Young Children Who Are Deaf or Hard of Hearing and Have Autism Spectrum Disorder: Three Case Studies

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YOUNG CHILDREN WHO ARE DEAF OR HARD OF HEARING AND HAVE AUTISM SPECTRUM DISORDER: THREE CASE STUDIES

by

ELIZABETH CAMERON KELLOGG

B.A., Princeton University, 1998

A thesis submitted to the
Faculty of the Graduate School of the
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Master of Arts
Department of Speech Language Pathology
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This thesis entitled:
Young Children who are Deaf or Hard of Hearing and Have Autism Spectrum Disorder: Three Case Studies
written by Elizabeth Cameron Kellogg
has been approved for the Department of Speech Language Pathology

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Christine Yoshinaga-Itano

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Susan Moore

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Amy Thrasher

Date_______________

The final copy of this thesis has been examined by the signatories, and we Find that both the content and the form meet acceptable presentation standards Of scholarly work in the above mentioned discipline.

IRB protocol # 1206.19
Kellogg, Elizabeth Cameron (M.A., Speech Language Pathology)

Young Children who are Deaf or Hard of Hearing and Have Autism Spectrum Disorder: Three Case Studies

Thesis directed by Professor Christine Yoshinaga-Itano

The average age of diagnosis for autism spectrum disorder (ASD) for a child already identified as D/HH is later than that for a hearing child. Early assessment data (starting at 9 months) for three children who were D/HH and later diagnosed with ASD were analyzed. The results from the MacArthur-Bates CDI Words and Gestures, the Child Development Inventory, and the Play Assessment Questionnaire were used to develop three profiles of children who are D/HH and have ASD. One child lacked expected skills and language at ages 9 and 14 months. Another child lost skills and language after 17 months. The third child had results usually within or above the average range. However, his age quotient decreased for MacArthur-Bates CDI: WG *Words Expressed* and the CDI: Social. While it can be difficult to diagnose the co-occurrence of ASD and deafness, there were early warning signs for these children.
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CHAPTER 1: INTRODUCTION

Due to the research about the positive impact of early intervention for children with autism spectrum disorder (ASD), both for hearing and deaf children, early identification of ASD is important. It is difficult to study infants who are later diagnosed with ASD. Retrospective studies often involve home videos reviewed when the children are older and parent recall. Prospective studies tend to target high risk populations, such as the siblings of children diagnosed with ASD (Ozonoff et al., 2010). The purpose of this unique retrospective study is to develop profiles for three children who were diagnosed as deaf or hard of hearing (D/HH) at birth and then later diagnosed with ASD.

Colorado Home Intervention Program

In Colorado, children who are identified as D/HH through universal newborn hearing screening programs or identified in the first 3 years of life are offered an array of family-centered services until age 3. Within 48 hours of identification of a hearing loss, a trained clinician contacts the family and services can begin. Over 90% of the families choose to participate in the Colorado Home Intervention Program (CHIP) (Yoshinaga-Itano, 2003). CHIP began offering family-centered, family focused intervention for children who are D/HH in 1969 (Thomson, 1997).

Researchers at the University of Colorado Boulder have investigated the predictors of successful outcomes for infants and toddlers with congenital deafness and hearing impairment since the mid 1980s (Yoshinaga-Itano, 2010). Assessments are a component of CHIP and data are collected at approximately six-month intervals. The Child Development Inventory (CDI), MacArthur-Bates Communicative Development Inventories (CDI), the Play Assessment Questionnaire (PAQ) and analyses of spontaneous language samples are some of the assessments
used (Yoshinaga-Itano, 2010). Parents have given permission for the assessment data to be collected in a statewide database for further analysis and research. The database began in the mid 1980’s and currently includes approximately 2000 children from Colorado (Yoshinaga-Itano, personal communication, June 10, 2013).

**Autism Spectrum Disorder**

The criteria for diagnosing ASD are changing as of the 2013 publication of the DSM-V (American Psychiatric Association, 2013). For a helpful review of the changes and the implications of the criteria under the DSM-V, see Mahjouri and Lord (2012). The children in this study were diagnosed with the criteria from the DSM-IV (American Psychiatric Association, 2000) which includes deficits in verbal and nonverbal communication, deficits in social interaction, and restricted, repetitive, and/or stereotyped behavior, activities and/or interests. For those unfamiliar with ASD, Vernon and Rhodes (2009) wrote an article for the *American Annals of the Deaf* summarizing ASD and its history.

In 2012, the Centers for Disease Control published prevalence rates from data collected by the Autism and Developmental Disabilities Monitoring (ADDM) Network in 2008. According to the data, 1 in 88 8-year old children met research criteria for ASD (Investigators, ADDM Network, 2012). According to this 2012 report, the average age of diagnosis for an autistic disorder was 4 years as opposed to children more broadly diagnosed with an autism spectrum diagnosis or pervasive developmental disorder-not otherwise specified, which was 4 years 5 months. The average age of diagnosis for children with Asperger disorder was 6 years, 3 months. Other researchers have cited different average age of diagnosis, ranging from approximately 3 years (Barbaro & Dissanayake, 2009) to 6-8 years (Levy, Mandell, & Schultz, 2009). According to Charman and Gotham (2013), prior to the 1990’s, it was rare for children to receive a diagnosis of autism until they were 3-4 years. Presently, many children are identified in toddlerhood, as early as 18 months (Wetherby, Brosnan-Maddock, Peace, & Newton, 2008).

Currently there are neither a genetic test nor biological markers for ASD (Barton, Dumont-Mathieu & Fein, 2012). Thus standardized assessments and clinical judgments are used
to diagnose ASD. Screeners are often used to refer children for a full ASD evaluation. For a review of early screening tools for ASD at the 18- and 24-month pediatric visits, please see Barton et al. (2012). With the promising results for children who receive early intervention and the average age of diagnosis at age 4, there is a push for earlier identification. Barton et al. (2012) stated early identification and subsequent early intervention are related with positive outcomes in communication, social interaction, and cognitive development and included several supporting studies. Boyd, Odom, Humphreys, and Sam, (2010) advocated for early identification which can lead to earlier intervention which may result in a reduction of the severity of children’s symptoms because the brain is more malleable during that critical period of development.

**Deafness and ASD**

According to Gallaudet Research Institute (2007, as cited in Vernon & Rhodes, 2009) about 1 in 80 children in the deaf population also have ASD. Rosenhall, Nordin, Sandström, Ahlsén, and Gillberg (1999) report a higher prevalence of profound hearing loss or deafness in the population of people with ASD (3.5%) than in the general population (0.1-0.2%). Worley, Matson, and Kozlowski (2011) report the prevalence estimates of dual diagnosis of ASD and being D/HH range from 4-20% of the population of children with ASD.

