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APPLICATION OF THE LANGUAGE USE INVENTORY:
IDENTIFYING PRAGMATIC LANGUAGE DEFICITS IN YOUNG CHILDREN WHO ARE
DEAF AND HARD OF HEARING

by

Brittany Naugle

A thesis to be
submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Department of Communication Sciences and Disorders
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To the Graduate Faculty:

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

Kristina M. Blaiser, Ph.D., CCC-SLP,
Major Advisor

Heather Ramsdell-Hudock, Ph.D., CCC-SLP,
Committee Member

Amy Hardy, M.S., CCC-SLP,
Committee Member

Ryan Lindsay, Ph.D., MPH,
Graduate Faculty Representative

IDAHO STATE UNIVERSITY
HUMAN SUBJECTS COMMITTEE
NOTICE OF APPROVAL

October 11, 2017

Kristina Blaiser
Comm Sci Disorders/Deaf Educ
Meridian 594
1311 E. Central Drive
Meridian, ID 83642

RE: regarding study number IRBFY201879 : Idaho Collaborative Assessment Project

Dear Dr. Blaiser:

I have reviewed your request for expedited approval 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 Oct 11, 2018, 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 (2082822179; email humsbj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

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LIST OF ABBREVIATIONS

ASD	Autism Spectrum Disorder
ASL	American Sign Language
CIs	Cochlear Implant(s)
DHH	Deaf or Hard of Hearing
EI	Early intervention
HA/HAs	Hearing aid(s)
HL	Hearing loss
ICAP	Idaho Collaborative Assessment Project
IESDB	Idaho Educational Services for the Deaf and Blind
LUI	Language Use Inventory (O'Neill, 2007)
MLU	Mean length of utterance
NH	Normal hearing
SPHL	Severe to profound hearing loss
ToM	Theory of mind

Application of the Language Use Inventory: Identifying Pragmatic Language Deficits in Young
Children Who are Deaf or Hard of Hearing

Thesis Abstract – Idaho State University (2018)

Children who are Deaf or Hard of Hearing (DHH) demonstrate delayed pragmatic language development compared to their age-matched hearing peers (Goberis, Beams, Dalpes, Abrisch, Baca, & Yoshinaga-Itano, 2012). Early identification and intervention for social language use in children who are DHH will lead to overall improvements in language and pragmatic skills over time. Pragmatic skills are assessed in a variety of ways included parent-reported questionnaires. The Language Use Inventory (LUI; O'Neill, 2007) has been successfully applied to children from different populations but not yet to children who are DHH. An increased understanding of the pragmatic profile of young children who are DHH can aid in the early identification and intervention of these children who exhibit pragmatic language deficits. The purpose of this study is to create a profile of the performance of young children who are DHH on the LUI, as well as to reveal and confirm previously found attributes of the relationship between age and degree of hearing loss on early language use of children who are DHH.

Key words: Deaf, hard of hearing, Language Use Inventory, pragmatic language, theory of mind.

Background

Estimates on the prevalence of hearing loss in children in the United States varies from 1.7% to 5%; and of infants born in 2004, the incidence of permanent childhood hearing loss was 1.1 per 1000 children screened (Mehra, Eavey, & Keamy, 2009). Martin-Prudent, Lartz, Borders and Meehan (2016) reported that in 2008, 67% of children receiving early intervention were receiving these services for hearing loss. Children who DHH demonstrate delayed pragmatic development compared to their age-matched hearing peers (e.g., Goberis, Beams, Dalpes, Abrisch, Baca, & Yoshinaga-Itano, 2012). There is reason to believe that early attention to social language use in children who are DHH will lead to overall improvements in language and pragmatic skills over time. Pragmatic skills are assessed in a variety of ways, particularly as children enter school-age (O'Neill, 2007; Pesco & O'Neill, 2012; see also DeLucio & Girolametto, 2011; Paatsch & Toe, 2013; Most, Shina-August, & Meilijson 2010; Peterson, 2004). The Language Use Inventory (LUI; O'Neill, 2007, 2009; Pesco & O'Neill, 2012) has been used to assess early developing language use skills with children from different populations. This study investigated performance trends on the LUI of young children who are DHH. The purpose of this study is to determine the pragmatic profile for this population and how, in turn, this profile may be used to support early intervention (EI) programming. More specifically, what language development patterns are characteristic of children who are DHH, and how can the LUI aid in the development of effective assessment and intervention tools?

