but reported no hearing concerns and that their child passed their newborn hearing screening. All other children used in the analysis passed a hearing screening conducted by the author in a quiet room at their preschool at 20 dB HL at 1000, 2000, and 4000 Hz.

It is noted that one of the seven NH participants failed their hearing screening in both ears. This child's data was not included in the analysis, and this participant was dropped from the study. In the right ear the participant failed at 20 dB HL at 1000 Hz and 2000 Hz but passed at 4000 Hz. In the left ear she failed at 20 dB HL at 1000 Hz but passed at 2000 Hz and 4000 Hz. Otoscopy was also performed. It was noted that this participant had a blockage from a foreign object in her right ear. The left ear had a highly visible cone of light and appeared to be within normal limits for otoscopy. This participant was referred to their primary care physician for a foreign object in the ear. She was also referred to an audiologist for a full audiological evaluation. This child's data concerning initiations and success was coded but not used in the total analysis comparing children with NH to children who are DHH.

Collection Procedure

Participants were video recorded during interactions with their peers during a choice time context at their respective preschool locations. Stations were set up with familiar toys and all participants were allowed to play with those items in a specified

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area. The video function on five iPad mini devices were used for DHH preschool and four were used for the NH preschool. One less iPad was used at the NH preschool because it became unavailable since it was being used by other researchers at Idaho State University on the days data was collected. All verbal and non-verbal interactions were still adequately recorded in the NH preschool despite using one less camera than the DHH preschool. The videos were used to record all of the participants initiation types used with peers, which modality was used, and the success of those initiations. Participants were recorded twice for fifteen minutes, the duration of their choice time play, on two separate days.

Participants were told that they were being recorded, to play with their peers, and instructed not to touch the iPad mini devices. It was important to give this instruction because the kids could see the videos of themselves reflected in the “selfie” view of the device cameras, they were in the room when the devices were being set up. They required instruction of what they were supposed to do next during their preschool time in order to transition from a book reading activity in both preschools.

Educators were instructed to let the children play without interference. However, at times the children addressed their teachers from across the room or started fighting and asked for help. Due to these factors, adult interactions are included in the recordings in these instances if they occurred in view of the cameras. Some redirection occurred from participants standing in front of cameras and making faces so that other interactions could be seen also occurred, participants would be told “leave the camera alone, go play”. These situations occurred at both preschool locations during both recordings.

Video Analysis and Measures

Each initiation attempted by or directed towards a target child was transcribed and labeled by type of initiation, modality used, and the success of the initiation. These measures were recorded on individual Microsoft Excel spreadsheet tabs for each participant. This study followed the definition of initiation stated and used by Vandell and George (1981): "Initiation was defined as any act that was clearly (in the coder's judgement) directed to the peer and was not part of an existing interaction" (p. 629). In this study, an initiation was considered successful if it yielded a response from an intended peer within 5 seconds (Weisel et al., 2005). Responses that were considered successful included both verbal (spoken language and sounds) and nonverbal (head turn, head nod/shake, offering of a toy) reactions. Initiation types and modalities were modeled after the Deluzio & Girolametto (2001) study. Initiation types were: none, related activity, unrelated activity, wait and hover, disruption, and direct. Modalities were: verbal, gestural, and combination. Two initiation types were added during coding, and all videos previously coded were reviewed after the change was made. See discussion for more details. The initiation types added were parallel play and social attention (Rubin et al., 1978; Fantuzzo et al., 1996). All initiation types and modalities used in this study with examples and any special considerations are included in the Coding Guide used by the researchers in Appendix B.

In some instances, the children addressed their teachers from across the room or started fighting and asked for help so adult interactions are included in the recordings. If the interactions occurred in sound of the cameras, these initiations/interactions were also coded.

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Video recordings, consent forms, and demographic forms were all kept in the HATCH lab at Idaho State University—Meridian (ISU) which is kept locked and is only accessible to research personnel. Consent and demographic forms were kept in clearly marked confidential folders. Videos were kept on a computer which required a password to gain access to, a flash drive back-up in the folders, and on the secure HIPPA-approved internet service, BOX. All coding Microsoft Excel files were also kept on Box but contained no personal identification information (PHI). All videos, files, and forms will be destroyed upon completion of this research.

All videos were coded by the author, a graduate student in Speech-Language Pathology. To check for inter-judge reliability, one undergraduate student majoring in Communication Sciences and Disorders also coded 20% of the videos. The undergraduate student completed the Social/Behavioral Research Course training module on the Collaborative Institutional Training Initiative (CITI) which is required before participating in research with human subjects and was approved by the ISU Institutional Review Board before participating as a researcher. It is noted that the author already completed this requirement before the study began. The undergraduate student was trained by the author using only the Coding Guide located in Appendix B. It is noted that the aforementioned changes to the coding process were made before the undergraduate student was trained and started the coding process. Originally, two undergraduate students were selected, but one dropped out due to family circumstances and was unable to participate as a researcher. Due to time constraints no other research personnel were recruited.

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Inter-judge reliability was 61.4%. Due to the low number a meeting was held between the two researchers coding the videos. It was found that the two researchers were consistently coding multiple similar interactions differently, and systematic changes to the coding were made. It was noted that the researcher brought in for determining reliability had ignored certain aspects of the Coding Guide while coding the videos. After this meeting the inter-judge agreement was 98.2%. Any systematic changes/decisions affecting the coding of the primary researcher were noted and all the video codes were reviewed to reflect these changes. It is noted that the primary researcher's coding file was in 80% agreement with the final coding product used for statistical analysis.

Results

There were seven children who are DHH ages three- to five-years-old who participated in the study. Four of the children had completed demographic forms that accompanied that consent form. There were three males and four females. Five of them were enrolled in a Total Communication preschool class and the other two were enrolled in a Listening and Spoken Language class. Demographics for the participants who are DHH that are available are located in Table 5. There were seven children who are NH ages three- to five-years-old who participated in the study, five females and two males. One female was excluded from all data analysis after she failed the hearing screening.

Table 5. DHH Demographic Information

Participate Code Number	101F	103F	104F	107M
Gender	F	F	F	M
Amplification Currently Used	HA	HA	CI	CI
Age in Months	72	49	48	54

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Age in Months when Hearing Loss Confirmed	0	0	0	3
Age in Months When Fit with Hearing Technology	2	2	-	11
ASL or Signs Used in Home with Child	Y	Y	Y	Y
Spoken Language Used in Home with Child	Y	Y	Y	Y
ASL or Signs Used in Home by Child	Y	Y	Y	Y
Spoken Language Used in Home by Child	Y	Y	Y	N
Other Languages Used in Home (in addition to English or ASL/sign)	-	Ch	Sp	-
Functional Hearing Ability ^a	2	1	3	2
Sibling # of #. (#/#)	2/2	2/2	2/2	1/2
Race	W	A	O	W
Mothers Education Level	SHS	BD	VD	MD
Father's Education Level	HS	BD	SHS	VD

Note. F=female; M=male; Y=Yes; N=No; ASL=American Sign Language; HA=Hearing Aid; CI= Cochlear Implant; W=White; A=Asian; O=Other; Ch=Chinese; Sp=Spanish; SHS= Some High School; BD=Bachelor's Degree; VD=Vocational Degree; MD= Master's Degree; HS=High School Diploma.

^aFunctional Hearing Ability is a rating scale that was filled out by parents on the demographic form located in Appendix D. It is how their hearing functions while using their hearing amplification. It has four levels: 1-Functions Normally, 2-Mildly Limited, 3-Severely Limited, and 4- No Functional Hearing.

Raw Data

All initiations, modalities, and rates of success of the DHH and NH groups were analyzed. The individual and group count results for the DHH group are represented

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below in tables 7-9. The individual and group count results for the NH group are represented below in tables 10-12. The key for all tables is found in Table 6. It is noted that one participant, code 104 F, from the DHH group was absent from preschool the second day of data collection. Only 15 minutes of her peer entry behaviors during choice time play are included in this study while all other participants have the full 30 minutes included in the data. The information in tables 7-12 was used to run the nonparametric statistics to determine significance and includes all of the count data recorded during the coding of the video interactions.

Table 7 displays the count data for each participant in the DHH group's successful initiations and modalities used. Group totals are also included. The initiation type and modality used most for this group that were successful were unrelated activity and gestural. Table 8 displays the count data for each participant in the DHH group's unsuccessful initiations and modalities used. Group totals are also included. The initiation type and modality used most for this group that were unsuccessful were disruption and gestural. Table 9 displays the total initiations and modalities used regardless of success for the DHH group. The initiation type and modality used the most overall were unrelated activity and gestural.

Table 10 displays the count data for each participant in the NH group's successful initiations and modalities used. The initiation type and modality used most for this group that were successful were direct and verbal. Group totals are also included. Table 11 displays the count data for each participant in the NH group's unsuccessful initiations and modalities used. Group totals are also included. The initiation type and modality used most for this group that were unsuccessful were disruption and verbal with combination

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in close second. Table 12 displays the total initiations and modalities used regardless of success for the NH group. The initiation type and modality used the most overall were direct and verbal.

Table 6. Key for All Other Tables

Initiation Types		Abbreviation
None		None
Direct		Dir
Related Activity		Rel
Unrelated Activity		Unre
Wait and Hover		W&H
Disruption		Disr
Parallel Play		Par
Adjacent Social Attention		Adj
Modalities		Abbreviation
Verbal		Verb
Gestural		Gest
Combination		Combo
Colors		Meaning
		Child Codes
		Totals
		Successful Initiation Types
		Successful Modalities
		Unsuccessful Initiation Types

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	Unsuccessful Modalities
	Initiations and Modalities (without success factored)
	Other
Other	Abbreviation
Child Codes for Males	[Code Number]M Example: 102M
Child Codes for Females	[Code Number]F Example: 101F
Statistically Significant (for numbers in charts)	Colored red

Table 7. DHH Group Individual and Group Successful Initiations and Modalities Totals

-	Type—Successful								Modality—Successful		
CHILD CODE	None	Dir	Rel	Unre	W&H	Disr	Par	Adj	Verb	Gest	Combo
101F	0	9	2	6	0	0	0	1	3	10	4
102M	1	4	7	7	0	0	0	0	1	16	1
103F	0	2	3	9	0	0	0	2	6	3	7
104F	0	1	2	0	1	0	1	0	0	4	0
105M	0	1	15	3	0	0	0	0	14	0	5
106M	0	1	3	2	0	0	2	1	5	2	2
107M	0	1	4	4	2	0	4	0	2	10	0
Totals	1	19	36	31	3	0	7	4	31	45	19

Note. DHH= Deaf or Hard of Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention; Verb=Verbal; Gest=Gestural; Combo=Combination.

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Table 8. DHH Group Individual and Groups Unsuccessful Initiations and Modalities Totals

-	Type—Unsuccessful								Modality—Unsuccessful		
CHILD CODE	None	Dir	Rel	Unre	W&H	Disr	Par	Adj	Verb	Gest	Combo
101F	2	0	0	6	2	15	1	0	1	19	2
102M	1	1	3	3	1	2	3	1	0	13	0
103F	5	0	0	5	0	7	1	2	1	5	7
104F	4	0	0	0	0	1	0	0	0	1	0
105M	0	1	0	2	1	0	0	0	2	0	1
106M	0	0	0	0	0	1	0	0	0	1	0
107M	4	0	0	1	3	0	0	5	0	5	1
Totals	16	2	3	17	7	26	5	8	4	44	11

Note. DHH= Deaf or Hard of Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention; Verb=Verbal; Gest=Gestural; Combo=Combination.

Table 9. DHH Group Total Initiations and Modalities Used

-	None	Dir	Rel	Unre	W&H	Disr	Par	Adj	Verb	Gest	Combo
Successful	1	19	36	31	3	0	7	4	31	45	19
Unsuccessful	16	2	3	17	7	26	5	8	4	44	11
Totals	17	21	39	48	10	26	12	12	35	89	30

Note. DHH= Deaf or Hard of Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention; Verb=Verbal; Gest=Gestural; Combo=Combination.

Table 10. NH Group Individual and Group Successful Initiations and Modalities Totals

-	Type—Successful								Modality—Successful		
CHILD CODE	None	Dir	Rel	Unre	W&H	Disr	Par	Adj	Verb	Gest	Combo
109F	0	5	7	9	0	0	2	0	14	1	8
110F	0	13	3	4	0	2	0	0	12	1	9
111F	0	2	1	0	2	0	0	0	0	1	2
112F	0	10	7	9	9	0	0	0	16	0	10
113M	0	10	7	4	0	0	0	1	17	2	3
114M	0	5	8	1	0	0	0	2	13	2	1
Totals	0	45	33	27	11	2	2	3	72	7	33

Note. NH=Normal Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention; Verb=Verbal; Gest=Gestural; Combo=Combination.

Table 11. NH Group Individual and Group Unsuccessful Initiations and Modalities Totals

-	Type—Unsuccessful								Modality—Unsuccessful		
CHILD CODE	None	Dir	Rel	Unre	W&H	Disr	Par	Adj	Verb	Gest	Combo
109F	0	2	0	5	0	5	0	1	4	3	6
110F	0	2	0	3	0	2	0	0	3	1	3
111F	0	1	0	2	1	0	1	0	2	3	0
112F	1	3	0	8	0	7	0	0	8	2	8
113M	2	1	1	0	0	8	0	0	3	4	3
114M	1	1	0	0	1	0	0	0	1	0	0
Totals	4	10	1	18	2	22	1	1	21	13	20

Note. NH=Normal Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention; Verb=Verbal; Gest=Gestural; Combo=Combination.

Table 12. NH Group Total Initiations and Modalities Used

-	None	Dir	Rel	Unre	W&H	Disr	Par	Adj	Verb	Gest	Combo
Successful	0	45	33	27	11	2	2	3	72	7	33
Unsuccessful	4	10	1	18	2	22	1	1	21	13	20
Totals	4	55	34	45	13	24	3	4	93	20	53

Note. NH=Normal Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention; Verb=Verbal; Gest=Gestural; Combo=Combination.

Initiations Total Use Regardless of Success Group Comparison

Total Initiations. The Mann-Whitney U was used to analyze all initiation types, regardless of success, to identify if there was a significant difference in the amount of use for each type. The probability for each initiation type being used by one group over the other and the total number count for each type is included in Table 13. Direct was the only initiation type that was significant ($p=0.02$) for being used more by the NH group as compared to the DHH group with the NH group using it 34 times more than the DHH group. Figure 1 displays the total use of each initiation type by group.