Because the dual diagnosis is not well understood, it is not well researched and infrequently diagnosed. Vernon and Rhodes (2009) cited the importance of a special 2008 edition of *Odyssey: New Directions in Deaf Education* in which mental health specialists in deafness began focusing on the double disability. It is also quite difficult to diagnose (Easterbrooks & Handley, 2005; Jure, Rapin, & Tuchman, 1991). One reason it is still so hard to diagnose is the potentially shared core deficit in communication across both diagnoses. Additionally, many items on the Autism Diagnostic Observation Schedule (ADOS) are not appropriate for a child who is D/HH. For example, one item involves obtaining a child’s attention by calling his or her name when the child is not looking.
Often the ASD diagnosis is given later to children who are already identified as D/HH as compared to hearing children (Roper, Arnold, & Monteiro, 2003). Early identification of autism (as well as for deafness) is beneficial due to the interventions that can be implemented (Worley et al., 2011). Vernon and Rhodes (2009) specifically mentioned the advantage of interventions between the ages of 1 and 4 years during which brain plasticity is high and it is easier to establish or alter neural pathways (Sacks, 1989, as cited in Vernon and Rhodes, 2009).

Current literature about D/HH and ASD is growing. Some articles focused on clinical feature descriptions (Jure et al., 1991) and symptomatology comparisons (Roper et al., 2003; Worley et al., 2011). There are a few articles targeting intervention for the dual diagnosis. Easterbrooks and Handley (2005) conducted an interesting single subject case study about an ABA intervention with an elementary student who was deaf and had ASD. Malandraki and Okalidou (2007) also conducted a single subject case study about using PECS with a 10-year-old boy who was deaf and had ASD. Beals (2004) wrote about her own experience as a parent of a son with the dual diagnosis of deafness and ASD. Myck-wayne et al. (2011) included a description of the experiences of four families with children who were D/HH and had ASD who were quite frustrated with the delay in receiving the dual diagnosis. Parents also reported feeling alone in finding and coordinating intervention and school services. The set of case studies in the current article was unique because data from assessments in the first year of life were analyzed and no other articles have included data as early.
CHAPTER 2: METHOD

The current study is a retrospective case study of three children identified as infants who were D/HH. Each child entered the CHIP program when deafness or hearing loss was identified. Several assessments were administered from that point through the age of 3 years. The Play Assessment Questionnaire, MacArthur-Bates Communicative Development Inventory: Words and Gestures and Communicative Development Inventory: Words and Sentences and Minnesota Child Development Inventory were among those assessments. These children were later diagnosed with an ASD. It is estimated that of the children who are currently or were previously enrolled in CHIP, about 2 in 80 also have been diagnosed with ASD (Yoshinaga-Itano, personal communication, June 10, 2013). The three case study participants were chosen from the group of children in the CHIP database with a diagnosis of ASD due to the consistency of assessments at approximate intervals of 5-6 months, starting at least at 9 months old. They each also had at least five assessment sessions total. All of the children lived in a Colorado metro area. The histories for each child are reported with the known information. Due to the great variety of expression of characteristics across diagnoses and the variety of intervention, each study is treated as a separate case.

Case Study Participants

Sam

Sam was born in 2005 to two deaf Caucasian parents. He was diagnosed with a bilateral severe sensorineural hearing loss at birth. He was fitted with hearing aids at 7 months old. Sam’s intervention began at age 2 months old, while he was in the NICU. His intervention was solely from CHIP and consisted of individual therapy delivered in his home. His therapist used sign and speech while his parents used only sign with him. As he grew, he learned sign but did not speak.
Max

Max was born in 2002 to hearing Caucasian parents. At birth, he was diagnosed with profound bilateral sensorineural hearing loss. He received cochlear implants at 16 months. His intervention began at 18 months or before and included services from CHIP, Listen Foundation, and later a private therapist. At 18 months, he received 1 hour a week of in-home intervention, and by 21 months he was receiving an hour of in-home intervention along with an hour of out of the home intervention. His intervention initially consisted of verbal/oral therapy without sign language. By age 26 months, some sign was used. Max was diagnosed with ASD at age 18 months and with apraxia of speech at age 5 years old.

Allen

Allen was born in 1996 to hearing Caucasian parents. He was diagnosed with a bilateral severe sensorineural hearing loss at birth. He was fitted with hearing aids at age 2 months. Intervention began at age 2 ½ months old and was 90 minutes a week in his home. Auditory/verbal therapy was used. Until age 15 months, Allen received intervention services from CHIP only. Around 15 months, he began attending a deaf/hard of hearing (D/HH) group at Children’s Hospital of Colorado (CHCO). With the addition of the D/HH group at CHCO, he received 5 hours of intervention per week and both ASL and English order signing was added to the verbal/auditory approach to communication to become a total communication approach.

Assessment Tools

MacArthur-Bates Communicative Development Inventory

The MacArthur-Bates Communicative Development Inventory (CDI) is a parent questionnaire about language understanding and production for children as young as 8 months of age. It was developed in 1993 and revised in 2007 (Fenson et al., 2007). Since 1993 there have been two scales, CDI Words and Gestures (CDI: WG) for infants from 0;8 to 1;4 and the CDI Words and Sentences (CDI: WS) for toddlers from 1;4 to 2;6. A modified version of the MacArthur-Bates CDI: WG was given to the parents in the CHIP program. Usually, parents indicate the words or phrases the child understands and the ones s/he produces. CHIP utilizes a
version that includes a way to indicate which words the child understands, which words the child says, and which words the child signs. All the items and questions from the CDI: WG are unchanged.

The CDI: WG contains two parts with several sections. The first section consists of three questions about the child’s responsiveness to language. In the next section, using a list of 28 items, parents identify phrases the child understands. The third section has two questions about the child’s frequency of imitating words and labeling objects. The following section is a 396-item vocabulary checklist broken into 19 semantic categories. Part II of the questionnaire contains sections about actions and gestures. The subscales of the actions and gestures sections are First Communicative Gestures, Games and Routines, Actions with Objects, Pretending to Be a Parent, Imitating Other Adult Actions (using real or toy implements), and Pretend Objects.