Pattern of Pragmatic Language Development in Children who are DHH

Children who are DHH have been shown to have delayed development of pragmatic language as well as differing patterns of development. Goberis and colleagues (2012) looked at

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order and type of pragmatic skill mastery and found both slower rates and differing orders of skill acquisition in children who are DHH compared to normal hearing (NH) peers. Second, observed interactions between pairs of preschool classmates found that children who are DHH received only half as many initiations from peers as their normal hearing counterparts received (DeLuzio & Girolametto, 2011). Third, Jeanes, Nienhuys, and Rickards (2000) examined communication breakdowns, with regard to identification and the process of repair, in children who are DHH versus NH children. Results indicated that children who are DHH were less aware of their listener's needs, and children who are DHH were found to use less effective means of communication repair. Finally, Most, Shina-August, and Meilijson (2010) used The Pragmatic Protocol to compare the verbal, nonverbal, and paralinguistic pragmatic skills of children who are DHH compared to children with NH. Verbal aspects included pragmatic behaviors expressed in words (e.g., responses to partners, cohesion, and choosing the conversation topic). Nonverbal behaviors included eye gaze, facial expression, and physical contact. Paralinguistic aspects related to how the words were used (e.g., clarity of speech, prosody, voice intention, and fluency). Children who are DHH demonstrated a significantly higher use of inappropriate behaviors and had not mastered consistent and appropriate use of pragmatic skills by the age NH children had demonstrated their understanding and use.

Goberis and colleagues (2012) examined the pragmatic skills of 109 children with NH compared to 126 children who are DHH based on the results of the Pragmatic Checklist (Simon, 1984), a parent-reported questionnaire. All participants were between the ages of 2 to 7 years. Participants with NH were divided into the following groups by age: 18 to 29 months ($n = 14$), 30 to 41 months ($n = 19$), 42 to 53 months ($n = 23$), 54 to 65 months ($n = 23$), 66 to 77 months ($n = 17$), 78 to 89 months ($n = 11$), and 90+ months ($n = 4$). Participants who were DHH were

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divided similarly: 24 to 35 months ($n = 93$), 36 to 47 months ($n = 50$), 48 to 59 months ($n = 102$), 60 to 71 months ($n = 89$), 72 to 83 ($n = 82$), and 84 to 96 ($n = 67$). Parents completed a questionnaire that consisted of demographic, language use, and situation comprehension questions. Skills were considered mastered by a group when 75% of children were marked as using more complex language as indicated by parent report. Children with normal hearing mastered 44% (20 of 45) of the items by 3 years of age, 95% (43 of 45) by age 4 years, 98% at 5 years, and 100% by 6 years. In contrast, participants who were DHH demonstrated mastery of 6.6% (3 of 45) of the items by 6 years of age and 69% (31 of 45) of the items by 7 years. The three items mastered by 6 years of age included (1) makes polite requests – uses words; *please*, *thank you*, (2) expresses needs, and (3) role-plays with props. Items not mastered using complex language by children who are DHH by 7 years of age included: (1) provides information on request, (2) repairs incomplete sentences, (3) ends conversations, (4) interjects, (5) apologizes, (6) requests clarification, (7) makes promises, (8) asks questions to problem solve, (9) asks questions to make predictions, (10) retells a story, (11) tells four- to six-frame picture story in correct order, (12) creates original story, (13) explains relationships between objects-action-situations, and (14) compares and contrasts. Interestingly, findings were consistent even with targeted intervention. Children who are DHH demonstrated development of pragmatic skills more slowly and later as compared to their hearing peers.

DeLuzio and Girolametto (2011) also examined differences in pragmatic development between children who are DHH and their peers through observational studies of classmates in an integrated classroom. A total of 52 children, age 37 to 60 months, participated in the study; 24 as observed participants, and 28 as playmates to the observed participants. Of the 24 observed participants, half of the children were determined as having NH and were designated as the

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control group. The remaining 12 children were all diagnosed with a congenital severe to profound hearing loss (SPHL) and were designated as the experimental group. Half of the children in the experimental group used bilateral hearing aids (HAs), while the other half used cochlear implants (CIs). Individual children from each group were paired with a playmate with NH and matched by age, sex, parental education level, and number of siblings. Playmate and participant dyads were videotaped playing with a toy farm set over two, 20 minute play sessions and transcriptions were coded based on initiation/peer entry strategy, modality of initiations and turns, outcome of initiation codes, and definitions of acceptable gestures.