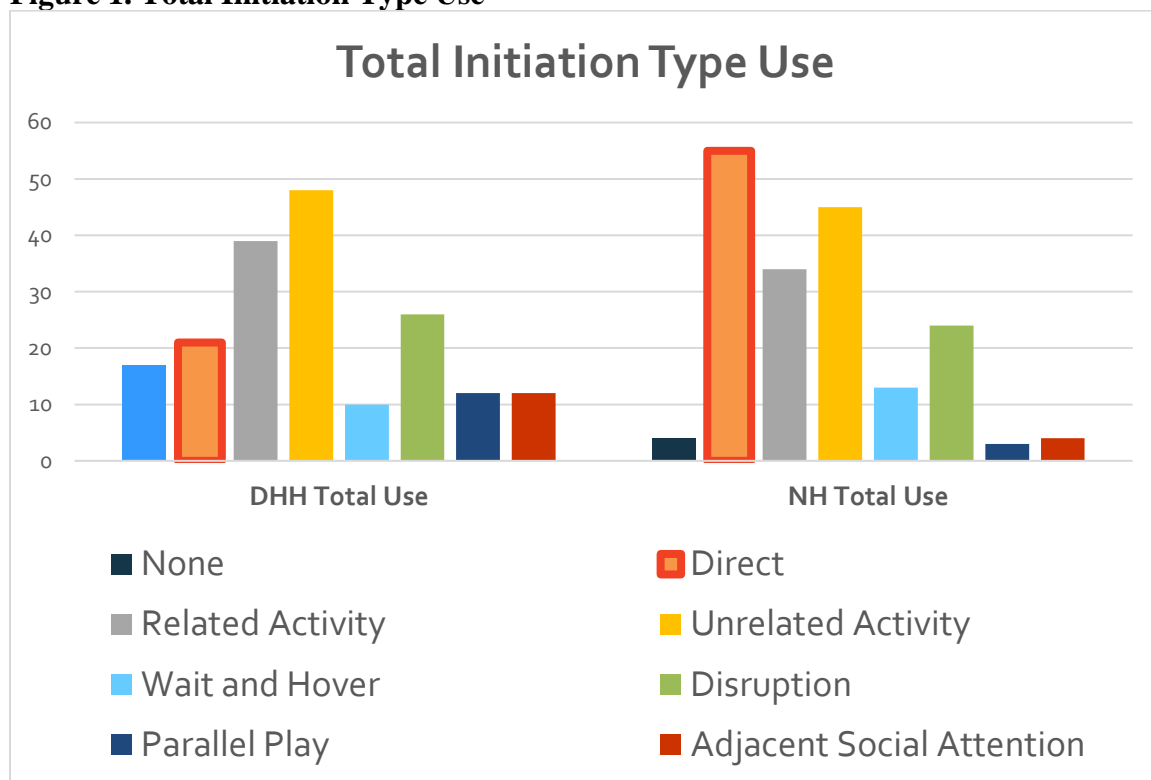
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Table 13. Total Initiations

Type	DHH Total Use	NH Total Use	Probability > Z
None	17	4	0.12
Direct	21	55	0.02
Related Activity	39	34	0.83
Unrelated Activity	48	45	0.94
Wait and Hover	10	13	0.88
Disruption	26	24	0.77
Parallel Play	12	3	0.08
Adjacent Social Attention	12	4	0.41
Total Initiations	185	182	-

Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing.

Figure 1. Total Initiation Type Use



Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing.

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Percent of Use. The percentage of use for each initiation type by group was identified and is summarized in Table 14. The order of use from most to least for the DHH group is as follows: unrelated activity, related activity, disruption, direct initiation, none, wait and hover, adjacent social attention, and parallel play. The order of use from most to least for the NH group is as follows: direct initiation, unrelated activity, related activity, disruption, wait and hover, none, adjacent social attention and parallel play. It is noted that the top 4 in each group (and all categories over 10% in both groups) were the same initiation types but in different orders.

Table 14. Initiation Types Percent of Use by Group

Type	DHH	NH
None	9.2	2.2
Direct Initiation	11.4	30.2
Related Activity	21.0	18.7
Unrelated Activity	25.9	24.7
Wait and Hover	5.5	7.1
Disruption	14.1	13.2
Parallel Play	6.4	1.6
Adjacent Social Attention	6.4	2.2

Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing.

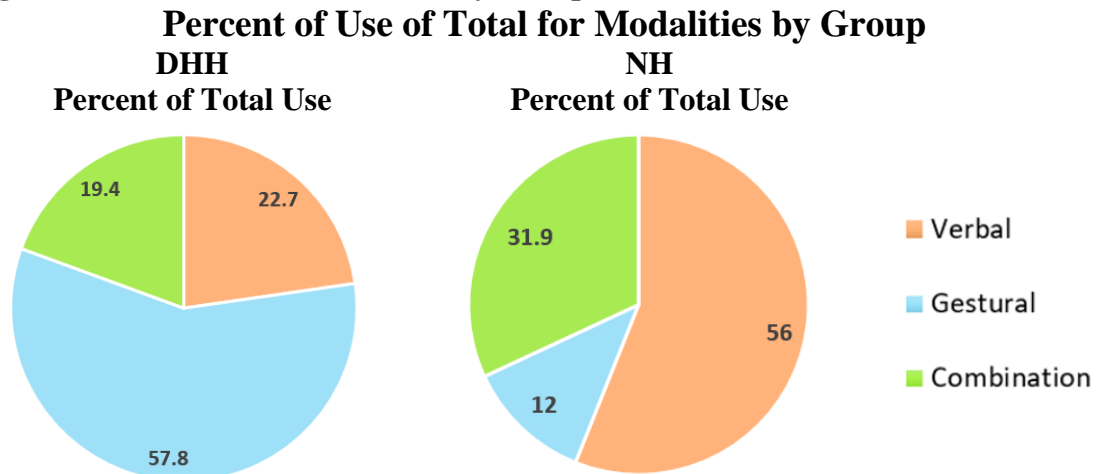
Modalities Total Use Regardless of Success Group Comparison

The percentage of use for each modality by group was identified and is summarized in Figure 2. The order of use from most to least for the DHH group is

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gestural, verbal, combination. The order of use from most to least for the NH group is verbal, combination, gestural.

Figure 2. Modalities Percent of Use by Group



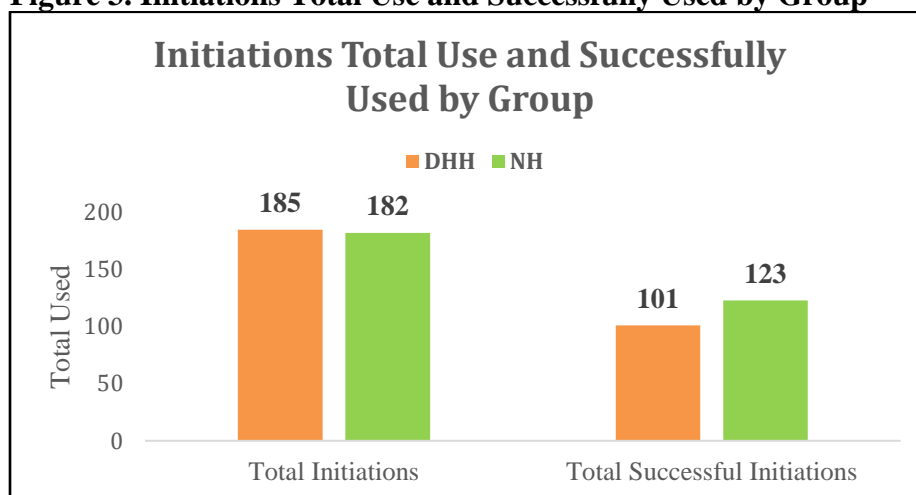
Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing.

Overall Success Rates

The Wilcoxon Signed Rank was used to determine if there was a significant difference between the total success rates between the DHH group and the NH group.

There is no significant difference between the total successful and unsuccessful initiations between the DHH and NH groups. Figure 3 provides displays the total number of initiation bids, or attempts at peer entry, used by each group and the amount that were successful.

Figure 3. Initiations Total Use and Successfully Used by Group



Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing.

Success Rates for Initiations

DHH Group. The Wilcoxon Signed Rank was used to examine if any initiation types were significantly more successful within the DHH group. Table 15 displays the total count of each successful and unsuccessful initiation bids by type and the probability that it is significantly different. Direct initiation and related activity were the two types significantly more likely to be successful for the DHH group. The percentage of use for each initiation type coupled with success rates are listed in Table 16. Figure 4 visually represents the percent of use for all successful initiation types. For the successful initiations, the types were used in the following order from most to least: related activity, unrelated activity, direct initiation, parallel play, social adjacent attention, wait and hover, and none. For the unsuccessful initiations, the types were used in the following order from most to least: disruption, unrelated activity, none, adjacent social attention, wait and hover, parallel play, related activity, and direct initiation.

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Table 15. DHH Success by Initiation

Type	Total Successful	Total Unsuccessful	Probability > S
None	1	16	^a
Direct Initiation	19	2	0.03
Related Activity	36	3	0.02
Unrelated Activity	31	17	0.06
Wait and Hover	3	7	0.31
Disruption	0	26	0.06
Parallel Play	7	5	0.84
Adjacent Social Attention	4	8	1.0
Grand Total	101	84	-

Note. DHH=Deaf or Hard of Hearing.

^aThe probability was unable to be calculated for none due to a lack of statistical power.

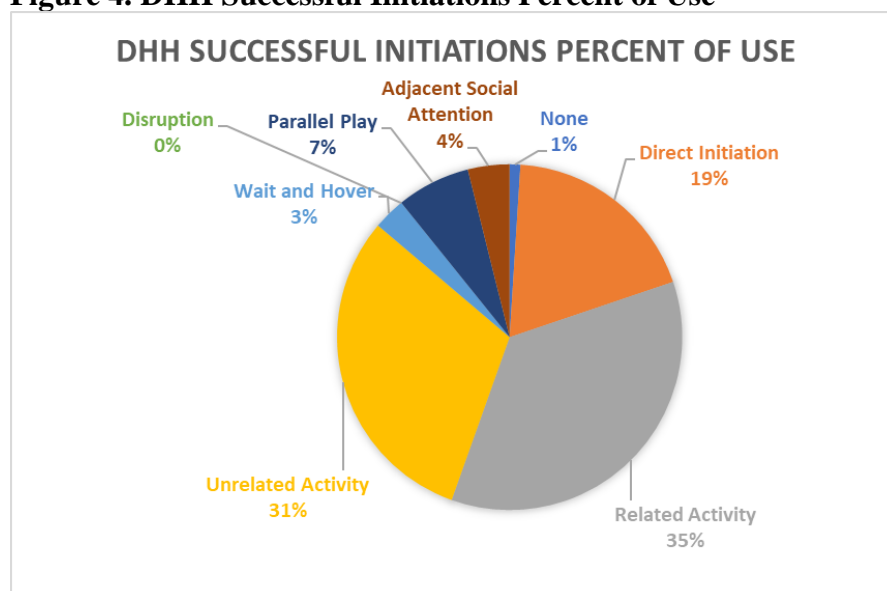
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Table 16. DHH Initiation Percent of Use by Success Rate

	Percent of Total Successful Initiations	Percent of Total Unsuccessful Initiations	Percent of Times Successful When Type Was Used
None	1.0	19.0	<1
Direct Initiation	18.8	2.3	90.4
Related Activity	35.6	3.5	92.3
Unrelated Activity	30.7	20.2	64
Wait and Hover	3.0	8.3	30
Disruption	0	31.0	0
Parallel Play	6.9	5.9	58.3
Adjacent Social Attention	3.9	9.5	33.3

Note. DHH=Deaf or Hard of Hearing.

Figure 4. DHH Successful Initiations Percent of Use



Note. DHH=Deaf or Hard of Hearing.

NH Group. The Wilcoxon Signed Rank was used to examine if any initiation types were significantly more successful within the NH group. Table 17 displays the total

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count of each successful and unsuccessful initiation bids by type and the probability that it is significantly different. Direct initiation and related activity were the two types significantly more likely to be successful for the NH group. The percentage of use for each initiation type coupled with success rates are listed in Table 18. Figure 5 visually represents the percent of use for all successful initiation types. For the successful initiations, the types were used in the following order from most to least: direct initiation, related activity, unrelated activity, wait and hover, adjacent social attention, parallel play, disruption, and none (it is noted that disruption was never successful for the NH group.) For the unsuccessful initiations, the types were used in the following order from most to least: disruption, unrelated activity, direct initiation, none, wait and hover, related activity, adjacent social attention, and parallel play.

Table 17. NH Success by Initiation

Type	Total Successful	Total Unsuccessful	Probability > S
None	0	4	^a
Direct Initiation	45	10	0.03
Related Activity	33	1	0.03
Unrelated Activity	27	18	0.25
Wait and Hover	11	2	0.75
Disruption	2	22	0.25
Parallel Play	2	1	1.0
Adjacent Social Attention	3	1	.75
Grand Total	123	59	-

Note. NH=Normal Hearing.

^aThe probability was unable to be calculated for none due to a lack of statistical power.

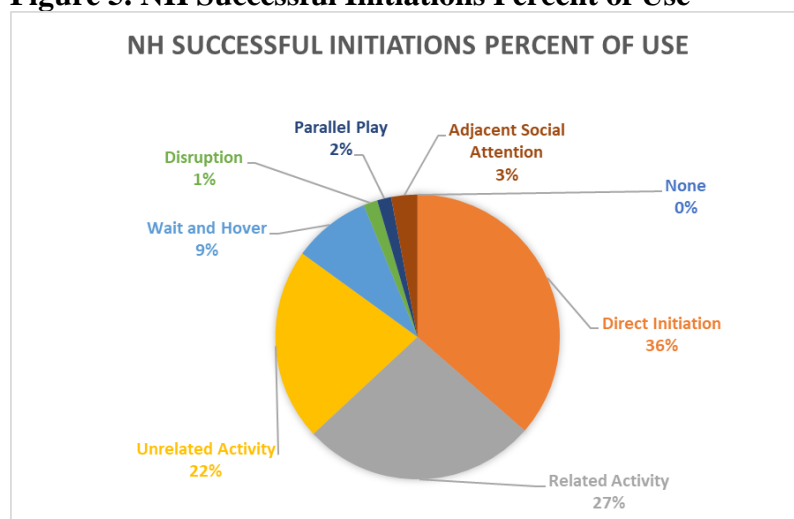
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Table 18. NH Initiation Percent of Use by Success Rate

Type	Percent of Successful Initiations	Percent of Unsuccessful Initiations	Percent of Times Successful Within Own Type
None	0	6.8	0
Direct Initiation	36.6	17.0	81.0
Related Activity	26.8	1.7	97.1
Unrelated Activity	22.0	30.5	60.0
Wait and Hover	8.9	3.4	84.6
Disruption	1.6	37.3	8.3
Parallel Play	1.6	1.7	66
Adjacent Social Attention	3	1.7	75

Note. NH=Normal Hearing.