The MacArthur-Bates CDI: WG may be particularly beneficial for use with children with ASD due to the inclusion of two areas of concern for children with ASD: vocabulary comprehension and production as well as the use of early social-communicative behaviors (e.g., imitation, functional and symbolic play, and declarative and imperative gestures) (Luyster, Lopez, & Lord, 2007).

Child Development Inventory

The Minnesota Child Development Inventory (MCDI) was developed in 1972 and was later updated and renamed the Child Development Inventory (CDI) in 1992 (Ireton, 1992). This caregiver questionnaire is normed for children 15 months to 6 years. The CDI has 270 items that are answered either yes or no. It measures development in eight areas and overall general development leading to nine scales including Social (40 items) and Self Help (40 items). With nine scales, the CDI provides a greater picture of a child than many of the other toddler and preschool scales and screeners. The scores for the scales are given as developmental ages.

There are a few differences between the MCDI and the CDI. Ireton (1992) explained the CDI consists of a more comprehensive set of items in terms of age coverage as well as eliminating “poor items” (p. 2). The CDI also has a more representative and more current norm
sample. Furthermore, Ireton reported the CDI is simpler and easier to use. There is a change in the name of one of the scales; the Personal-Social Scale became the Social Scale. While the manual for the MCDI was not available, Apuzzo and Yoshinaga-Itano (1995) described the Personal-Social scale as measuring personal and social behavior, including independence, imitation, social interaction, and concern for others. Ireton described the Social Scale as including interactions with parents, children, and other adults and from individual interaction to group participation.

The MCDI was used with two of the case study participants (Max and Allen) and the CDI was used with one (Sam). This made comparison of specific items difficult because only 17 out of 40 items corresponded between Personal-Social Scale (MCDI) and the Social Scale (CDI). Some of the items for the Self Help Scale were changed and just 25 out of 40 items corresponded. Additionally, age level information for each item is available in the CDI manual and unknown for the MCDI. Thus, the individual items for Sam could be organized by age level and only the corresponding items for Max and Allen could also be organized by age level.

**Play Assessment Questionnaire**

The Play Assessment Questionnaire (PAQ) began as the Play Assessment Scale (Fewell, 1984, as cited in Calhoun, 1987) and was used solely for research. Calhoun’s thesis compared the Play Assessment Scale, administered in a clinical setting and the PAQ, a questionnaire filled at home by the mother of the child, and an adaption of the Minnesota Child Development Inventory (MCDI). The PAQ consists of 45 questions, arranged in developmental order, about children’s behavior. Each item contains example behaviors and a place to write in behaviors. For example, item #10 “Has your child ever put one or more object(s) inside another even though it may not have belonged there, such as: a block into a bucket; or a toy truck into a box; or a peg into a cup; or other?” Caregivers are asked to indicate *yes* if they have seen the child spontaneously do the behavior; *help* if the child can do the behavior only with help, modeling, or coaxing; and *no* if they have never seen the child do the behavior.
CHAPTER 3: RESULTS

MacArthur-Bates CDI: WG

The MacArthur-Bates CDI: WG was one of the three assessments utilized in the current study. The parents of Max and Sam filled out the MacArthur-Bates CDI: WG four times between ages 9 months and 27 months. Allen’s parents filled it out three times between the ages of 4 and 15 months. Allen scored in the average range across all domains at age 15 months and thus the MacArthur-Bates CDI: WG was not continued and the MacArthur-Bates CDI: WS was used. Max and Sam’s scores fell below the typical range in at least some of the domains at 16 months and the assessment was continued past the normed ages (0;8 to 1;6). The results of the following measures related to the MacArthur-Bates CDI: WG will be presented for each case: age quotient, words produced (expressive vocabulary), total gestures produced, and a subscale of gestures.

Age quotient is the developmental age score (derived by the norms from the assessment) divided by the chronological age, multiplied by 100. Over time, age quotients indicate the rate of development. A flat age quotient trajectory indicates a year’s growth in a year’s time. Figures 1, 2, and 3 represent the age quotient for the case study participants for some of the subscales. It is expected that the age quotient would stay constant or increase as children increase their vocabularies. Note that for each subscale, all children begin with a quotient of at least 89. The age quotient of 89 indicates a developmental age of <8 months at chronological age of 9 months and is the lowest developmental age given on the assessment. Thus, when the age quotient decreased, more representative age quotients may begin at 14-16 months.

As shown in Figure 1, Max’s age quotients were fairly consistent in the 40 to 60 range, with the additional score of 67 for total gestures at 21 months. Between the ages of 14 and 26 months, he appeared to make about a year’s growth. As mentioned above, the age quotient score
of 89 at 9 months is potentially misleading. Because the scores were below the norms, the actual developmental ages for the raw scores were not available. Given that his raw scores were zeros for all four subscales, it is likely his age quotient would be lower than 89 for 9 months (Table 1). Similarly, Max scored at <8 months at 14 months across all categories, so age quotients at 14 months may be inflated as well.

![Figure 1. MacArthur-Bates CDI: WG age quotients for Max.](image)

<table>
<thead>
<tr>
<th>CA in Months</th>
<th>Receptive Language</th>
<th>Expressive Language</th>
<th>Phrases Understood</th>
<th>Total Gestures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Dev. Age</td>
<td>Number</td>
<td>Dev. Age</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>&lt;8 mo</td>
<td>0</td>
<td>&lt;8 mo</td>
</tr>
<tr>
<td>14</td>
<td>5</td>
<td>&lt;8 mo</td>
<td>0</td>
<td>&lt;8 mo</td>
</tr>
<tr>
<td>21</td>
<td>37</td>
<td>10 mo</td>
<td>1</td>
<td>9 mo</td>
</tr>
<tr>
<td>26</td>
<td>101</td>
<td>14 mo</td>
<td>36</td>
<td>16 mo</td>
</tr>
<tr>
<td>34</td>
<td></td>
<td></td>
<td>66</td>
<td>18 mo</td>
</tr>
</tbody>
</table>

There are fewer data points on Sam’s age quotient graph (Figure 2) because he reached the ceiling of the tool at 16 months for receptive vocabulary and at 22 months for phrases understood. The developmental age for his receptive vocabulary at 16 months and for his phrases understood at 22 months was listed as >16 months and an age quotient could not be calculated.
Sam’s rate of acquiring words, phrases, and gestures decreased between 9 and 22 months. In many of the categories, he lost skills or words he previously understood and/or produced. For example, for Gestures: *Imitating Other Adult Actions*, his raw score dropped from 7 to 3 (with five lost skills and one new skill). Sam lost skills on the CDI and the PAQ as well.