Findings resulting in no statistically significant differences between the control and experimental groups included: (1) the modality (i.e., verbal, vocal, gestural, or a combination) of choice for initiations, (2) the proportion of responses provided to playmates, and (3) the mean length of peer interaction. The results revealed that children with NH received twice as many initiations ($M = 20.3$, $SD = 15.6$) compared to children who are DHH ($M = 9.6$, $SD = 6.7$), a statistically significant difference with a large effect size ($t[11] = -3.20$, $p = .008$, $d = 0.92$). Also, a statistically significant difference ($t[11] = 3.34$, $p = .007$) was found between the two groups demonstrating that children with NH received proportionately more responses ($M = .38$, $SD = .19$) to their initiations than the experimental group received ($M = .17$, $SD = .15$). Analysis of initiation strategies showed that the related activity mode of initiation received the most responses and was used most frequently by the children with NH, while the strategy of wait and hover rarely worked and yet was used 31.7% of the time by children who are DHH compared to participants with NH: 18.9% of the time. As a result, children who are DHH experienced social isolation more frequently than their NH peers, which further impeded their development of pragmatic skills gained from relationship interaction and social learning with peers.

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Jeanes and colleagues (2000) investigated the pragmatic skills related to communication breakdown repair in children with NH compared to children who are DHH based on a paired instructional task. Sixty students participated in the study, 20 of which had NH, and 40 of which were profoundly deaf, each having a hearing loss exceeding 90 dB in their better ear. Participants were grouped as NH, oral deaf, and signing deaf participants. Dyads were positioned opposite one another with a visual barrier in between and asked to communicate a variety of diagram tasks and a card matching tasks. The designated speaker instructed the listener in selecting the correct card or recreating a diagram using expressive language. From all of the tasks listener requests for clarification were categorized as specific, general, implied, or unsolicited. Clarifying responses were first categorized as appropriate or inappropriate and then by response type (major modifications, minor modifications, repetition, no response, or confirming). Samples from NH dyads were transcribed verbatim, while a record form to document details of the conversation including what was signed, gestured, fingerspelled, as well as facial expression and head movement for both groups of participants who are DHH. Results revealed that oral dyads requested clarification at a higher rate than their hearing and signing peers. Secondly, there were high rates (99%, 90%, and 87%) of appropriateness across all age levels and groups, and NH, oral, and signing groups, respectively. Overall, findings suggested that children who are deaf, both oral and signing, use less appropriate responses, less productive pragmatic behaviors when requesting clarification, less effective responses to requests for clarification, and generally have more difficulty during times of communication breakdowns.

Most, and colleagues (2010) examined the pragmatic abilities of children who are DHH using CIs or HAs compared to hearing children based on the participants' pragmatic and language abilities. Thirty-seven children participated, 24 children who are DHH (11 CI users, 13

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HAs users) and 13 children with NH. Language level was assessed using three subtests of the Hebrew MAASE linguistic test ([in Hebrew] Rom, Morag, & Peleg, 2007), which was developed in Hebrew to assess complex semantic language abilities of school-age children. Pragmatic abilities were elicited with a familiar adult and assessed by a speech-language pathologist using the Pragmatic Protocol (Prutting & Kirchner, 1987). Pragmatic behaviors were coded as “appropriate” if used correctly each time, or “inappropriate” if either used improperly or inconsistently appropriate. Results showed that participants with NH were using a wide variety of pragmatic communication functions by age 7 years, whereas only 4% of the children who are DHH were able to use pragmatic behaviors appropriately for the 15 minute interaction. Specifically, participants with NH surpassed their peers’ pragmatic ability regarding verbal competencies, but no significant differences were found between the groups related to paralinguistic and nonverbal pragmatics.

Peterson (2004) assessed theory of mind (ToM), a specific pragmatic skill, with an altered location and misleading container false-belief task. The study included 52 Australian children aged 4 to 12 years and divided into four groups: 13 children with CIs, 13 children with conventional amplifying HAs, nine children with Autism Spectrum Disorder (ASD), and 17 normally developing preschoolers. The children participated in a set of two false belief tests. The first false-belief task involved two dolls, one hiding a marble in a different location when the other doll returned, the task for the child was to indicate where the second doll would look for the marble. The second task was a misleading container false belief task where an item (e.g., birthday candles) was enclosed in familiar container (e.g., Bandaid box) with an item enclosed. Before the mismatched contents were revealed, the child was asked what he/she thought was in the box. Once the contents were revealed and then replaced, the child was then asked what the

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next child would think was within the container.