Figure 5. NH Successful Initiations Percent of Use



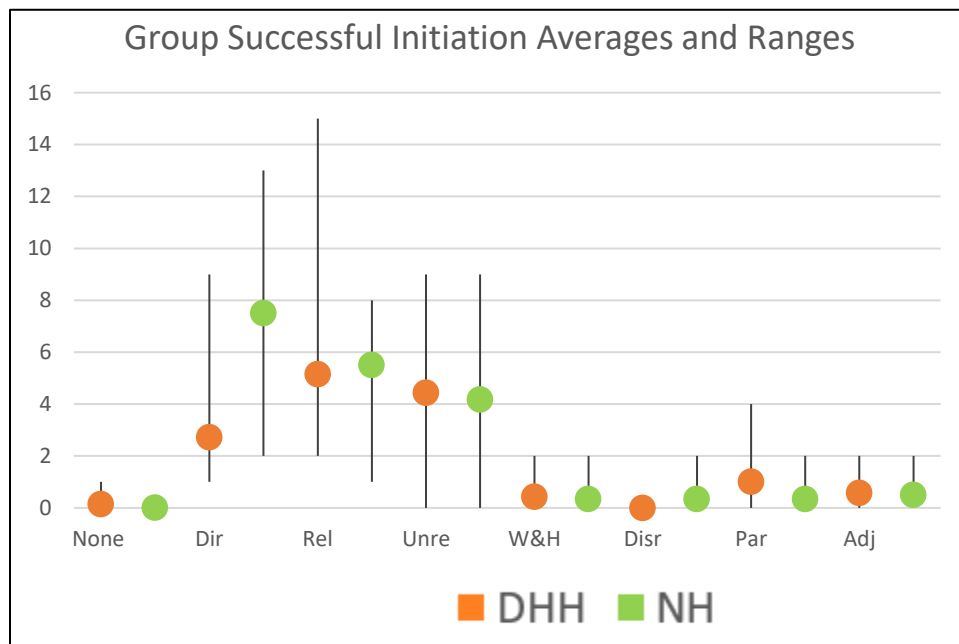
Note. NH=Normal Hearing.

Group Comparison. The findings reported above have been summarized and condensed in order to provide a more effective avenue for comparison of the two groups. Figure 6 displays the average number of times each initiation type was successful for each group in a side by side visual comparison. It also includes the ranges of success for

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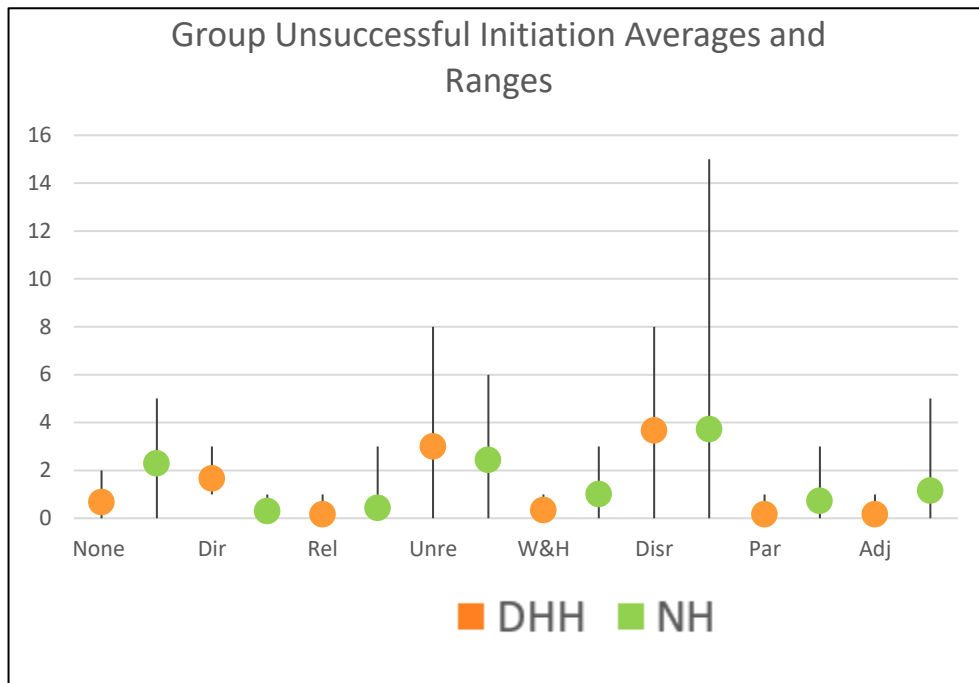
the participants in each group. Figure 7 displays the average number of times each initiation type was unsuccessful for each group in a side by side visual comparison. It also includes the ranges of success for the participants in each group. This type of comparison allows for a group against group comparison as well as illustrates the high variability between participants uses of each initiation type.

Figure 6. Group Successful Initiation Averages and Ranges by Type



Note. DHH= Deaf or Hard of Hearing; NH=Normal Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention;

Figure 7. Group Unsuccessful Initiation Averages and Ranges by Type



Note. DHH= Deaf or Hard of Hearing; NH=Normal Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention;

Success Rates for Modalities

DHH Group. The Wilcoxon Signed Rank was used to examine if any modalities were significantly more successful within the DHH group. Table 19 displays the total count of each time a modality was successful and unsuccessful and the probability that it is significantly different. Verbal was significantly more likely to be successful for the DHH group. The percentage of use for each modality coupled with success rates are listed in Table 20. The modalities used the most times overall to make a successful initiation in order from most to least are gestural, verbal, and combination. This differs from the percentage of times a modality was successful compared to its own modality type which in order from most to least are verbal, gestural, combination. This comparison

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is shown in Figure 8. The modalities used to make an unsuccessful initiation in order from most to least are gestural, combination, verbal.

Table 19. DHH Success by Modality

Modality	Total Successful	Total Unsuccessful	Grand Total of Type	Probability > S
Verbal	31	4	35	0.03
Gestural	45	44	89	0.66
Combination	19	11	30	0.19
Grand Total of Success	95	59	-	-

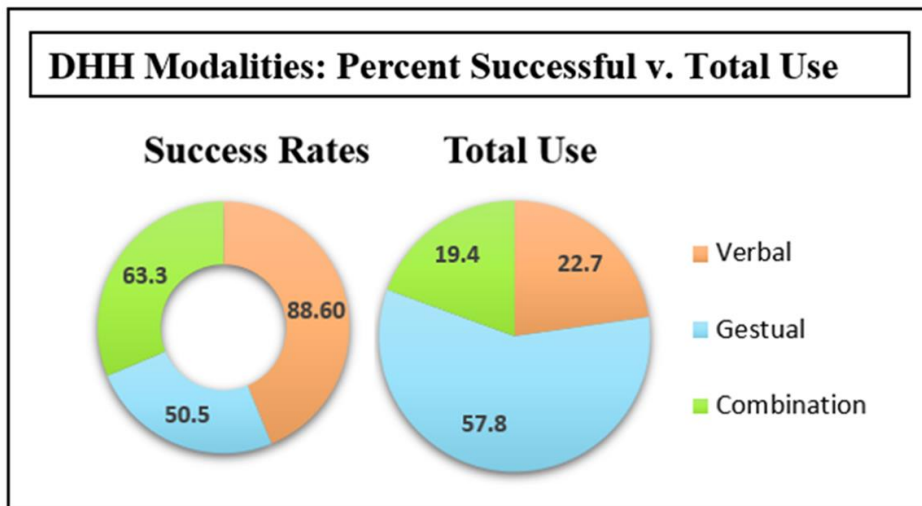
Note. DHH=Deaf or Hard of Hearing.

Table 20. DHH Modality Percent of Use by Success Rate

Type	Percent of Successful Modalities	Percent of Unsuccessful Modalities	Percent of Times Successful Within Own Type
Verbal	32.6	6.7	88.6
Gestural	47.3	74.6	50.5
Combination	20	18.6	63.3

Note. DHH=Deaf or Hard of Hearing.

Figure 8. DHH Modalities Percent Successful vs. Total Use



Note. DHH=Deaf or Hard of Hearing.

NH Group. The Wilcoxon Signed Rank was used to examine if any modalities were significantly more successful within the NH group. Table 21 displays the total count of each time a modality was successful and unsuccessful and the probability that it is significantly different. No modality was significantly more likely to be successful than another for the NH group. The percentage of use for each modality coupled with success rates are listed in Table 22. The modalities used the most times to make a successful initiation in order from most to least are verbal, combination, gestural. The modalities used to make an unsuccessful initiation in order from most to least are also verbal, combination, gestural.

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Table 21. NH Success by Modality

Modality	Total Successful	Total Unsuccessful	Grand Total of Type	Probability > S
Verbal	72	21	93	0.06
Gestural	7	13	20	0.38
Combination	33	20	53	0.06
Grand Total of Success	112	54	-	-

Note. NH=Normal Hearing.

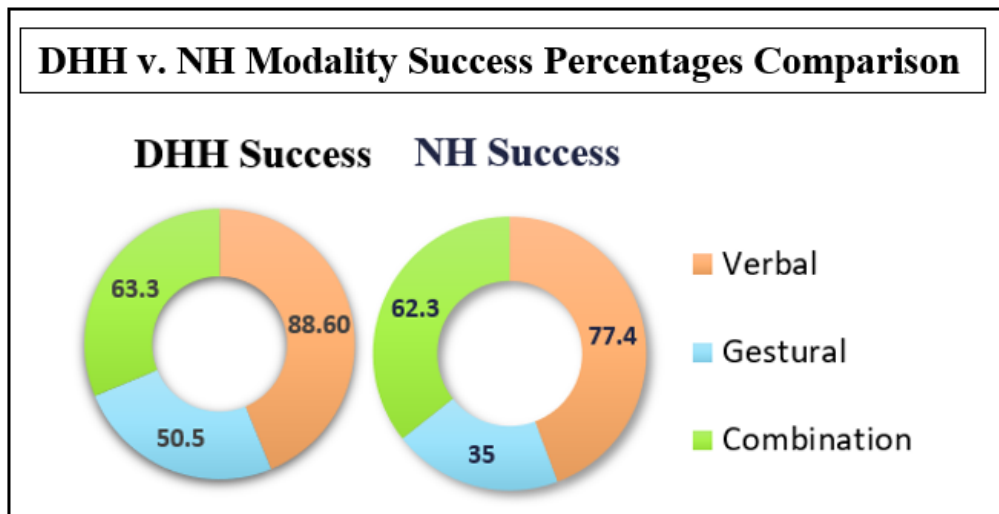
Table 22. NH Modality Percent of Use by Success Rate

Modality	Percent of Successful Modalities	Percent of Unsuccessful Modalities	Percent of Times Successful Within Own Type
Verbal	64.3	38.9	77.4
Gestural	6.3	24.1	35.0
Combination	29.5	37.0	62.3

Note. NH=Normal Hearing.

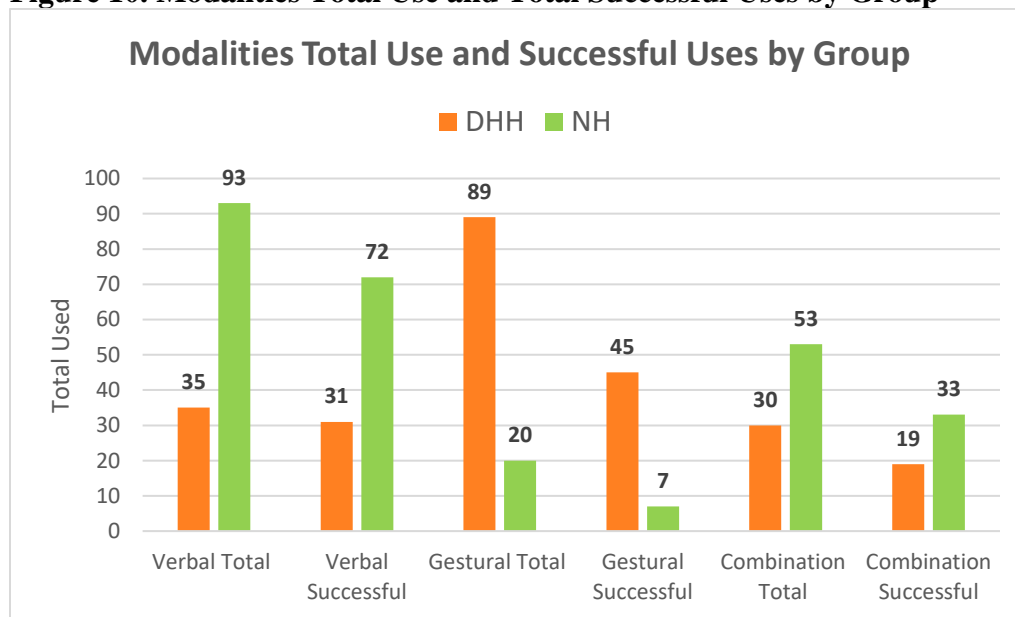
Group Comparison. The findings reported above have been summarized and condensed in order to provide a more effective avenue for comparison of the two groups. Figure 9 displays the percentage of times a modality was successful for each group in a side by side visual comparison. Figure 10 displays the count data for the total use and total successful uses of each modality for both groups for visual comparison.

Figure 9. DHH v. NH Modality Success Percentages Comparison



Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing.

Figure 10. Modalities Total Use and Total Successful Uses by Group



Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing.

Participant Who Failed the Hearing Screening from the NH Group

Participant code 108F who failed the hearing screening in the NH group participated in the free play activity, was present in the videos, and her peer entry interactions were recorded the same as all other participants. However, her results were

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not included in all of the analysis above. All of her original count data is located in Table 23. Her success rates for both initiations and modalities are included in Table 24. No formal statistics were done on her data due to lack of power.