![Figure 2. MacArthur-Bates CDI: WG age quotients for Sam.](image)

As mentioned earlier, Allen scored in the average range for 16 months old and the MacArthur-Bates CDI: WG was no longer given. The MacArthur-Bates CDI: WS was used to continue to measure his expressive vocabulary. Also, at 9 months, Allen’s developmental score for all four categories, except for expressive vocabulary, was <8 months and thus he had an age quotient score of 89. Given this, only his age quotient for expressive vocabulary can be considered. As shown in *Figure 3*, while Allen began with a quotient over 100 and thus had a steeper trajectory than the normed sample, his expressive vocabulary growth slowed over time. He was not making a year’s growth in a year’s time and his scores fell below the typical range after 21 months.
Graphs, not tables, are available for the norms for the MacArthur-Bates CDI: WG and for the norms for the D/HH population. Thus, new graphs could not be made and a graph of current data was superimposed onto existing graphs. For the MacArthur-Bates CDI, the norms for the D/HH population have also been calculated for subgroups, including children with cognition of greater than or equal to 80, degree of hearing loss, and age of identification. The norms for children who are D/HH and have cognition of greater than or equal to 80 were used because all three participants had cognition greater than 80. This is relevant because the norms for the total D/HH population tend to be lower than the norms for hearing children. While nobody has examined the reason for this difference, it may be due to the heterogeneity of the D/HH population. Deafness is often comorbid with syndromes and other developmental differences, which leads to more children who are D/HH and have cognition standard score lower than 80 as compared to the hearing population (Beer, Harris, Kronenberger, Holt, & Pisoni, 2012).

The three figures below overlay the total number of words produced from the MacArthur-Bates CDI: WG for Sam and Max and MacArthur-Bates CDI: WS for Allen onto the norms for all the children who are D/HH (Figure 4), the norms for the children who are D/HH with cognition greater than or equal to 80 (Figure 5), and the norms for hearing children (Figure 6). On Figure 4 and Figure 6, Allen’s trajectory does not match those of the other children in the
norm meaning his age quotient score was decreasing as on the graph above. Note also, when Allen was compared to his peers who are D/HH with cognition greater than or equal to 80, his scores were below the 50th percentile. The trajectories of Max and Sam’s scores seemed to be linear rather than exponential like those of the children in the 25th percentile.

*Figure 4. MacArthur-Bates CDI: WS word produced for D/HH norms and case study participants. Adapted from Marion Downs Hearing Center (2011a).*

*Figure 5. MacArthur-Bates CDI: WG words produced for children who are D/HH with cognition greater than or equal to 80 and case study participants. Adapted from Marion Downs Hearing Center (2011a).*
Figure 6. MacArthur-Bates CDI: WS words produced for male/female norms and case study participants. Note that data for the case study participants exceeds the x-axis. Adapted from Fenson et al. (1994) p. 80.

Figure 7 overlaps the total gestures produced by Sam, Max, and Allen on top of the total gestures for the total group D/HH norms. Sam’s score was close to the 50th percentile at 16 months and 32 months. Max’s total gestures were below the 25th percentile at 16 months and caught up to almost the 50th percentile by 21 months. Given that at 16 months Max demonstrated 4 out of 18 early gestures and 3 out of 45 late gestures, it is not surprising Max was diagnosed with ASD by 18 months. While it was not listed on Max’s information sheets, it was likely Max began receiving early ASD intervention. This may explain his dramatic increase in gesture use after 18 months (at 21 months he demonstrated 11 out of 18 early gestures and 21 out of 45 late gestures).

At 16 months, Allen’s scores were above the 75th percentile for children who are D/HH (Figure 7), children who are D/HH and have cognition greater than or equal to 80 (Figure 8) and close to the mean of the norms for hearing males (Figure 9). This was not consistent with the results of several researchers who found children with ASD had delayed gestures compared to the control group or the norms (Charman, Drew, Baird, & Baird, 2003; Luyster et al., 2007; Miniscalco, Fränberg, Schachinger-Lorentzon, & Gillberg, 2012; Mitchell et al., 2006).
On Figure 7, Sam’s scores at 16 months and Max’s scores at 21 and 26 months were also inconsistent with those findings. This may have been due to their scores being compared to the D/HH total group norms that were lower than the norms for children without hearing loss. On Figure 8, when compared to the children who are D/HH with cognition greater than or equal to 80, Max’s scores were well below the 25th percentile. Sam’s total gestures were just at the 25th percentile at 16 months and subsequently fell below. On Figure 9, when compared to the norms for hearing children, Sam and Max were below one standard deviation for combined sexes at 16 months.

![MacArthur CDI: Total Gestures](image.png)

*Figure 7. MacArthur-Bates CDI: WG total gestures for D/HH norms and case study participants. Adapted from Marion Downs Hearing Center (2011a).*
Figure 8. MacArthur-Bates CDI: WG total gestures for the children who are D/HH with cognition greater than or equal to 80 and case study participants. Adapted from Marion Downs Hearing Center (2011a).

Figure 9. MacArthur Bates CDI: WG total gestures for male/female norms and case study participants. Adapted from Fenson et al. (1994) p. 75.

MacArthur-Bates CDI: WG Subscale D, *Pretending to Be a Parent*, is one the subscales for the late gestures section and, in the current study, appeared to be an important and revealing category. It involves children playing parent with a doll or stuffed animal including such actions as feeding it with a bottle, talking to it, and hugging it. Table 2 presents the entire subscale as well as the norms that indicate by what month 50% of the normed sample demonstrated the skill.
Both sexes combined showed 4 of the items by 16 months. Neither Sam nor Max displayed any skills from this category until after 17 months (Figure 10). By 17 months, Allen had demonstrated two of them (i.e. brushing/combing its hair and hugging/kissing it). Notice that Sam lost skills. Between 17 and 21 months, he lost five skills and gained one new one.