Children demonstrated ToM skills when they were able to identify that individuals who were not aware of the new location or contents of a misleading container would assume the item's initial location or contents featured on the container. Both of the groups including children who are DHH, performed significantly below the performance of hearing peers who were matched by their verbal mental age. The group of children with HAs performed at a mean rate of 38% errorless rate on both tasks, children with CIs had an 8% errorless rate, children with ASD 11% errorless, and NH preschoolers 71% errorless performance. The children who are DHH performed similarly to verbal mental age-matched peers who had ASD. Peterson's (2004) findings are significant for children who are 4 to 12 years of age, particularly as they apply to the development of ToM in children who are DHH because it is, at its base, a social concept.

Overview of Assessments Examining Pragmatic Skills

In addition to the assessments for pragmatics listed in the previous studies, Pragmatic Checklist (Simon, 1984) utilized by Goberis and colleagues (2012) and the Pragmatic Protocol (Prutting & Kirchner, 1987) used by Most and colleagues (2010); observational studies by DeLuzio and Girolametto (2011); cooperative communication tasks employed by Jeanes and colleagues (2000); and ToM tasks used by Peterson (2004), the literature provides further examples of ways pragmatic skills are assessed. The LUI has been used to predict later language outcomes in young children (Pesco & O'Neill, 2013). Foster-Cohen and van Bysterveldt (2016) used the LUI to aid in the identification of needs in children classified as having high and complex needs, mainly children with Down syndrome. Paatsch and Toe (2013) measured conversational skills of children with NH compared to children with mild to profound hearing losses.

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As shown, pragmatic skills can be measured in a variety of ways. A commonly featured approach among the measures mentioned earlier includes parent reporting. The LUI is a parent-completed questionnaire, which capitalizes on the intimate knowledge parents possess of their child's language use. It is posited that early identification of weaker pragmatic communication skills through a parent-report tool, such as the LUI, will facilitate integration of said pragmatic skills into EI. Early intervention that addresses delayed pragmatic skills is supported by studies demonstrating that children who are DHH exhibit slower acquisition of early pragmatic skills, as well as delayed use of these skills in complex language (Goberis et al., 2012; Jeanes et al., 2000; Most et al., 2010; Paastch, 2013; Peterson, 2004). Children who are DHH can go on to face significant challenges with literacy, written communication, and abstract communication skills (Goberis et al., 2012; Mellon, Ouellette, Greer, & Gates-Ulanet, 2009; DeLuzio & Girolametto, 2011), all of which could be ameliorated by EI.

Language Use Inventory (LUI)

The LUI is a new standardized, norm-referenced parent report of the language use of children ages 18 to 47 months. A cohort of 177 families from across Canada participated in a norming study by filling out the LUI questionnaire. The LUI is based on its foundational idea that language development is “entwined with growth in social cognition, especially children's growing understanding of mind” (O'Neill, 2009). Further, the LUI has been used to assess early developing language skills with children from different populations (Foster-Cohen & van Bysterveldt, 2016; O'Neill, 2007). The LUI could be applied as an assessment tool in the identification of needs in children who are DHH.

Foster-Cohen and van Bysterveldt (2016) used the LUI to identify developmental language needs of children with high and complex needs including disorders such as Down

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syndrome, global developmental delay, and cerebral palsy. The study examined the pragmatic skills of 65 children ranging in age from 29 to 66 months. Participants in the study were the mothers of these children who attended the same family-centered EI program in New Zealand for children with high and complex needs. The diagnoses included Down syndrome ($n = 29$), developmental delays as a result of prematurity ($n = 12$), global developmental delay ($n = 10$), cerebral palsy ($n = 4$), ASD ($n = 4$), dyspraxia ($n = 3$), other syndromes ($n = 3$). Participants completed three questionnaires, the MacArthur Communicative Development Inventory: Toddlers (the New Zealand English adaptation; CDI-NZ; Fenson et al., 1993), the LUI, and the Adaptive Behavior Assessment System II (ABASII; Harrison & Oakland, 2003). The results found strong correlations between the three measures resulting in one-tailed Pearson correlations for the ABAS and LUI: 0.834, ABAS and CDI: 0.845, and LUI and CDI: 0.914. Two individual cases were outlined as examples of how developing assessment scores revealed language patterns that were not obvious to the child's clinical team in lieu of the assessments.