Initiations. For the successful initiations, the types were used in the following order from most to least: direct initiation, related activity, and disruption (it is noted that all others were never successful). For the unsuccessful initiations, disruption was used the most followed by a tie for none, direct initiation, related activity, wait and hover, and parallel play. This participant never used the initiation strategies of unrelated activity nor adjacent social attention.

Modalities. The modalities used the most times to make a successful initiation in order from most to least are combination then verbal (she never used the gestural modality with a successful initiation). The modalities used to make an unsuccessful initiation in order from most to least are gestural then verbal (she never used the combination modality with an unsuccessful initiation).

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Table 23. Participant 108F Coding Data

-	Type—Successful								Modality—Successful		
CHILD CODE	None	Dir	Rel	Unre	W&H	Disr	Par	Adj	Verb	Gest	Combo
108F	0	2	2	0	0	1	0	0	2	0	3
	Type—Unsuccessful								Modality—Unsuccessful		
	None	Dir	Rel	Unre	W&H	Disr	Par	Adj	Verb	Gest	Comb
	1	1	1	0	1	3	1	0	1	6	0
	None	Dir	Rel	Unre	W&H	Disr	Par	Adj	Verb	Gest	Combo
Grand Totals	1	3	3	0	1	3	1	0	3	6	3
# Total Initiations: 13 # Total Successful Initiations: 5 # Total Unsuccessful Initiations: 8											

Note. Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention; Verb=Verbal; Gest=Gestural; Combo=Combination

Table 24. Participant 108 F Success Rates for Initiations and Modalities

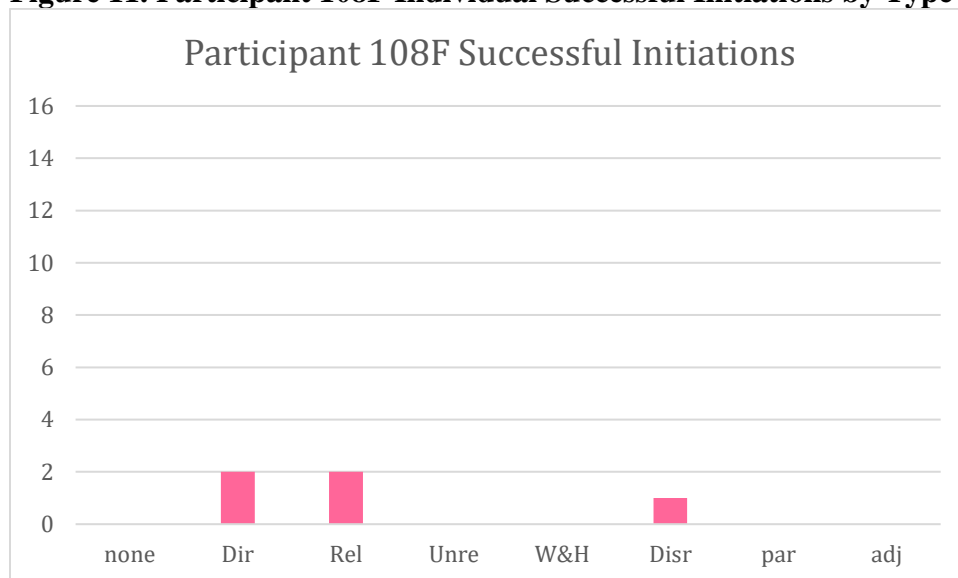
Types and Modalities	Percent of Successful	Percent of Unsuccessful	Percent of Times Successful Within Own Type
None	0	12.5	0
Direct Initiation	40	12.5	66.7
Related Activity	40	12.5	66.7
Unrelated Activity	0	0	n/a
Wait and Hover	0	12.5	0
Disruption	20	37.5	25
Parallel Play	0	12.5	0
Adjacent Social Attention	0	0	n/a
Verbal	40	14.3	66.7

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Gestural	0	85.7	0
Combination	60	0	100

Participant 108F's Comparison to NH Group. Participant code 108F who failed the hearing screening from the NH preschool can be used as a case study about how children whose hearing loss go unidentified approach peer entry. Her initiations can be compared to the individual initiations of all other participants in order to determine which participants or whole group her results most closely align with. Figures 11, 12 and 13 display the individual successful initiations sorted by type for 108F, the DHH group, and the NH group respectively. The individual unsuccessful initiations for 108F, the DHH group, and the NH group are below in figures 14, 15, and 16 respectively.

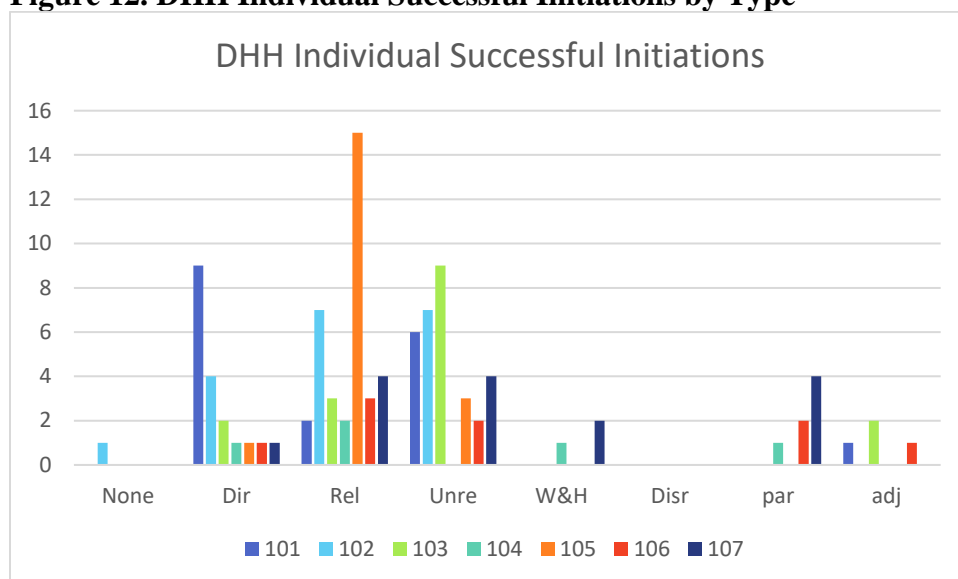
Figure 11. Participant 108F Individual Successful Initiations by Type



Note. Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention;

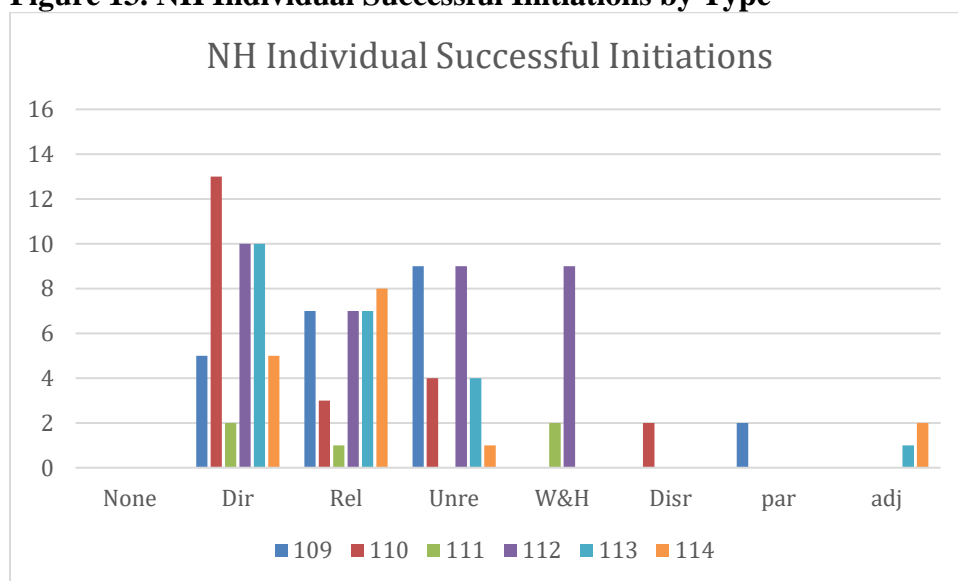
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Figure 12. DHH Individual Successful Initiations by Type



Note. DHH=Deaf or Hard of Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention;

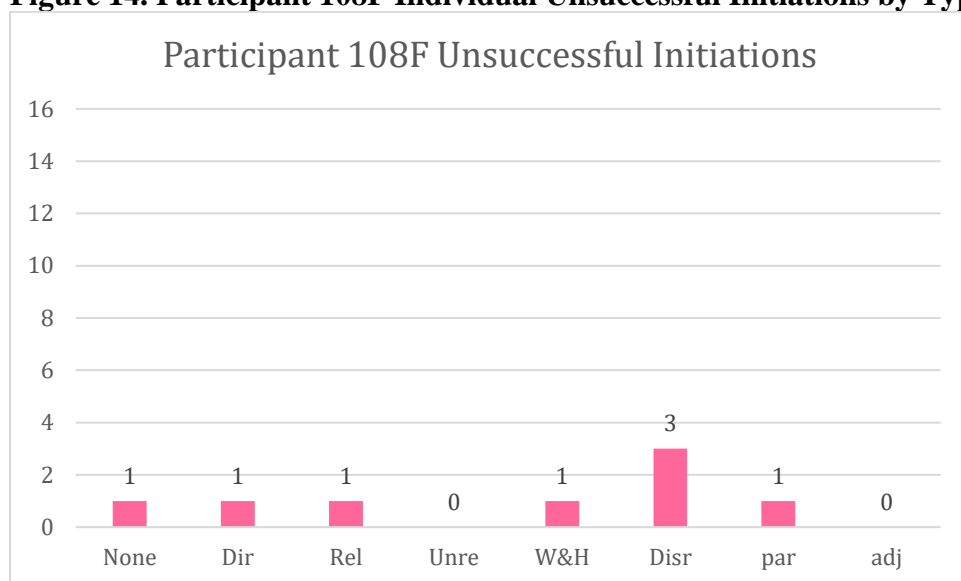
Figure 13. NH Individual Successful Initiations by Type



Note. NH=Normal Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention;

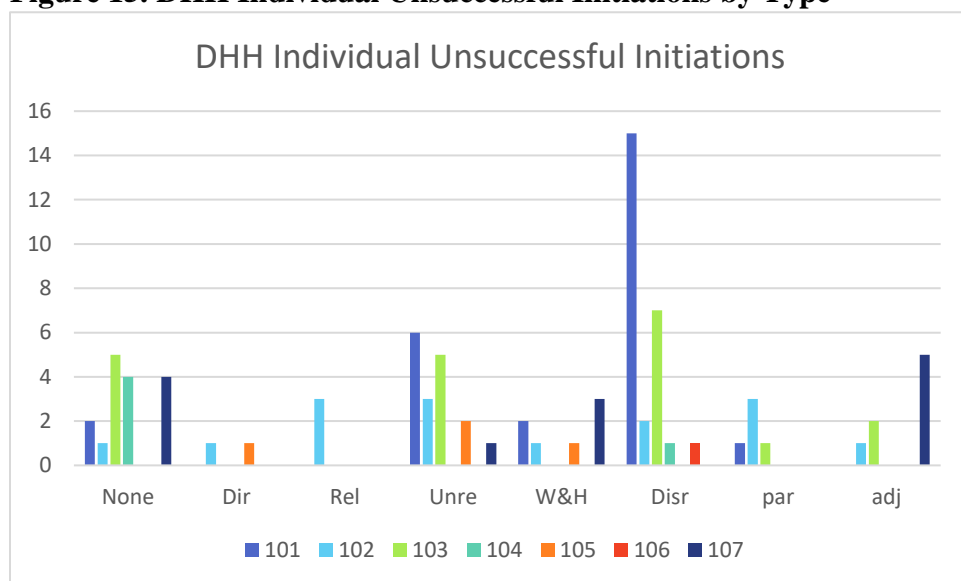
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Figure 14. Participant 108F Individual Unsuccessful Initiations by Type



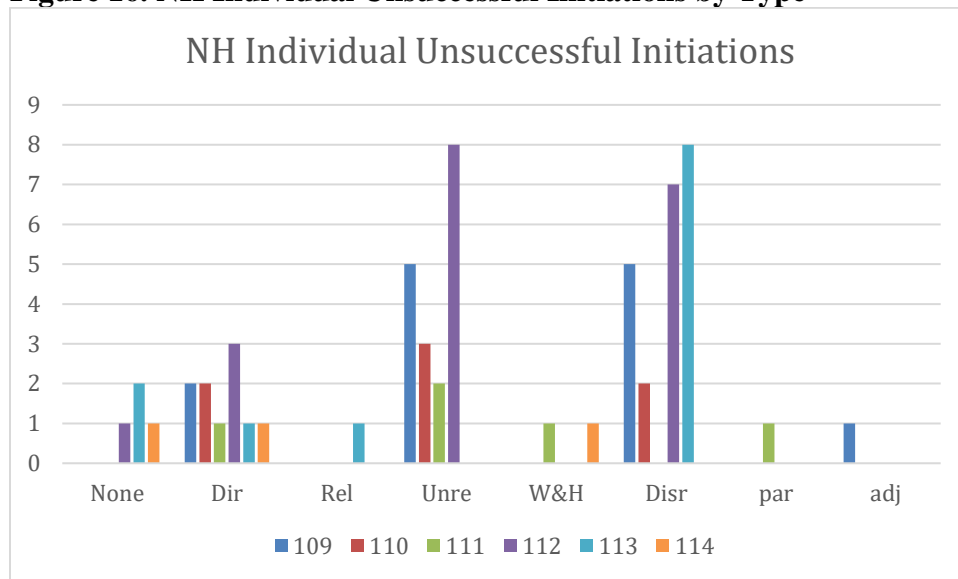
Note. Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention;

Figure 15. DHH Individual Unsuccessful Initiations by Type



Note. DHH=Deaf or Hard of Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention;

Figure 16. NH Individual Unsuccessful Initiations by Type



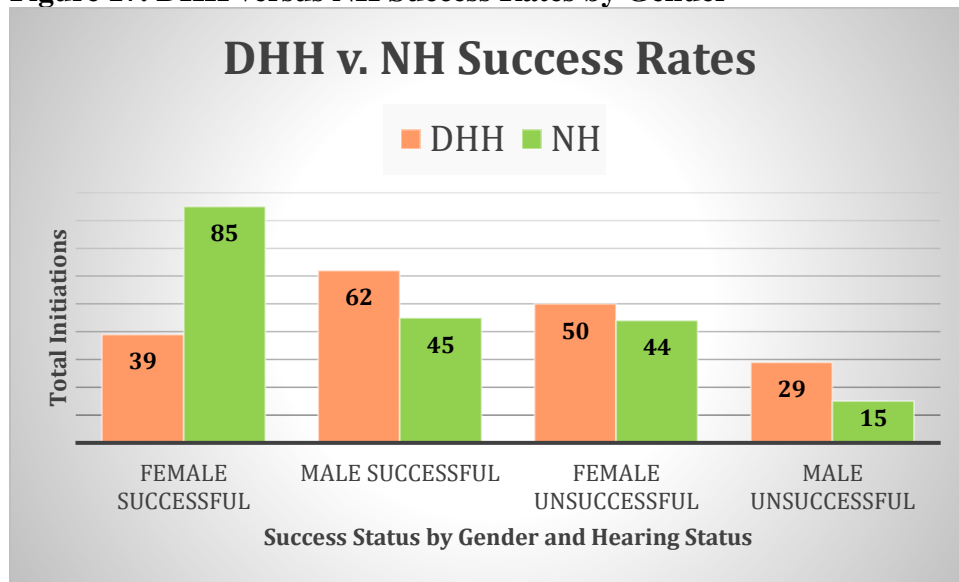
Note. NH=Normal Hearing; Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention;

Gender

When all participants both who are NH and DHH were analyzed together (to preserve power) using the Wilcoxon Signed Rank, it was found that males had a significantly higher success rates overall than females (probability $>F = 0.0346$). Figure 17 displays the total successful vs. total unsuccessful trend of males and females respective to their DHH and NH groups. Figure 18 displays the total female and male success trends with all participants combined from both groups combined.