Table 2
**MacArthur-Bates CDI: WG Subscale D: Pretending to be a Parent**

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item</th>
<th>50% Month</th>
<th>Actual %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Put to Bed</td>
<td>10</td>
<td>52.4</td>
</tr>
<tr>
<td>2</td>
<td>Cover with blanket</td>
<td>13</td>
<td>52.1</td>
</tr>
<tr>
<td>3</td>
<td>Feed with bottle</td>
<td>16</td>
<td>53.7</td>
</tr>
<tr>
<td>4</td>
<td>Feed with spoon</td>
<td>16</td>
<td>50.0</td>
</tr>
<tr>
<td>5</td>
<td>Brush/comb hair</td>
<td>(16)</td>
<td>43.3</td>
</tr>
<tr>
<td>6</td>
<td>Pat or burp it</td>
<td>(16)</td>
<td>31.3</td>
</tr>
<tr>
<td>7</td>
<td>Push in stroller/buggy</td>
<td>(16)</td>
<td>41.2</td>
</tr>
<tr>
<td>8</td>
<td>Rock it</td>
<td>(16)</td>
<td>40.3</td>
</tr>
<tr>
<td>9</td>
<td>Kiss or hug it</td>
<td>(16)</td>
<td>35.8</td>
</tr>
<tr>
<td>10</td>
<td>Try to put shoe/sock/hat on it</td>
<td>(16)</td>
<td>31.3</td>
</tr>
<tr>
<td>11</td>
<td>Wipe its face or hands</td>
<td>(16)</td>
<td>31.8</td>
</tr>
<tr>
<td>12</td>
<td>Talk to it</td>
<td>(16)</td>
<td>17.9</td>
</tr>
<tr>
<td>13</td>
<td>Try to put a diaper on it</td>
<td>(16)</td>
<td>15.2</td>
</tr>
</tbody>
</table>

*Note:* Adapted from Fenson et al. (1994) p. 159.

*Figure 10.* MacArthur-Bates CDI: WG Pretending to be a Parent total gestures for case study participants.
Figure 11 displays the norms for the hearing population. Notice the difference between the mean for males and females. Figure 12 depicts the same graph of the norms for the hearing population with the scores for Sam, Max, and Allen superimposed over it. Allen’s score of two items was within one standard deviation from the average for both sexes combined. Sam and Max were lower than one standard deviation below.

Figure 11. MacArthur-Bates CDI: WG Pretending to Be a Parent for male/female norms. Adapted from Fenson et al. (1994) p. 80.

Figure 12. MacArthur-Bates CDI: WG Pretending to be a Parent for male/female norms and case study participants. Adapted from Fenson et al. (1994) p. 80.
CDI

*Figure 13* depicts the age quotients for the CDI: Social and the MCDI: Personal-Social. Recall that Sam’s assessments included the CDI and Max and Allen’s assessments included the MCDI. Also, the scales were named differently between the two versions. Additionally, note that Sam was not given the CDI between 16 and 28 months. Age quotients for Sam, Max, and Allen all decreased over time. Between 28 and 32 months, Sam lost eight skills, maintained six, and gained 7, thus his raw score went from 14 to 13. Lost skills included #23 *Usually obeys when asked to do something or told not to*, #34 *Usually shares toys or possessions*, and #30 *Initiates activities with other children*. Max lost four skills between 26 and 31 months, two of which he had reportedly been demonstrating since 21 months.

![CDI: Social Age Quotient](image)

*Figure 13*. CDI: Social and MCDI: Personal-Social age quotients for case study participants.

There was not an overall trend for *no* answers for CDI: Social or MCDI: Personal-Social items involving other children. While all three participants scored *no* for some items (e.g. #24 *Offers to help others*, and #10 *Gives directions to other children*), all three had *yes* answers by the listed age level for some items (e.g. Sam: #12 *Plays physical games with other children such as tag, hide-and-seek, hopscotch*, Max and Allen: #243 *Plays with other children, doing things with them*).
Figure 14 compares the norms for the children who are D/HH from the MCDI: Personal Social and Max and Allen. Sam’s data from the CDI: Social was included though it was unknown if the D/HH norms for the CDI: Social were different from the MCDI norms. There was no data separating the children who are D/HH with cognition greater than or equal to 80. For hearing children, it is expected the chronological age would match developmental age. Not only did Max and Allen’s scores fall at the 25th percentile by 33-39 months, their trajectories were less steep than their peers who are D/HH.

The MCDI and CDI Self Help age quotients are depicted in Figure 15. Both Sam and Allen’s age quotient decreased. Allen, in particular, was right at the expected age quotient of 100 until 21 months when his scores started decreasing steadily. Max’s age quotient was not as consistent and he plateaued between 21 and 26 months. Sam’s age quotient was even less consistent. The missing data would have been interesting to plot. Sam lost one skill between 16 and 28 months and two skills between 28 and 32 months which was fewer skills than he lost on the CDI: Social Scale. The two skills he lost were related to independence in his environment:
#54 Goes around the house independently; requires little supervision and #56 Remembers where things are kept in the house. Max did not lose any skills. Allen lost one skill on this subscale (i.e. #285 Brushes teeth without help). His caregiver indicated he could do it at the 21- and 27-month dates, but not at the 35-month date.

Figure 15. MCDI and CDI: Self Help age quotients for case study participants.

When compared to the D/HH norms (Figure 16), all three case study participants’ scores fell below the 25th percentile around 35 months. Sam and Max’s scores were consistently at or just below the 25th percentile. It’s possible that the norms for the children who are D/HH for the CDI: Self Help would be different and Sam’s data has been added here because those norms were not available. Allen’s developmental age, on the other hand, started close to the 50th percentile and then began to plateau while the age quotient at the 50th percentile continued to increase.
Figure 16. MCDI: Self Help for D/HH norms and case study participants. Note that Sam's data from the CDI has been added. Also the y-axis begins at 5 months. Adapted from Marion Downs Hearing Center (2011b).

**PAQ**

The PAQ norms for hearing children were not available and thus only norms for children from CHIP are used for comparison. Only graphs of developmental ages were available, so age quotients could not be compared and the superimposition of graphs is used for comparison. Additionally, there were no graphs for the children who are D/HH with cognition of greater than or equal to 80. Recall that each item can be scored as *yes, help* (with modeling, imitation, or coaxing), and *no*.

*Figure 13* is notable in two ways. Sam and Max’s trajectory of scores were relatively flat, indicating no overall increase or decrease. Allen’s age quotient scores decreased. Additionally, there was little difference between spontaneous skills and imitated skills for all three participants. At any one time, the most additional skills a child could demonstrate with help were three. This means the children were not imitating many play behaviors.
Figure 17. PAQ age quotients for case study participants.