O'Neill (2007) investigated the test-retest reliability of the LUI, as well as its sensitivity and specificity accuracy rates in identifying children with language delay. This was accomplished through the participation of 207 parents recruited from the University of Waterloo Centre for Child Studies database. The LUI has demonstrated excellent test-retest reliability as well as strong sensitivity and specificity for identifying children with language delay.

Pesco and O'Neill's (2012) later study examined the LUI's ability to predict language outcomes by way of recruiting a sample representative of the test's initial norming study and looking at predicting language outcomes in participants 3 to 4 years later. Findings supported the LUI's predictive validity, particularly for children initially assessed between ages 24 to 47 months. The LUI has proven its efficacy in predicting later language outcomes, and therefore

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accurately determining the need for intervention. Children who are DHH can also benefit from early identification and intervention through combining the LUI's social premise of language development with the known high occurrence and high impact of pragmatic delays in children who are DHH.

Given what is known about pragmatic language development in children who are DHH, the dependable validity measures of the LUI, and its successful application across varying population subgroups, the following research questions have been developed:

- 1) Based on LUI reports, what pragmatic items/skills present as challenging for children at ages 18 to 60 months who are DHH?
- 2) What is the relationship between child/family demographic factors (e.g., age of child, maternal education), hearing related factors (e.g., degree of hearing loss, age identified, age fit with hearing technology) and early language use of children who are DHH?

Methods

Recruitment

Ethical approval for the research was granted by the Human Subjects Institutional Review Board Committee at Idaho State University. Forty-three families were sent information requesting their participation in the current study through the Idaho Educational Services for the Deaf and Blind (IESDB) and Idaho State University Idaho Collaborative Assessment Project (ICAP). The LUI, ICAP demographics, and informed consent forms were distributed via email to the primary caregivers of children between the ages of 18 to 60 months who were identified as having a permanent hearing loss. Parents completed the LUI online, answering every question on

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the assessment, which generated a LUI report. The LUI report, ICAP demographic, and informed consent forms were sent to the Project Coordinator.

Inclusion criteria for the study are caregivers of children who have permanent hearing loss between ages 18 and 60 months of age, completed LUI pragmatic and demographic questionnaires, and informed consent. Children under the age of 18 months or over the age of 60 months were not included in the study.

The Language Use Analysis

The Language Use Inventory (LUI; O'Neill, 2007) is standardized, norm-referenced assessment that caregivers can complete electronically for children age 18 to 47 months. The LUI is currently the only standardized parent-report questionnaire available to assess young children's social pragmatic use of language. It is the foundational idea of the LUI that alludes to its value in young children who are DHH: language development is entwined with growth in social cognition, particularly the development of ToM. The LUI has the potential to be a valuable tool in identifying young children who are DHH, as we know pragmatic language is an area of relative weakness, particularly understanding of mind, or ToM.

The LUI consists of three subtests, or parts. Part 1 examines how the child communicates with gestures. Part 1 includes 11 Likert-type scale questions with anchors described as 1 = *never* and 5 = *not anymore*, and two yes/no questions. Part 1 is optional depending on the degree to which the child still communicates with gestures. Part 2 surveys the child's communication with words and consists of 27 yes/no questions, two yes/no questions with conditional short-answer, two short-answer, and three four-point Likert-type scale questions with anchors described as 1 = *never* to 4 = *often*. Part 3 assesses the child's longer sentences and includes eight four-point

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Likert-type scale (e.g., 1 = *never* and 4 = *often*), 128 yes/no, three yes/no with conditional short-answer, and two short-answer questions.

Percentile scores for children under 47 months of age are provided for each of the three parts of the LUI. When a child is over 48 months the results are reported in age equivalent scores (in months). Data generated includes Part 1 total score (out of 13) and percentile, Part 2 total score (out of 28) and percentile, Part 3 total score (out of 133), and LUI total percentile score (sum of Parts 2 and 3 total scores and out of 161) and percentile. The report generates an iconic infographic representation of the LUI total percentile score percentile. Additional graphic representations are provided for the total score percentile, Part 2 and 3's percentile scores, and all scored subscale sections within Parts 2 and 3. Norms are available for boys and girls separately at every month from 18 to 47 months of age.