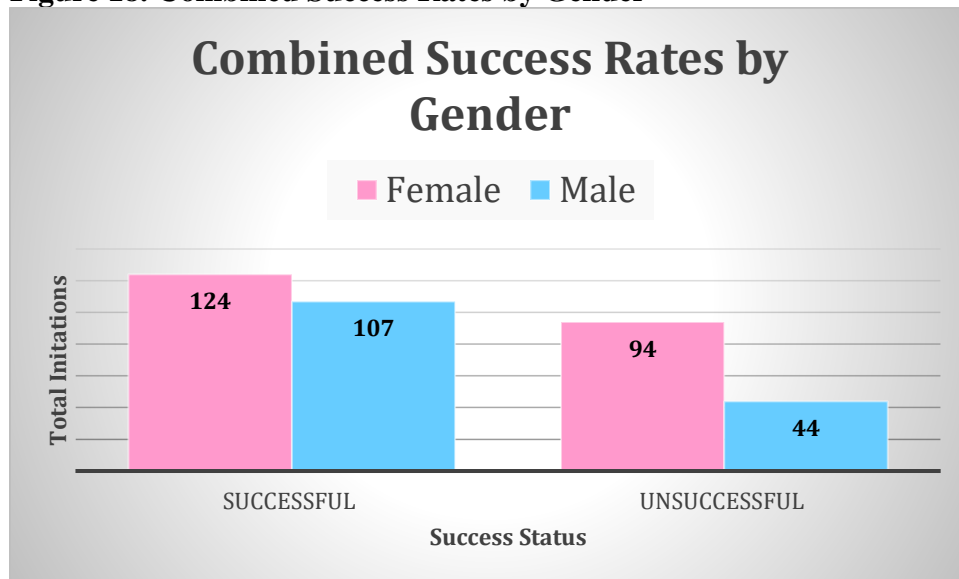
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Figure 17. DHH versus NH Success Rates by Gender



Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing.

Figure 18. Combined Success Rates by Gender



Other Demographic Factors

Due to lack of power with only four of the seven participants who are DHH filling out the demographic questionnaire in total, there was not enough power to run nonparametric statistics for the demographic factors. There are some demographics that

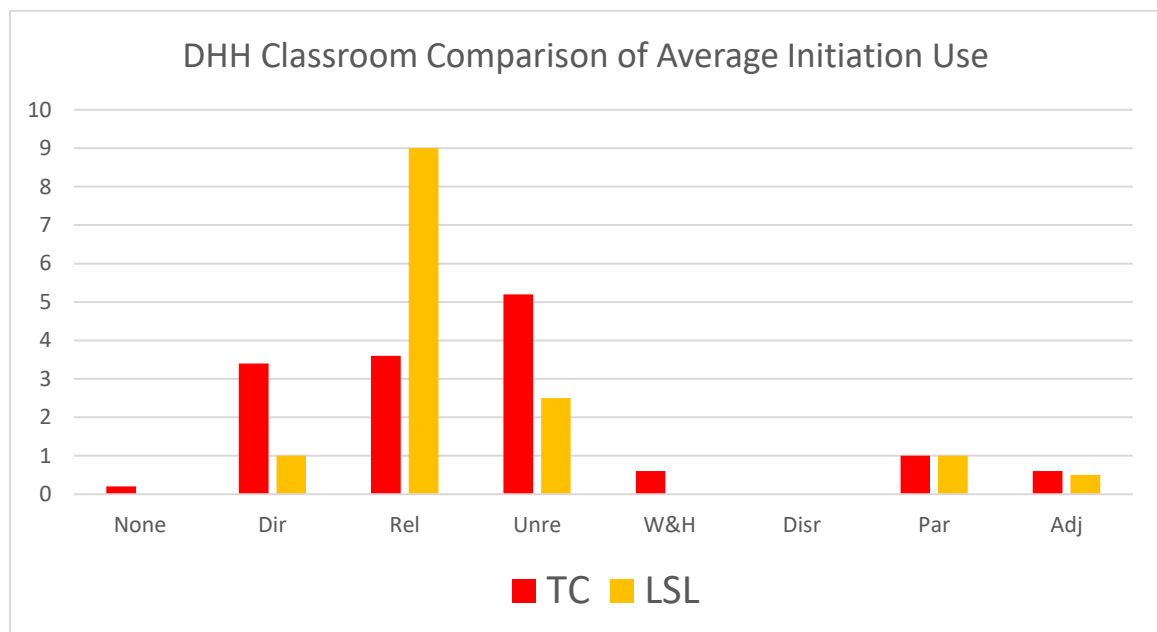
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may be the source of some of these four participants' successes and failures, which will be reviewed.

DHH Preschool Classroom Communication Mode

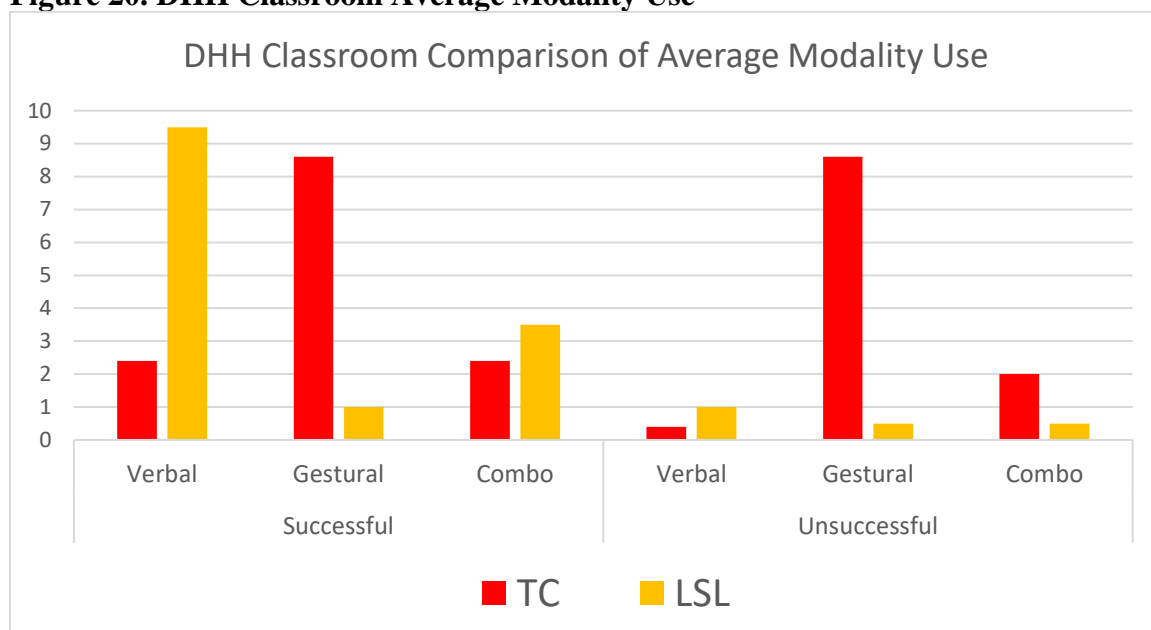
The preschool classroom placement for the participants who are DHH can be analyzed in order to showcase the communication preferences and differences between these two groups. Figure 19 shows that on average children in the TC class used unrelated activity more than any other type while children in the LSL class used the initiation type related activity more than any other type. Figure 20 shows that children in the TC class used gestural more than any other modality while the LSL class used verbal most successfully.

Figure 19. DHH Classroom Average Initiation Use



Note: Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention; TC=Total Communication Classroom; LSL=Listening and Spoken Language Classroom.

Figure 20. DHH Classroom Average Modality Use



Note: Dir=Direct Initiation; Rel=Related Activity; Unre=Unrelated Activity; W&H=Wait and Hover; Disr=Disruption; Par=Parallel Play; Adj=Adjacent Social Attention; TC=Total Communication Classroom; LSL=Listening and Spoken Language Classroom.

Alignment to Other Research: DHH Initiation Types Total Use

The results of total initiation type use, regardless of success, from this study can be compared to the results of the DeLuzio and Girolametto (2011) study from which the original six initiation strategies for this study originated. The percent usage from both studies is included in Table 25 and displayed in Figure 21.

Table 25. Initiation Types Percent of Use Comparison

-	Current Findings		DeLuzio & Girolametto (2011, p. 1203)	
	DHH	NH	DHH	NH
Average Number of Initiations	26.4	30.3	19.2	17.8
Direct Initiation	11.4	30.2	<1.0	<3.0

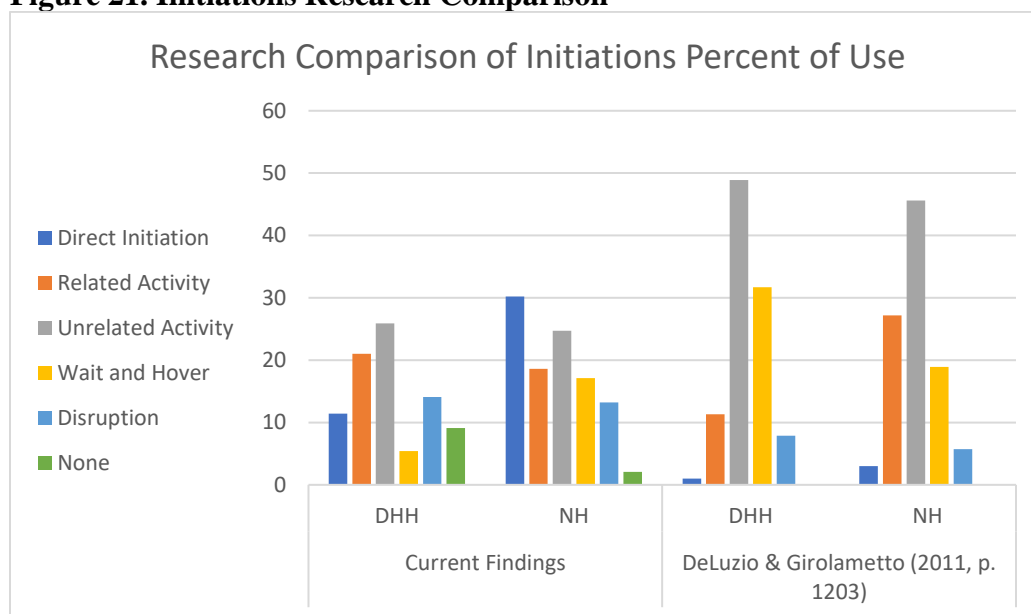
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Related Activity	21.0	18.6	11.3	27.2
Unrelated Activity	25.9	24.7	48.9	45.6
Wait and Hover	5.4	17.1	31.7	18.9
Disruption	14.1	13.2	7.9	5.7
None	9.1	2.1	a	b
Parallel Play	6.5	1.6	c	d
Adjacent Social Attention	6.5	2.2	e	f

Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing. All values are expressed as a percentage except for the total number of initiations.

^{abcdef}Data not reported in the DeLuzio and Girolametto (2001) study.

Figure 21. Initiations Research Comparison



Note. DHH=Deaf or Hard of Hearing; NH=Normal Hearing.

Discussion

The aim of this study was to identify how preschoolers who are DHH enter into play with children who are their same age and their same hearing status peers. This is

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particularly important to understand as often children who are DHH are in self-contained preschool programs (i.e. with peers who are also DHH) but enter into mainstream (i.e. with hearing peers) settings at kindergarten. This study also aimed to identify the success rates of children who are DHH and their same-aged NH peers with peer entry as well as to identify any demographic factors that were correlated with increased success. The study also examined how significantly different their peer entry skills were than their same aged normal hearing peers.

There was no statistically significant difference between the total number of initiations nor the success rates of the two groups suggesting that children who are DHH from this sample are having success with their peers similar to the success of children who are NH with their peers. Differences were identified between the two groups' use rates of the different initiation types and modalities and males had higher success rates than the females, contrary to findings from other researchers.

Initiations Total Use Regardless of Success Group Comparison

The total number of initiations used for each group were very close in number with the DHH group only using three more initiations than the NH group overall. In this sample, when children were in groups matched by hearing status, the children who were DHH from this sample were initiating a similar amount to their peers. The two groups were different in terms the initiation strategies they used most frequently. While direct initiation was the only type of initiation strategy that was statistically significant (i.e., children with NH used more than children who were DHH), parallel play was also used notably more by the DHH group than the children in the NH group.