Figures 14 and 15 compare the developmental ages for the D/HH norms and the case study participants. Allen’s scores were right at the 50th percentile. Max’s scores were just below the 25th percentile and Sam’s scores were at the 10th percentile. Between 21 and 32 months, Sam lost several skills. The scores represented in the graphs are those obtained with basal and ceiling rules. When analyzing all of his yes scores, not just those within the basal and ceiling, he lost two spontaneous skills between 21 and 28 months and seven spontaneous skills between 28 and 32 months. In comparison, Max lost no spontaneous skills until 26 months and then lost two spontaneous skills between 26 and 34 months. Allen lost two spontaneous skills between 20 and 28 months and three spontaneous skills between 27 and 36 months. When considering the basal and ceiling rules, Sam’s raw score indicated 10 lost skills between 28 and 32 months and was reflected in the dramatic drop in Figures 14 and 15.
Figure 14. PAQ developmental ages for spontaneous skills for D/HH norms and case study participants. Adapted from Marion Downs Hearing Center (2011c)

Figure 15. PAQ developmental ages for spontaneous and imitated skills for D/HH norms and case study participants. Adapted from Marion Downs Hearing Center (2011c)

PAQ and Pretending to Be a Parent

There are several items on the PAQ that contain “pretending to be a parent” behaviors as examples. Table 4 (in the Appendix) lists some sample items. Because other actions with other objects also fit the question, it cannot be known which behaviors caused the caregiver to check
yes for that item. There are only three items that specifically ask about pretending to be a parent (i.e. #15, 19, 32).

When considering Table 3, please note the ages carefully. The children were tested at different times. Max’s caregiver did not fill out the PAQ before 21 months and Allen’s caregiver first started filling it out at 4 months. Item numbers 15 and 19 were two on which Sam lost spontaneous skills. As previously mentioned, Sam lost skills within the MacArthur-Bates CDI: WG Pretending to Be a Parent subscale as well. Recall that Allen’s caregiver checked off two items from Pretending to Be a Parent at 16 months, so these skills were just emerging when the assessment stopped being given. From the yes answers on the PAQ at 20, 28, and 31 months, it seems likely that Allen’s score on Pretending to Be a Parent would continue to increase.

Table 3
Answers for Pretending to Be a Parent Items from the PAQ

<table>
<thead>
<tr>
<th>Item</th>
<th>Sam</th>
<th>Max</th>
<th>Allen</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>19</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>32</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Sam</th>
<th>Max</th>
<th>Allen</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>19</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>32</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
CHAPTER 4: CONCLUSION AND DISCUSSION

By choosing case study participants from the CHIP database, data from assessments beginning at 4 months were available to be analyzed for children who were diagnosed early as D/HH and went on to receive a diagnosis of ASD. Among the variety of assessments given by CHIP, the MacArthur-Bates CDI, MCDI/CDI, and the PAQ were chosen. They are not traditionally used as screeners for ASD, but they contribute to the larger picture of the whole child including a possible diagnosis of ASD. All three assessments are appropriate for very young children, with the MacArthur-Bates CDI: WG being normed for the youngest infants, at 8 months.

Implications

While the MacArthur-Bates CDI: WG has not been used as a screener for ASD, it has been used to measure communication skills in children with or who were later diagnosed with ASD. Several researchers found delays in gesture for children with ASD and Mitchell et al. (2006) suggested delays in gestures may be among the earliest signs of ASD. Furthermore, Mitchell et al. (2006) suggested gesture development was potentially more informative than vocabulary development before 18 months. However, when compared to the norms for total gestures produced on the MacArthur-Bates CDI: WG for the total group of D/HH children from CHIP, Sam, Max, and Allen were not delayed. There is great variability within the total D/HH population in CHIP and when children were separated by cognition, Sam and Max were around or less than the 25th percentile for total gestures produced. Sam and Max also both had decreased total number of words produced on the MacArthur-Bates CDI: WG and WS as compared to the norms for all the children who are D/HH.

The MacArthur-Bates CDI: WG Subscale D: Pretending to Be a Parent was examined.
The norms for the hearing population for this subscale differed significantly for males and females. According to Fenson et al. (1994), females do not acquire many of these items by 16 months (between six and seven behaviors) and boys acquire even fewer (between three and four). There are a few possible reasons for this. One is a cultural consideration. Play materials may not be as available for boys, parents may not encourage these behaviors with boys, and parents may underreport these behaviors in boys. Additionally, these types of symbolic behaviors may emerge later than other gestures and play skills and girls may be slightly ahead of boys in the acquisition of cognitive functions such as symbolic behaviors (Fenson et al., 1994).

Play involving “pretending to be a parent” might be related to theory of mind. Theory of mind is the ability to consider someone else’s experience, including their mental states, as separate from one’s own. Many researchers have suggested that people with ASD have deficits in theory of mind (Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998). Pretending to be a parent involves taking on a role of caregiver to a substitute for oneself. This may be difficult if one has difficulty imagining oneself in another’s place. Some of the other gestures and actions included in the late gestures section involve imitating adult actions which might be an easier cognitive task for children with ASD.

If lack of “pretending to be a parent” behaviors is part of a profile of a child with ASD, then there are several ways these behaviors may be assessed. The most comprehensive assessment, which includes 13 items, is the MacArthur-Bates CDI: WG. The MacArthur-Bates CDI: WG subscale D: Pretending to Be a Parent would be a quick and cost effective checklist to use with parents. Several researchers endorse using the whole MacArthur-Bates CDI: WG when assessing young children with or potentially with ASD for several reasons (Charman et al., 2003; Luyster et al., 2007; Miniscalco et al., 2012; Mitchell et al., 2006). It is particularly helpful when assessing children with limited language because it includes gestures and early non-verbal communication. It is easy for parents to fill out and may be more representative of children’s language and communication than could be gathered in a clinical visit.
The M-CHAT contains a single relevant item: “#5. Does your child ever pretend, for example, to talk on the phone or take care of dolls, or pretend other things?” (Robins, Fein, Barton, & Green, 2001). The ADOS Toddler Module and Modules 1 and 2 include at least one main activity and several other opportunities for “pretending to be a parent” (Luyster et al., 2009). The examiner is looking for imaginative play overall rather than “parent” play. There are also non-ASD specific assessments for young children that include symbolic play involving “pretending to be a parent” behaviors such as feeding a bear (e.g. PLS-5).

The results and age quotients for the case study participants from the CDI: Self-Help subscale were quite interesting and not necessarily anticipated. It is expected that children with cognition greater than or equal to 80 will have self-help skills within normal limits. The case study participants did not have fine or gross motor deficits and should have been able to perform the necessary actions. The types of items none of the three children acquired by the appropriate age included “washes face without help,” “toilet trained for urine control and bowel movements,” “washes self in bathtub—may need a little help,” and “unzips zippers.” While self-help skills like these are not social in nature, they are learned by imitating a caregiver. Children with ASD might not see the purpose in learning the skill when someone else is helping them with it. They also tend to use adults as tools and the adult is acting as a tool when performing these actions on the child. Additionally, this may be related to deficits in play involving “pretending to be a parent.” Having cognition greater than or equal to 80 and low scores on the CDI: Self-Help may fit one of the profiles of being diagnosed with ASD.

The PAQ was analyzed as well. There is an overlap between play behaviors on the PAQ and play gestures as measured by the MacArthur-Bates CDI: WG Pretending to Be a Parent. On the PAQ, Allen’s score was at the 50th percentile and Max and Sam’s scores did not fall as low on the graph as one might expect for children later identified with ASD. The scores for all three case study participants on the PAQ were also not as low as those on the Pretending to Be a Parent subscale. The PAQ may not be as sensitive in measuring deficits in play involving Pretending to Be a Parent subscale due to the type of play at this early age as measured on the
PAQ. Early play is more concrete and functional and children with ASD may develop these skills more easily than symbolic and imaginative play (Christensen et al., 2010). Symbolic and imaginative play develops later and most of the symbolic and imaginative items on the PAQ were marked with a no by the caregivers of the case study participants, even at 31-34 months. Thus, the PAQ might be more sensitive in identifying deficits in play consistent with ASD in children older than 3 years.

When examining the data, none of the differences Sam and Max exhibited (e.g. words produced compared to the D/HH norms; gestures produced compared to the children who are D/HH with cognition equal to or greater than 80 norms; potentially Pretending to Be a Parent compared to the D/HH norms; the decreasing age quotients) may be noteworthy by themselves. Yet, the collection of these differences may contribute to a profile of a child with hearing loss that should be referred for further ASD evaluation. The decreased scores are in areas that match expected symptoms for ASD.

This creates three profiles of children with hearing loss and ASD. Max’s scores tended to be lower than Sam’s, and Max’s data contained more scores of zeroes around 9 and 14 months. Max’s absence of comprehending or producing words, phrases, or gestures probably added to other characteristics that lead to his ultimate diagnosis of ASD by 18 months old.

Regression of skills is often considered an early warning sign and, combined with other factors, is a potential indicator for a referral for an ASD evaluation. Landa (2008) stated that any child with ASD can regress (previously acquired skills are diminished or lost), particularly in the following areas: expressive language and social-emotional reciprocity. She reported regression occurs in 10-50% of children with autism, at a mean age of 19 months. Barton et al. (2012) mentioned an average onset for regression between 15 and 21 months. Due to this, experts advocate screening at 18 months and 24 months because lost skills will probably be evident. Sam’s reported lost skills were concerning. They contribute to a profile of a child with hearing loss and ASD. These findings and the decreasing age quotients lead to an endorsement for the use of screening over multiple sessions. This is important because screeners may often be
performed only once. Follow up and subsequent screening and assessment may reveal loss of skills or a lower age quotient trajectory than the trajectory of a typically developing peer. Single instance screening is not sufficient. Identifying the optimal schedule for screening has yet to be determined.

While Allen had the most language of the three participants, his age quotient for expressive vocabulary did decrease steadily from above the 90th percentile to below the 75th percentile of the D/HH norms and below the 50th percentile for the norms for the children who are D/HH with cognition greater than or equal to 80. Allen’s scores did not have as many differences from the norms. This is a reminder that a child with ASD may score in the average or above average range in areas of social communication, play, and self-help, at least at some ages. However, his age quotients did decrease on several sections of the assessments (e.g. MacArthur-Bates CDI: Words Produced and CDI: Social). As mentioned above, age quotients are particularly helpful when measured over time so trajectories can be examined. When screeners and assessments are performed over multiple sessions, age quotients also permit comparison of children to themselves in addition to their typically developing peers and this indicates their rate of development. Slowed development is concerning.

**Current ASD Research**

Many researchers are currently investigating early identification of ASD, before 18 months. Wetherby and Prizant (2002) developed the Communication and Symbolic Behavior Scales Developmental Profile as a standardized tool for screening children between 12 and 24 months that focuses on communication and symbolic abilities. Ozonoff and her colleagues (Ozonoff et al., 2010) completed a prospective study on the emergence of behavioral signs of autism in the first and second years of life. Specifically, they coded gaze to faces, social smiles, and directed vocalizations from videotapes. They found no group differences at 6 months. Between 6 and 18 months, infants later diagnosed with ASD had decreasing trajectories of social communication behavior and loss of skills.
Paul, Fuerst, Ramsay, Chawarska, and Klin (2011) examined the vocal production of infants at 6, 9, and 12 months. They concluded pre-speech vocal productions were associated with later symptoms of ASD. In another study, one-day automated language recordings (i.e. a Language Environment Analysis (LENA) Digital Language Processor) were used to compare children with ASD, language delay, and who were typically developing (Oller et al., 2010). Using algorithms, Oller and his colleagues found development of the formation of syllables as a significant indicator distinguishing between children with ASD, language delay, and those who were typically developing.

Neural scientists have found a period of abnormal brain and head overgrowth that precedes or occurs with the onset of behavioral symptoms, (Courchesne et al., 2011). In a small, preliminary study, Courchesne and his colleagues found an abnormal excess of number of neurons in the prefrontal cortex of males with autism. Shic, Bradshaw, Klin, Scassellati, and Chawarska (2011) have focused on eye gaze of toddlers watching various displays including videotapes of people interacting. Their report included findings such as toddlers with ASD spent more time looking at people’s bodies than at their heads. Thus, researchers are uncovering ways beyond language and communication to identify ASD. This has promising implications for diagnosing ASD in children who are D/HH due to the shared deficit in communication.

**Future Research**

Many questions and areas for further research are raised as a result of these case studies. For Sam and Max, the MacArthur-Bates CDI: WG appeared sensitive to deficits in their total gestures and, in particular, the number of gestures in the subscale Pretending to Be a Parent. Further research is needed to determine if the MacArthur-Bates CDI: WG can be useful in screening for ASD as early as 9 months. It could become one of the earliest assessments to be sensitive to differences between children with ASD and typically developing children.

Many of the areas for future research surround the need for more norms. The norms for the D/HH population for the Child Development Inventory are based on the older MCDI. Once there are a sufficient amount of scores for the CDI in the CHIP database, the norms could be
updated for the current assessment. It would be beneficial to compare Sam’s data to the D/HH norms for CDI instead of the MCDI. Additionally, separating out the norms for the MCDI, CDI, and the PAQ for the children who are D/HH with cognition greater than or equal to 80 would be worthwhile. When compared to their peers who are D/HH with cognition greater than or equal to 80, the case study participants’ scores were often further below the norms than when compared to the D/HH population as a whole. Recall the difference in norms for the total D/HH population and the children who are D/HH and have cognition greater than or equal to 80 may be due to the heterogeneity of the D/HH population. Comparing children with cognition greater than or equal to 80 to their peers with cognition greater than or equal to 80 may be more sensitive to differences between children with ASD and typically developing children.