Clinically, it is important to note that both groups had the same top four initiation

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strategies but did not use the strategies with the same quantities proportionally. The same strategies (direct initiation, related activity, unrelated activity, and wait and hover) were used for both groups but fell in a different order when listed from orders from most to least used. The fact that both groups are using the same core initiation strategies gives a positive outlook for future interactions when individuals who are DHH are mainstreamed with NH peers in kindergarten classrooms. Additionally, SLPs can help children who are DHH with explicit instruction of how to increase use of an initiation strategy that is potentially already in their repertoire.

Modalities Total Use Regardless of Success Group Comparison

The background of the participants who are DHH helps explain why gestural and combination were used much more frequently than the NH group. Five of the seven participants who are DHH attend a preschool class for children using total communication approach to learning language. Total communication (TC) is a communication option that incorporates all means of communication including signs, natural gestures, fingerspelling, body language, facial expressions, listening, lip reading, and speech (Marconi, 2016). Since goal of TC is to optimize speech by adapting to the individual needs, TC should look different for each child (Total Communication, n.d.). In addition to these five participants in the TC classroom, the other two participants in the DHH group were reported to have exposure to American Sign Language (ASL) and all displayed at least basic understanding of common signs as shown by the interactions observed during the video analysis. The difference in the total use of the different modalities is not as critical to future peer entry success as which modalities are used most successfully for peer entry which is discussed below as well as the implications for

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integration in kindergarten. This is especially true since given the definitions used by the primary researcher, signs were included in the gestural modality and vocalizations were included in the verbal modality

Overall Success Rates

There was no significant difference between the success rates of the children who are DHH and NH when they are interacting with their same age peers, in their daily preschool classrooms, where with children who have the same hearing status. It was noted that children who are NH did have more successful initiations than children who are DHH and with a larger sample size, this trend might reach significance. No other studies to date have been identified by the author as observing preschoolers who are DHH interacting with familiar, same aged peers who are also DHH and comparing their peer entry or play to their same age peers with NH interacting with familiar, same aged peers with NH. A comparison which displays the differences in how these groups of children play with their equal peers. This distinction is important because preschool children who are DHH are often placed in self-contained DHH classrooms during preschool.

The equal success rates highlight the importance of peer consideration and power in a conversation. In Bat-Chava and Deignan's (2001) study, multiple parents reported that the patience of the play partner of their child with DHH was an important contributing factor to success. This data shows that when children who are DHH interact with each other, they are equal partners, and just as successful as children who are NH.

This difference in success when DHH preschoolers are put with their same age, familiar, peers with the same hearing status is an avenue for more research. More

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research will show how significant this equality between children with DHH and NH peer entry is and how situations or training could help children who are DHH be equal with familiar peers with NH. Peer training focused on maintaining balance of power in a conversation may be the key element to increasing peer entry success between children who are DHH and NH.

Success Rates for Initiations

DHH Group. The following initiation types were identified as those to be the most successful for children who are DHH: related activity, unrelated activity, and direct initiation. Both direct initiation and related activity were statistically significant for being more likely to be successful when used. In contrast, the most unsuccessful initiation types were disruption, unrelated activity, and none. It is noted that unrelated activity was both one of the most successful and least successful initiation types used. This is due to unrelated activity having a high use rate at 25% of all initiations as well as a highly unpredictable success rate with only 64% of unrelated activity initiations being successful. This signifies that unrelated activity is better to use than other initiation types with low success rates (wait and hover, disruption) but is less desirable for use than initiation types with high success rates (direct initiation, related activity).

From this information, the best initiation types to be taught to children during intervention who are DHH in order to help them have more successful interactions are related activity and direct initiation. Children who are DHH should be taught to eliminate their use of disruptions and alter their unrelated activity initiations to related activity initiation strategies in order to increase their peer entry success.

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NH Group. The following initiation types were identified as those to be the most successful for children who are NH: direct initiation, related activity, and unrelated activity. Both direct initiation and related activity were statistically significant for being more likely to be successful when used. In contrast, the most unsuccessful initiation types were disruption, unrelated activity, and direct initiation. However, it is important to note that direct initiation was statistically significant for being more likely to be successful when used, it had the highest use rate out of all initiations in the NH group taking up 30% of all initiations made regardless of success. Unrelated activity had the same issues as the DHH group for success as discussed above.

From this information, the best initiation types to be taught to children during intervention who are NH in order to help them have more successful interactions are related activity and direct initiation. Children who are NH should be taught to eliminate their use of disruptions and alter their unrelated activity initiations to related activity initiation strategies in order to increase their peer entry success. with NH who have more patience and understanding towards their DHH peers, an increased quality of social interactions occurs (Bat-Chava and Deignan (2001)

Group Comparison. Both the participants who are DHH and NH in this study would benefit from the same intervention/instructions on how to improve their peer entry. Both groups of participants need to decrease their number of disruptions, alter their unrelated activity initiations to related activity initiations, and increase their use of direct initiations. This shows that the two groups of children are not as different in their use of peer entry strategies as could be expected with previous research detailing the delayed pragmatic language abilities of preschoolers who are DHH (Goberis et al., 2012). While

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there are other factors that contribute to the success of peer entry (modality, attention of partner) and the use of pragmatic language skills (body language, eye contact, tone, word choice for different partners, appropriateness, etc.), this shows that the breakdown in communication when these two groups combine in kindergarten is not happening because of the strategies they use to enter into play.

Success Rates for Modalities

DHH Group. Within the DHH group, only one modality, verbal, was statistically significant for being more likely to lead to a successful peer entry. However, when all successful initiation bids are compared using modality, gestural had the highest number of successful bids. Gestural was used the most out of all modalities within the DHH group, being used 57.8% of the time. These results signify that although children who are DHH are using the gestural modality more, it is only about 50% as successful than if they were to use verbal or a combination of both verbal and gestural. The participants who are DHH in this study are not using their most successful initiation strategy the majority of the time. Intervention focused on instructing children who are DHH to use the verbal or at least a combination of verbal and gestural modalities when communicating with their peers whether they be DHH or NH is needed to increase success rates of peer entry in preschool.

The participants who are DHH in this study used a lot of signs during their play with each other. This attributed to many of the gestural and combination modalities, although some of the gestures noted in the study for the DHH group were typical gestures also seen in the NH group such as pointing or shrugging. It was noted during the coding process that some of the unsuccessful gestural bids to initiate play by the DHH group

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were immediately followed by a similar bid using the verbal or combination modalities which led to success. This evidence indicates that children who are DHH who use hearing technology (such as hearing aids or cochlear implants) have more success when they use verbal modalities either alone or in combination with ASL or other gestures when attempting to enter into play with other children who are DHH.

NH Group. Within the NH group no modality was significantly more likely to be successful than another. However, verbal and combination were the most commonly used. In contrast to the DHH group, the NH group both uses and is most successful with modalities in the following order from most to least: verbal, combination, gestural. These results signify that NH children already use their most successful strategy most of the time.

Group Comparison. While neither group was significantly more successfully than the other overall, the groups achieved this success using different amounts of the different modalities. It is important that both groups were most successful using the verbal modality (DHH was significant, NH was close to significant). However, the DHH group did not use their significantly more successful modality most of the time, they used gestural most often. The DHH group most likely uses gestural most because of many of the participants preference for using ASL. However, that does not explain why they are not the most successful at their preferred modality. This is most likely due to the lack of responses from their peers that their initiations in the gestural modality were only about 60% successful. This lack of response could be due to not seeing the initiation, or it could be due to the fact that children who are DHH are more likely to be significantly developmentally behind on their pragmatic language skills as Goberis et al. (2012) found.

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How the two groups achieve success is clinically important when providing intervention to a child with a pragmatic language delay who is struggling with peer entry. When a child who is DHH needs to play with children who are NH, the child who is DHH can be instructed to increase their use of verbal initiations, or at least to combine their gestures with the verbal modality in order to align their successful peer entry bids to that of the profile of a child who is NH in order to increase the likelihood that they will be successful.

A child who is NH can be instructed to attend to more gestures addressed to them in order to align their response to initiations with the profile of a child who is DHH. While a child who is NH may not understand all the gestures a child who is DHH may make, they can ask what one means when they do not understand which would make the initiation of the other child successful.

Training for both children who are DHH and NH will be important when these groups of individuals intertwine in Kindergarten in order for them to best build successful and positive relationships (Bat-Chava & Deignan, 2001). It has already been shown that positive peer relationships between children who are DHH and their peers with NH do not develop sufficiently through mutual exposure, and interaction difficulties may prevent the group from having effective social interactions (Weisel et al., 2005). Peer communication partners/friends of children who are DHH need to be willing to take additional time and effort to communicate in order for that relationship to be successful. This evidence warrants the need for communication partner training for young children who are NH and DHH when they are mainstreamed in the same classrooms.

Participant Who Failed the Hearing Screening from the NH Group

Participant code 108 F who failed the hearing screening from the NH preschool can be used as a case study about how children whose hearing loss goes unidentified do with peer entry. This participant never initiated nor was on the receiving end of an initiation for the entire first 15-minute video recording despite the fact that she was sitting at the same table as three other female classmates and playing with the same toys as them. She showed minimal interest in what they were doing or what they were talking about and focused on her own play. This extreme of a lack of interaction going both ways did not occur with any other participants in either preschool group. While there were short periods of time that children from either group play alone without engaging with other children around them it never occurred while they were playing with the same toys from both groups.

Participant code 108F's initiations can be compared to the individual initiations of all other participants in order to determine which participants to which her results most closely align. All other participants had more than double the number of initiations that 108F had. Nevertheless, 108F's data most closely matches with two other participants one is 104F from the DHH group. However, it is difficult to do an accurate comparison because 104F did miss one of the data collection sessions, which may have contributed to her lower numbers. Participant 108F's initiations most closely match that of her NH peer 111F with whom she was sitting at the same table with during both play sessions. While the numbers of these two participants match on paper, considerations of their play environment need to be made. This NH peer was the receiver of most of another female participants initiations, and those two participants spent most of their time playing

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collaboratively and ignoring the other two girls at their table. Since 111F had many initiations being presented to her she did not have as many moments that required her to get the attention of her peers. 108 F, the participant identified with hearing loss did not receive the same opportunities as her peer (111F) to respond to bids to play.

Participant 108 's unsuccessful initiations and how they compare to the individual participants from both groups can also provide insight into her peer entry skills and how her peers accept her. 108F's data does not closely match any other participants' unsuccessful initiations data. No other participants had a low but relatively equal use of all strategies but a spike in disruptions, especially not in such low quantities. This lack of a match could be due to the low sample size or her unique situation of having an uncorrected hearing loss while playing with peers with NH.

This lack of social interaction for the child who failed the hearing screening showcases the difficulties that children who are DHH have when they are in a choice time situation but are struggling to effectively communicate with and hear their peers. While there could be other factors that contribute to this participant's reticence, her social language abilities appear to be behind her peers. This evidence supports previous research that states that children who are DHH initiate less and have lower pragmatic language skills than their peers with NH (Martin et al., 2010; Goberis et al., 2012). Her lack of interactions with the other girls at her table during the first video could contribute to her being lonely. Decreased pragmatic language skills have been correlated to loneliness and decreased self-confidence (Most, Ingber, and Heled-Ariam, 2011).

This case-study highlights the importance of peer training and intervention. Participant 108 F should be receiving language therapy to address her pragmatic language

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deficits. She could receive instruction on how to interact with her peers, request to play with them, and in turn decrease her likelihood of being lonely, having decreased self-confidence, and her social-rejection impacting her academics through elementary school (Most, Ingber, and Heled-Ariam, 2011; Batten et al., 2013). Her peers could receive group instruction on hearing loss and how to invite their peer to play effectively. They may also benefit from understanding the importance of her seeing their face while they talk, the importance of the volume of their voice, and more.

Gender and Consistency with Previous Research

When the participants were not controlled for their hearing status it was found that males did better than females in peer entry. This is contrary to what other studies have found in peer entry research. Martin et al. (2010) who looked at the peer entry behaviors of children who are DHH and NH between the ages of 5- and 6-years-old found that females in either group were more successful than males.

One factor that may have contributed to the female success in the Martin et al. (2010) study was the high rates of self-confidence recorded by the researchers. The current study did not test for self-confidence or participants perceptions of themselves. Some factors that may contribute to males doing better than females in this study are the increased number of males who are DHH in the Listening and Spoken Language preschool class compared to the Total Communication class. In the DHH group all three girls were in the Total Communication class whereas two boys were in the Listening and Spoken Language class, and two were in the Total Communication class. One boy in particular from the Listening and Spoken Language classroom was more verbal and outgoing, which may have skewed the data from this small sample size. The females with

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NH were also interacting with another female who was identified with hearing loss during the study and that participant failed to respond to some initiations causing the other females to fail at an entry. The boys with NH were playing with each other and another female in a different area during both data collection times and did not interact with the participant who failed her hearing screening. While the data of the participant who was identified with hearing loss was not included in analysis, her failures to respond to an initiation bid are still included. In future research in peer entry researchers should take note of how males compare to females for success under different conditions in order to help clinicians plan assessments and interventions at the level appropriate for the children that they serve.

Other Demographic Factors

A comprehensive demographic form was used for the DHH group to be able to analyze a wide variety of demographic factors that may have impacted the participants' social skills. However, its length may have deterred some parents from completing it, and future research should take the length of the demographic form into account. In the future only the factors researchers are most interested in analyzing (e.g., communication modality, hearing technology, age identified, age fit with hearing aids, age enrolled in early intervention) should be included in order to increase the number of responses. Although only 4 of the DHH participants returned a demographic form with the consent form, some correlations can be drawn from the information that is available between those four participants and their performance during the study.

Age. 101F was the oldest participant who is DHH and she used direct initiation, unrelated activity, and disruption more than any of the other four participants. Her age

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may have contributed to her increased awareness that both direct initiation and unrelated activity are successful ways to play with her peers. Unfortunately, she also teased another participant for the majority of one recording session which contributed to her increased number of disruptions. Informally it was observed that this participant had an increased ability to know what modality to use with different peers. When getting the attention of peers who preferred using signs she would use signs, when getting the attention of peers who preferred spoken language she would get their attention verbally. This was also observed to be true when talking to her instructions when a substitute was present when she came into the other preschool classroom and the primary researcher was observing before the recording session.