Unfortunately, there is no normed data past 16 months for MacArthur-Bates CDI: WG for either the hearing population or the D/HH population. Not all the items on all the subscales are expected to be demonstrated by 16 months. For those subscales, norms could be potentially developed to see by what point those items might be present. It would be very interesting to see how many of the behaviors for Pretending to Be a Parent hearing males might demonstrate by 27 months. Similarly, the data for the D/HH population has not been separated out for Pretending to Be a Parent specifically. The D/HH norms for the MacArthur-Bates CDI generally are lower than the norms for hearing children, so it is likely they are lower for this subscale as well. However, the norms for the children who are D/HH with cognition greater than or equal to 80 might be more comparable to the norms for hearing children.

Other worthwhile comparisons would include hearing children with ASD, females who are D/HH with ASD, children with other language delays (both hearing and D/HH). These various comparisons could reveal how particular or general are the profiles presented here. It may be the profiles are only applicable to males who are D/HH. If there are similarities between these findings and hearing children with ASD, research within the D/HH population could contribute to the understanding of ASD overall. More assessments found to be sensitive to the differences between children who are typically developing and children with ASD would be
beneficial. The more differences identified and the earlier those differences present, the more opportunities there will be for earlier identification. “Pretending to be a parent” play is part of symbolic and imaginative play. Future research might involve comparing children’s “pretending to be a parent” play skills to their overall symbolic or imaginative play to see if children’s overall play skills correlate to their “pretending to be a parent” play skills. Additionally, there are studies examining the relationship of symbolic and imaginative play and theory of mind. Role-playing may be related to precursors for developing theory of mind and “pretending to be a parent” would be one way to measure role-playing.

If a larger sample of the children who are D/HH with ASD were assessed with the CDI over a period of time, it would be beneficial to follow them to 72 months because there are norms until age 6 years. It could be determined if the children’s scores continued to fall further behind or if they gained some of the missing skills. As there is currently little to no research comparing CDI scores for children with ASD against other groups of children (e.g. TD and DD), that area would be another to pursue. More research is needed to explore the reasons behind the low scores and decreasing age quotients for Sam, Max, and Allen on the CDI-Self Help subscale. Results from the CDI: Self-Help from larger populations of children with ASD, both children who are D/HH and hearing children, might indicate deficits in self-help for some children. The CDI, in particular the Social and Self-Help subscales, may be sensitive to differences between children with ASD and typically developing children.

Allen’s scores were often in the average range for the D/HH norms and for some of the norms for hearing children. There were several other assessments given to Allen during his time in CHIP. That data could be further analyzed to identify any anomalies that might have been relevant to a later diagnosis of ASD.

As mentioned above, following the diagnosis of ASD by 18 months, it is likely that Max received early intervention services for ASD. His increasing scores after that time may have been affected by the intervention. In particular, his total number of gestures and the numbers in the subscale Pretending to Be a Parent increased dramatically after 16 months. The MacArthur-
Bates CDI: WG could be investigated as an effective way to monitor progress during intervention.

The implications from these case studies may reach beyond the research of D/HH and ASD. The profiles of these case study participants are not unlike profiles of hearing children with ASD. The onset pattern of symptoms is often categorized as either early-onset and regressive (Ozonoff et al., 2010). Children, like Max, with the early-onset pattern have differences and/or deficits in several areas, including communication and social interaction. Children with the regressive pattern, like Sam, may appear typically developing for a year or longer but then lose previously acquired skills, particularly in the areas of communication and social interaction. If assessments such as the MacArthur-Bates CDI: WG and CDI can help to indicate these patterns, they may be useful in screening both hearing children and children who are D/HH as well.
References


# APPENDIX

## Table 4

*PAQ Items Related to Pretending to be a Parent*

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Question</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Does your child use toys in the way they are designed to be used:</td>
<td>- perhaps hugging or kissing a baby doll  &lt;br&gt;- or pulling a string on a See-and-Say toy and listening to the sound  &lt;br&gt;- or turning the pages of a book and looking at the pictures  &lt;br&gt;- or pushing a toy truck as if it were on a road</td>
</tr>
<tr>
<td>13</td>
<td>Has your child ever actually put two play objects together in the correct way?</td>
<td>- putting or stirring a spoon in a cup  &lt;br&gt;- or placing a doll on a doll bed  &lt;br&gt;- or setting the telephone receiver on a toy telephone  &lt;br&gt;- or putting toy “people” into one of the “people” cars</td>
</tr>
<tr>
<td>23</td>
<td>Have you ever seen your child do two or more different appropriate actions in the same play period using the same toy?</td>
<td>- loading blocks on a truck and pushing the truck or emptying it  &lt;br&gt;- or using a spoon first to stir in a cup then to “feed” the baby</td>
</tr>
<tr>
<td>33</td>
<td>Does your child ever put two or more objects together then play with them, such as</td>
<td>- putting blocks or “logs” on the back of a truck and then pushing it  &lt;br&gt;- or putting a toy person into a car and then pushing it around  &lt;br&gt;- or putting a doll in a stroller and pushing it</td>
</tr>
</tbody>
</table>

## Pretending to be a Parent Items

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Question</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Has there ever been a time when your child:</td>
<td>- seemed about to offer you food or drink by bringing it up to your mouth whether or not he/she finished feeding you  &lt;br&gt;- tried to give the doll a bottle by putting it to the doll’s head whether or not he/she put it in the doll’s mouth  &lt;br&gt;- brought a hairbrush up to someone else’s hair whether or not he/she brushed it</td>
</tr>
<tr>
<td>19</td>
<td>Does your child treat a doll as if it were a baby by:</td>
<td>- “talking” to it  &lt;br&gt;- or feeding or giving it a drink  &lt;br&gt;- or brushing the doll’s hair  &lt;br&gt;- or covering the doll with a blanket</td>
</tr>
<tr>
<td>32</td>
<td>During the same play period has your child ever used two different actions or props, in correct sequence on a doll?</td>
<td>- put a doll on the bed and then covered it with a doll blanket  &lt;br&gt;- or put a doll on a toy chair and the put the chair up to the table</td>
</tr>
</tbody>
</table>