Functional Hearing Ability. Although 104F was absent for one recording session, when her data is doubled to be equal with the other participants, she still made the least number of initiations overall compared to the three other peers with demographic info. One major factor that could have contributed to this is her Functional Hearing Ability rating of 3-Severely Limited. A participant received this rating from their parents, and it a rating of their hearing ability with their amplification. A rating level of 3 indicates that the child realizes some benefit from auditory communication, but it unable to function adequately without a visual or tactile mode of communication. The other three participants were rated as 1- Functions Normally and 2-Mildly Limited. The benefit a child who is DHH receives from their hearing amplification made a large difference between these participants and their number of initiation attempts overall, regardless of the success.

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Classroom Placement and Initiations. The preschool classroom placement for the participants who are DHH can be analyzed in order to showcase the communication preferences and differences between these two groups. This study found that the participants who are DHH are significantly more likely to be successful when using either direct initiation or related activity. When the initiations average use is broken down by classroom it is shown that the TC class was using the direct initiation and related activity strategies equally. However, the LSL class had a high preference for using related activity. In fact, the TC class was spread out across all the strategies much more than the LSL class. While this is a small group of participants, these trends should be monitored in future research as it can direct interventionist more specifically on what instruction children who are DHH may need in regard to peer entry depending on their preschool mode of communication.

Classroom Placement and Modalities. Preschool classroom placement also impacted modality use. Participants in the TC classroom had a high preference for gestures (which included formal signs in this study). The TC class used gestures the majority of time and on average, both for successful and unsuccessful uses. The LSL class had the participants who used a verbal modality most often, and those participants showed minimal preference for using gestures (although they did demonstrate understanding of some gestures as observed informally during play). This separation is important because children who are DHH are significantly more successful when they use the verbal modality to communicate. Children who are DHH need to be taught to use direct verbal strategies in order to be consistently successful at peer entry, especially as they prepare to integrate into mainstream kindergarten classrooms.

Alignment to Other Research: DHH Initiation Types Total Use

The results of total initiation type use, regardless of success, from this study can be compared to the results of the DeLuzio and Girolametto (2011) study from which the original six initiation strategies for this study originated. However, there are a few caveats to this comparison that should be considered. The current study had two more initiation strategies than the DeLuzio and Girolametto study. Additionally, the previous study was conducted with participants who are NH and DHH from the same classrooms interacting together. In comparison, the current study's participants only interacted with other participants with the same hearing status. Despite these caveats, both studies collected data about how DHH enter into play with familiar, same-aged peers. Since few studies have done this, a comparison is warranted and valuable to planning intervention, especially for children who spend time in both situations.

In the current study there was only one initiation type that was statistically significant for being used more in either group. The participants with NH used direct initiation significantly more the participants who are DHH. Initiation types none and parallel play were very close to being significant, had the sample size been larger, a significant difference may have been found. DeLuzio and Girolametto (2011) found no significant difference for the most used initiation types for both groups. There was also wide variability between the studies in the percent of usage of initiation types. This discrepancy in findings highlights the need for larger scale studies in both research situations (children with the same hearing status being observed together and children without the same hearing status being observed together) in order for more confidence in

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the generalizability of the results to the general population of children who are DHH and children who are NH in regards to their peer entry behavior.

Considerations for Kindergarten

The participants who are DHH in this study all attend a special preschool program with West Ada School District in Meridian, Idaho. When the children in this class room turn five, they will attend a half-day kindergarten as a cohort mainstreamed into a kindergarten classroom with peers with NH and will be provided an interpreter for the class. They will continue to be placed in the same classes throughout elementary school as a small group. They will attend the same middle school and high school, but details of classroom placements and the need for interpreters are made on an individual basis, based on each students Individualized Education Plan (IEP) once they reach middle school. With this perspective in mind, their future peer entry abilities need to be considered when planning intervention focused on peer entry skills during preschool.

The fact that both groups use the same top four initiation types overall leaves a good prognosis for the social skills of the children who are DHH as they transition to mainstream kindergarten classrooms as a group next school year. However, the success of those initiations will be affected since they used different modalities to gain that success with the NH group preferring to use oral language and the DHH group preferring to use ASL and other commonly known gestures.

Given the findings from this study, it is important for providers to consider preschool placement options of children who are DHH (i.e., mainstreamed with NH peers or in self-contained programs with peers who are also DHH). If a self-contained program is available, it can provide DHH children the opportunity to have equal conversational

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power with their peers, providing increases in social language abilities and opportunities for practice. This may reduce feelings of loneliness cited in previous research and seen in the example of the participant who failed the hearing screening in this study (Most, Ingber, and Heled-Ariam, 2011). In addition to the opportunity to develop social skills and have access to peers who are DHH, self-contained programs can offer a more intensive focus on early reading instruction and auditory-based activities not typically available in most preschool classrooms. Additionally, self-contained classrooms have staff specifically trained to work with the DHH population. There are important building blocks in all of the language domains that need to be developed for increased success in kindergarten and cannot be undervalued.

Since many children who are DHH, including the participants in this study, are mainstreamed as into public classrooms with their NH peers in kindergarten, access to hearing classmates in preschool settings could increase their social and academic success at earlier ages (Batten et al., 2013; Most et al., 2011). It would be interesting to examine the social language outcomes of preschool program that offers experiences with both a self-contained classroom and with preschool peers with NH. Such an opportunity allows for early instruction for both groups on how to begin playing with their peers who have a different hearing status and decrease any apprehension towards playing with children who wear hearing amplification or use signs and vice versa.

Application to Clinical Practice

In this study, patterns emerged that can be used to provide age-appropriate intervention and instruction for preschoolers who are DHH and the NH peers they interact with (when applicable). Both groups of participants had the most success using

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the verbal modality with either direct initiation or related activity initiation strategies. All of these initiation types/strategies and the verbal modality are in the repertoire of children who are DHH. Additionally, since these strategies were most successful for both groups of children, if they learn to use the direct and related activity initiation strategies, they will be more successful with either group.

Instruction should be age-appropriate, and changes should be individualized to each child. Changes should be also be logical and simple. Unrelated activity was a common initiation strategy for children who are DHH. This strategy could be changed to related activity by simply changing the topic of the comment or question made to be related to what the intended peers are already doing. It would be difficult to instruct a child to go from parallel play to direct initiations. More logical, slower, and simple changes should be made to make play natural and peer entry successful for each child's abilities and personalities.

Changing initiation modalities should be carefully considered and the approach to making the change should be catered to each individual. All three of the modalities were in the repertoires of the children who are DHH in this study who all use amplification technology. They were most successful with the verbal modality, possibly due to the attention they gained from making a sound. Not every child will be successful using only the verbal modality. However, a child who uses mostly gestures can be taught to use a vocalization, word, or phrase with their signs in order to gain more of the attention of their intended peer. This more gradual change toward the verbal modality can help them be more successful especially as they prepare to interact with their peers who are NH in the upcoming school-year.

Changes to Methods

The initiation types used for coding were altered during coding, and all videos coded previously were reviewed after the change was made. At first, initiation behaviors recorded were modeled only after the DeLuzio and Girolametto (2001) study: none, related activity, unrelated activity, wait and hover, disruption, and direct. However, after the author started coding the interactions it was noted that children were doing things during play that did not fit into any of DeLuzio and Girolametto's definitions but were still an initiation. The initiations that were being missed were similar to an initiation type which was also used by Weisel et al. (2005) labeled moving closer to playing children. However, Weisel and colleagues did note that they included movements with and without intentionally looking at the other children they were moving closer to. The author decided to split this initiation into two more categories which were used by two other researchers, namely, parallel play and social attention (Rubin et al., 1978; Fantuzzo et al., 1996). Rubin et al., (1978) defined parallel play as "Playing alone with materials different from children within speaking distance; no conversation with others" (p. 534). Parallel play was added as an initiation type because it was noted that children were specifically placing themselves next to other children playing with the same toys and waiting for an invitation to join play. Adjacent social attention was also added during the study. It was based on Fantuzzo et al.'s (1996) social attention category of social play which was defined as "The child plays independently but shows awareness of what the other child is doing; child does not speak to the other child" (p. 1380). This was modified to include the word adjacent. For the current study, this initiation type required a child to specifically physically move themselves and their toys closer to another child in order to make the

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initiation into play. All initiation types and modalities used in this study with examples and any special considerations are included in the Coding Guide used by the researchers in Appendix B.

Limitations

There were a number of limitations to this study to disclose. The low number of participants (7 DHH and 6 NH) were the biggest contributing factor to limiting the statistical power of this study. Additionally, there was an unequal number of male and female participants with two NH males vs. four DHH males and four NH females vs. three DHH females. Additionally, one DHH female was absent from preschool for one of the two 15 minutes of video recording for data analysis.

No language assessments were completed during the course of this study, and there were no exclusionary criteria involving current language level of performance. From the demographic forms received by the DHH group, it is known that at least one participant has a diagnosis of a developmental/cognitive delay. However, three demographic forms in the DHH group were never returned and the NH group's demographic form did not include any questions concerning language development. Despite these concerns, it is unrealistic to assume that a self-contained preschool for the DHH would have children without developmental disabilities or delays that affect language given the various syndromes, disorders, and other factors that are related to higher incidence of congenital hearing loss.

The organization of the preschools could also have contributed to differing success of the different groups. The DHH participants were selected from two preschool classroom types on the same elementary school campus: total communication and

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listening and spoken language. Some of the students used mostly ASL to communicate, some easily switched between ASL and spoken English, and others used mostly spoken English but displayed understanding of ASL. These classrooms of students interact on occasion, but their preschool teachers reported that they have trouble getting the two classrooms to interact with each other. The NH preschool participants were all from one classroom.

Another factor that may have impacted the results of the study was the inclusion of participant code 108F from the NH classroom in the free play. Participant code 108F was a female participant who failed her hearing screening in both ears. She contributed to other NH children being unsuccessful in their initiations directed towards her multiple times.

There are some caveats to comparing the count data as done in this study. There were differing numbers of participants included in the analysis. There were six participants in the NH group and seven from the DHH group. However, one of the seven from the DHH group was absent for half of the data collection so there were really only six and a half participants. This off-sets the analysis done when comparing count data since there were varying numbers of participants. Had there been an even number of different conclusions may have been drawn. However, since the participant that was only there for half of the data collection made minimal initiations it is unlikely to have made large effects on the conclusions made in this study.

Conclusion

More research is required with larger sample size to determine the significance of some of the demographic factors that contribute to personal rates of success, but overall it

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was seen that both groups are equally successful at entering into play with their peers. It was identified that the males in this study were significantly more successful than the females overall. More research should be done to determine if there were outside factors that contributed to this success such as their personal self-confidence, receptive and expressive language scores, number of peers they can interact with, or how many siblings they have. This study did not have the statistical power for that analysis. Additionally, more research should be conducted to determine the significance of the trend that children who are DHH are less successful than those who are NH.

When children who are DHH are playing with familiar, same-aged peers with the same hearing status they are just as successful as NH children at initiating play during choice time at preschool. While children from the DHH and NH groups have different preferences for the modalities that they used to gain success, their top three preferences for initiations were the same for the two groups just not in the same order. This shows that the breakdown in peer entry skills for DHH kids when interacting with NH kids in the preschool setting is not due to their social competence, but some other factor.

When children who are DHH are playing with familiar, same-aged peers with the same hearing status they are just as successful as NH children at entering into play with their peers. The two groups in this study used different modalities and used the different initiation types at different rates to achieve this success but ultimately neither group was statistically significantly more successful than the other. These differences contribute to the decreases in success noted for peer entry in the school age years for children who are DHH. Peer education and a split preschool day in both NH and DHH classrooms could increase the quality of social interactions of preschoolers who are DHH and NH. Most

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importantly, children who are DHH need to be taught direct verbal strategies in order to be most successful at peer entry.

Conflicts of Interest

This study was used as the Master's Thesis for the author at Idaho State University (ISU). No outside funding was provided specially for this study. Materials, namely the iPad mini devices were obtained from the HATCH lab at ISU. The author and her supervising professor, Kristina Blaiser PhD. CCC-SLP have no conflicts of interest to report at this time.

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Appendix A

Data Collection

Data was recorded in Microsoft Excel using the chart and key below.

Coding Chart

Note: the chart actually was a continuous line in Microsoft Excel. However, it was split in half here for the entire chart to fit on this page.

		Type--Successful								Modality--Successful				Type
Camera	Time	None	Dir	Rel	Unre	W&H	Disr	par	adj	Verbal	Gest	Combo	Non	
		Type--Unsuccessful								Modality--Unsuccessful				
		None	Dir	Rel	Unre	W&H	Disr	par	adj	Verbal	Gest	Combo	Notes and Questions	

Key

Title	Abbreviation
None	None
Direct Initiation	Dir
Related Activity	Rel
Unrelated Activity	Unre
Wait and Hover	W&H
Disruption	Disr
Parallel Play	Par
Adjacent Social Attention	Adj
Verbal	Verbal
Gestural	Gest
Combination	Combo

Appendix B

Coding Guide

Initiation Types

Type	Definition	Examples and Explanations
Direct Initiation	“An overt request for access into an interaction or play activity” (DeLuzio & Girolametto, 2011, p. 1202).	<p>This can be in the form of a question or suggestion:</p> <ul style="list-style-type: none"> - Can I play with you? - Play with me? - Let’s play cars! <p>-Inviting a child who is waiting and hovering to play by verbal or gestural invitation. Also includes handing them toys so that they can play.</p>
Related Activity	Making a comment or asking a question related to ongoing play activities (DeLuzio & Girolametto, 2011).	<p>-Any time there is no direct request to join or invitation for others to join play, but the child enters into the play already happening with a relevant comment or question</p> <p>-If some children were playing with stuffed dogs and another child approached with a dog and said, “My dog is eating his favorite food” or “What does your dog eat?”</p> <p>-mimicking what other children are saying or singing while playing next to them</p>

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Unrelated Activity	Making a comment about objects, events, people, or feelings that are in no way related to the topic already being entertained by the other children (DeLuzio & Girolametto, 2011).	<p>-Similar to related activity but comments/questions have no relevance to ongoing activity</p> <p>-if some children were playing with blocks and a child came up with a stuffed dog and said “My dog is eating his favorite food” or “I like my shirt today”</p> <p>-Look at what I am doing!</p> <p>-Asking a teacher not involved in play a question</p>
Wait and Hover	Entails a child observing and/or circling around a play area without making an attempt to join the ongoing play (DeLuzio & Girolametto, 2011).	<p>-Standing around and watching other children play without any attempt to join</p> <p>-Walking around and observing other children while they are in a fixed location playing</p> <p>-Following other children around at a short distance, watching them but making no attempts to join in.</p> <p>-Proximity to and observing play can be a clue to children with developed pragmatic language skills to invite the observer into the activity.</p>

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Disruption	When a child interrupts an ongoing play activity, this typically leads to a negative social interaction (DeLuzio & Girolametto, 2011).	<ul style="list-style-type: none"> -Grabbing a toy away -Knocking other children's blocks over -Generally messing up any activity they are trying to join in whatever way possible
Parallel Play	"Playing independently with toys similar to those being used by other in close proximity; no attempt to play with others" (Rubin, Watson, & Jambor, 1978, p. 534).	-If a child is playing with a toy that can be played with by multiple children at a time and a child approaches and just starts playing without taking the other child's items away. Such as bringing their own cars to use on a car race track.
Adjacent Social Attention	"Child plays independently but shows awareness of what other child is doing (i.e. looks at other child)" (Fantuzzo et al., 1996, p. 1380).	<ul style="list-style-type: none"> -Intentionally starting or moving play near another child <u>without</u> making a verbal request/comment or mutually-known gestural sign to join play. -moving a car close to another child's toys and looking at them to see if they will respond -sitting down to play with puzzles next to a child who is playing dolls and occasionally watching what they are doing. (Must show some sort of interest in what they are doing such as looking up to watch them, OR the strategy is "none")

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None	No overt attempt to initiate an interaction with another child is made (DeLuzio & Girolametto, 2011).	<ul style="list-style-type: none"> -Solitary play -making no attempt to interact with other children -Walking away from other children to cry or pout about something that has happened, or to play alone -sitting around other children who are playing but showing no interest in what they are doing verbally or nonverbally.
-------------	---	--

Modalities

Types	Definition	Examples and Explanations
Verbal	Using oral language to communicate.	<ul style="list-style-type: none"> -Spoken language -Grunting -Crying
Gestural	Using signs, iconic gestures, or facial expressions to communicate.	<ul style="list-style-type: none"> -American Sign Language -Pointing -Waving -Head nods or shakes -Smiling or frowning
Combination	Using both verbal and gestural means of expression together to communicate a single message.	

Success:

- **An initiation will be considered successful if it yields a response from an intended peer within 5 seconds. Responses may be verbal or non-verbal such as head turn, head nod/shake, or offering of a play toy.**
- Disruptions
 - A disruption is considered successful if it does not evoke a negative verbal or nonverbal response from a peer AND the children play together or beside each other afterwards. Grabbing and having no positive social interaction with a peer is not considered a successful peer entry.

None

- Count a child for using “none” if they make no attempt to play with another child for **1+ minutes**
 - After this has been counted once, do not count again until other types of initiations or responses to initiations are made.
- Also count as using “none” if a child walks away from other children to get a “break” or “pout” about what is going on, even if the act does **not** last for 1+ minutes.

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Modality

- The wait and hover type will not be recorded for modality and will be left blank.
- Parallel and Adjacent play are always coded as gestural.
 - If the participant makes a comment or question than it would be a related or unrelated activity

Parallel Play vs. Social Adjacent Play

- The basic difference between these two types of play is that in parallel play they are using the same types of toys, in social adjacent they are not.
- Additionally, in social adjacent play the initiating child is showing awareness of what their peer is doing.

Special Considerations:

- Multiple initiations for one interaction:
 - This can only occur for Wait and Hover, Parallel Play, or Adjacent Play
 - One is waiting for an invitation, and another has the opportunity to provide it.
- Some of the children who are DHH are using sign language at times during the videos. If a child uses a sign that you do not know and need to know in order to code an initiation correctly make a note in the “notes and questions” section of the individual child’s tab AND on the “questions” tab. Send Stephanie Robinson an email and she will contact you with the translation. (Dr. Kristina Blaiser will be interpreting any signs researchers do not know.) After receiving the translation, you can finish coding that individual initiation.

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Appendix C

Consent Form

Dear Parent or Guardian:

We are asking your permission for your child to participate in research being conducted with children at your child's preschool through Idaho State University. The purpose of this survey is to gain insight into the development of social communication abilities, also called pragmatic language abilities, for children who are deaf and hard of hearing. The research will include a demographic questionnaire which asks questions about your child's hearing loss and social factors. It will also include a video recording of the children during free play/choice time. Three cameras will be set up in the classroom collect all verbal and nonverbal interactions of all children present. These videos will be kept locked in the HATCH lab on Idaho State University Meridian Health Sciences Campus to which only research personnel will have access. Information collected will only be used for this research and will be destroyed after data is collected about social interactions from the videos. It is our hope that data from this survey will contribute to a better understanding of the development of pragmatic language abilities for children who are deaf and hard of hearing in order to help guide future assessment and intervention for Speech Language Pathologists.

Your child's responses to the survey will be anonymous. Your child's name will be coded in order to maintain anonymity in documentations, and personal identifying information collected from this research will not be distributed.

Your consent and your child's participation are completely voluntary, and your child may withdraw at any time. There is no reward for participating or consequence for not participating.

For further information regarding this research please contact Stephanie Robinson at email: robiste1@isu.edu, or Dr. Kristina Blaiser at email: kristina.blaiser@isu.edu.

If you have any questions about your rights or child's right as a research participant, you may contact the Idaho State University Institutional Review Board at 208-282-2179.

There are two copies of this letter. After signing them, keep one copy for your records and return the other one to your child's school. Thank you in advance for your cooperation and support.

If you agree to allow your child to participate, please sign below. After signing your name, return this sheet to your child's school.

Parent's Signature: _____
Child's Name: _____ (Please Print)
Date: _____

Appendix D

**Idaho State University
Pragmatic Language Abilities Research
INITIAL DEMOGRAPHIC FORM**

IDAHO STATE UNIVERSITY USE ONLY

Child's Name: _____ Child's Code: _____

NOTE: To be completed by the parent and/or the early intervention provider.

GENERAL INFORMATION:

Today's date: _____ / _____ / _____
mon day year

Child's Name: _____

Birthdate of child: _____ / _____ / _____
mon day year

Gender of child: _____ Boy _____ Girl

1. Ethnicity of child: _____ Hispanic/Latino _____ NOT Hispanic/Latino

2. Race of child (check all that apply):

- _____ White
- _____ Black or African American
- _____ Asian
- _____ Native Hawaiian or Other Pacific
Islander
- _____ American Indian or Alaska Native
- _____ Other _____

3. Languages used at home with the child (please mark all that apply)

_____ Spoken English	_____ Spanish
_____ Sign Language	
_____ Other (Please Specify: _____)	

Siblings: Child is number _____ of _____ children.

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5. Child has been attending pre-school/school since ____/____
mon / year

HEARING INFORMATION:

1. Did the child fail a newborn hearing screening?		____yes ____ no ____did no receive	
2. Onset of Hearing loss	____present at birth	____acquired after birth	____don't know
*If acquired, at what age? ____ months of age			
3. Age at which hearing loss was confirmed by an audiologist: _____.			
4. Date of hearing loss identification: _____.			
5. Age at which first received amplification: ____ months of age			

6. Type of amplification currently used:

_____None
 _____Hearing aid(s)
 _____FM auditory trainer
 _____Cochlear implant*
 _____Bone conduction aid (Baha or external)

*If the child has a cochlear implant....

First CI:

-Date implanted: _____

-Date activated: _____

Second CI:

-Date implanted: _____

-Date activated: _____

7. Current hearing aid/CI use: _____<3 hrs/day _____3-5 hrs/day
 _____6-10 hrs/day _____11+ hrs/day

8. Age at which intervention specific to hearing loss first started: ____ months of age

9. Cause of hearing loss:

_____unknown	_____Anoxia at birth
_____CHARGE syndrome	_____Chemotherapy
_____Cytomegalovirus (CMV)	_____Down Syndrome
_____Enlarged Vestibular Aqueduct (EVA)	_____Goldenhar Syndrome
_____High fever	_____Maternal Rubella
_____Meningitis	_____Prematurity
_____Treacher Collins	_____Viral Infection
_____Usher's syndrome	_____Waardenburg's syndrome
_____Other (Please Specify: _____)	

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10. Categorize the child's **Functional Hearing Ability** (when using amplification)

NOTE: If the child does not use amplification, rate functional hearing without amplification:

_____ **Functions Normally:** Child has negligible difficulty receiving auditory information.

_____ **Mildly Limited:** Child needs frequent spoken repetitions, occasional visual or tactile communication support or both.

_____ **Severely Limited:** Child realizes some benefit from auditory communication, although unable to function adequately without visual or tactile communication.

_____ **No Functional Hearing:** Child receives no benefit from spoken communication.

FAMILY INFORMATION

1. Mother's date of birth _____/_____/_____ Father's date of birth: _____/_____/_____
mon / day / year mon / day / year

2.

Is there a deaf or hard-of-hearing adult in the home?	_____yes	_____no
***If yes, does that person use sign language?	_____yes	_____no

2. Mode of communication used in the home **with** the child:

_____spoken language only _____spoken language with occasional signs
_____speech + sign _____sign only (no spoken language) _____Cued Speech

3. Mode of communication used **by** the child:

_____spoken language only _____spoken language with occasional signs
_____speech + sign _____sign only (no spoken language)
_____Cued Speech _____None yet

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In the top row of the table, list the adult(s) living with the child. List by their relationship to the child (e.g. mother, step father, etc). Check the **highest** degree held by each person.

	Adult #1:	Adult #2:
No diploma or G.E.D.	Last grade completed:	Last grade completed:
High School Diploma		
Vocational Degree		
Associate Degree		
Bachelor's Degree		
Master's Degree		
J.D. or Ed.D		
M.D.		
Ph.D.		

ADDITIONAL DISABILITIES

- | | |
|---|--|
| <input type="checkbox"/> No other disabilities | <input type="checkbox"/> Vision problem/impairment |
| <input type="checkbox"/> Brain damage/injury | <input type="checkbox"/> Seizures/Epilepsy |
| <input type="checkbox"/> Cerebral Palsy (CP) | <input type="checkbox"/> Emotional/Behavioral problem |
| <input type="checkbox"/> Specific learning problem (LD) | <input type="checkbox"/> Motor problem |
| <input type="checkbox"/> Developmental/Cognitive delay | <input type="checkbox"/> Central Processing Disorder |
| <input type="checkbox"/> Autism/PDD | <input type="checkbox"/> Cleft lip/palate |
| <input type="checkbox"/> Balance disorder | <input type="checkbox"/> Sensory/Motor integration problem |
| <input type="checkbox"/> Other disability. (Please specify: | |

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Rate the effect of any disabilities or other special characteristics the child has (*other than hearing loss*) on his/her speech/language development (**circle one**).

- 1 Child has no disabilities other than hearing loss
- 2 Child has one or more other disabilities, but they do not interfere with his/her speech/language development
- 3 Child has one or more other disabilities that provide minimal obstacles to his/her speech/language development
- 4 My child has one or more other disabilities that provide moderate obstacles to his/her speech/language development
- 5 My child has one or more other disabilities that provide significant obstacles to his/her speech/language development

Appendix E

**Idaho State University
Pragmatic Language Abilities Research
INITIAL DEMOGRAPHIC FORM**

IDAHO STATE UNIVERSITY USE ONLY

Child's Codename: _____

NOTE: To be completed by the parent/guardian and returned with the consent form.

Circle or fill in the appropriate answer for your child.

Gender: male/female

Age: _____ / _____
Years Months

Do you have concerns about your child's hearing? Yes/No

Did your child pass their newborn hearing screening? Yes/No/Did not receive

If you have concerns, or simply want your child's hearing screened, Idaho State University (ISU) will provide a free hearing screening to children who participate in this study. This screening is not required for participation and will be done on New Horizon campus. The screening will be administered by ISU graduate students in Speech-Language Pathology. **Please mark the appropriate option below:**

____ I give Idaho State University permission to screen my child's hearing.

____ I do **not** give Idaho State University permission to screen my child's hearing.

Appendix F

Hearing Screening Form

Idaho State
UNIVERSITY

AUDIOLOGIC SCREENING FORM - CHILD

Department of Communication
Sciences & Disorders

NAME:		DOB	AGE	<input type="checkbox"/> M <input type="checkbox"/> F
SCREENING SITE:			SCREENING DATE:	
OTOSCOPY		TYMPANOMETRY SCREEN		OTOACOUSTIC EMISSION SCREEN (OAE)
Right <input type="checkbox"/> Clear (WNL) <input type="checkbox"/> Blocked (refer) <input type="checkbox"/>		Right Type A B C <input type="checkbox"/> WNL <input type="checkbox"/> Refer Middle Ear Pressure Ear Canal Volume		<input type="checkbox"/> TEOAE <input type="checkbox"/> DPOAE Right ear <input type="checkbox"/> Pass <input type="checkbox"/> Refer <input type="checkbox"/> CNT <input type="checkbox"/> DNT
Left <input type="checkbox"/> Clear (WNL) <input type="checkbox"/> Blocked (refer) <input type="checkbox"/>		Left Type A B C <input type="checkbox"/> WNL <input type="checkbox"/> Refer Middle Ear Pressure Ear Canal Volume		Left ear <input type="checkbox"/> Pass <input type="checkbox"/> Refer <input type="checkbox"/> CNT <input type="checkbox"/> DNT
				Right 1kHz@20 dB HL <input type="checkbox"/> P <input type="checkbox"/> R 2kHz@20 dB HL <input type="checkbox"/> P <input type="checkbox"/> R 4kHz@20 dB HL <input type="checkbox"/> P <input type="checkbox"/> R Left 1kHz@20 dB HL <input type="checkbox"/> P <input type="checkbox"/> R 2kHz@20 dB HL <input type="checkbox"/> P <input type="checkbox"/> R 4kHz@20 dB HL <input type="checkbox"/> P <input type="checkbox"/> R
RECOMMENDATIONS *P = pass; R = refer; WNL = within normal limits; CNT = could not test; DNT = did not test				
<input type="checkbox"/> Monitor hearing as needed		<input type="checkbox"/> Referral to physician for wax removal		IS THIS A RESCREENING? <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Rescreen Pure Tones		<input type="checkbox"/> Referral to physician for middle ear evaluation		
<input type="checkbox"/> Rescreen Tympanometry		<input type="checkbox"/> Referral for speech or language evaluation		
<input type="checkbox"/> Refer for complete hearing evaluation				
NOTES:				
Screened by:				