Data Analysis

Data obtained from the electronic version of the LUI was downloaded in a comma separated values (CSV) file format. Descriptive analysis was performed among items frequently missed by the participants and trends were identified. Demographic variables such as age of hearing loss identification/diagnosis, degree of hearing loss, configuration of hearing loss (bilateral or unilateral), age enrolled in EI, and age fit with hearing technology were correlated with performance on the LUI.

Results

Demographics of Participants

As shown in Table 1, 24 families of children who are DHH participated in the study yielding a 55.8% return rate. Ages of the children ranged from 21 to 38 months and with a mean age of 30 months, 42% were male ($n = 10$) and 58% ($n = 14$) were female. Children were

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grouped by age: 21 to 24 months ($n = 5$), 25 to 30 months ($n = 6$), 31 to 34 months ($n = 8$), and 35 to 38 months ($n = 5$). All of the children had a diagnosed hearing loss confirmed by each child's audiogram. Per parent report, 46% ($n = 11$) of participants had hearing loss as their primary disability; 17% ($n = 4$) of participants had hearing loss with speech and language delays; the remaining 38% ($n = 9$) of participants had additional disabilities including ASD, motor problem, vision problem, developmental/cognitive delay, sensory/motor integration, and global developmental delay. Languages participants were exposed to included: English and American Sign Language (ASL) 50% ($n = 12$), English 21% ($n = 5$), English and other language not indicated 13% ($n = 3$), English, Spanish, and ASL 4% ($n = 1$), English and Spanish 4% ($n = 1$), English, Cantonese, and ASL 4% ($n = 1$), and ASL 4% ($n = 1$). Based on a LUI questions, *Was your child born prematurely?* And *If yes, how many weeks prematurely was your child born*, information was obtained about birth history. Approximately, 79% ($n = 19$) of participants had reportedly normal birth histories, 21% ($n = 5$) were born prematurely ranging from two to 37 weeks. Finally, maternal level of education was obtained: 4% ($n = 1$) 11th grade completed, 25% ($n = 6$) High school diploma, 25% ($n = 6$) Vocational degree, 8% ($n = 2$) Associate's degree, 25% ($n = 6$) Bachelor's degree, and 13% ($n = 3$) Master's degree.

Table 2 shows that the average age when hearing loss was diagnosed by an audiologist was 6.5 months with a range of 0.5 to 21 months. The majority, 75% ($n = 18$), of participants used HAs, 13% ($n = 3$) used CIs, 8% ($n = 2$) used bone conduction aids, and 4% ($n = 1$) used no amplification technology (child with unilateral loss). The mean age of initial fitting with hearing technology was 9.3 months ranging from 2 to 22 months; age when amplification was introduced was not provided by 8% ($n = 2$) of children. Two children with CIs were implanted at 12 months and the third was implanted at 14 months of age. Hearing loss configuration included: 58% ($n =$

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14) of children with bilateral losses, 38% ($n = 9$) with unilateral losses, and 4% ($n = 1$) of children did not have their configuration reported. According to each child's latest audiogram or provider report, 29% ($n = 7$) had a normal to mild or mild hearing loss, 25% ($n = 6$) had a normal to moderate, mild to moderate, or moderate loss, 21% ($n = 5$) had a mild-to-moderately severe or moderately severe loss, 21% ($n = 5$) had a moderate-to-severe or severe loss, and 4% ($n = 1$) had a profound loss. All participants received EI services. The mean age of initial enrollment in EI services was 8 months (range: 1 to 32 months); age of enrollment was not reported for 20% ($n = 5$) of participants.

Demographics questionnaires were provided electronically accompanied by an instructional email. The LUI demographic form provides information about the child's age, gender, weight at birth, premature birth (and if so, how many weeks premature), suspected or diagnosed health problems: substantive birth complications (e.g. seizures), speech and/or language problem or delay, hearing loss, developmental disability (e.g., ASD), other major health problem (all open-ended for description of health problem), country of child's birth, exposure to English from birth, current exposure to one or more languages other than English. In addition to the LUI, parents were asked to complete a supplemental demographic form (see Appendix). Information from the demographic form included: child's age, gender, birth history, health history related to development, exposure to languages other than English, characteristics of hearing loss and amplification, health and development, language exposure, and maternal education level. Each child's most recent audiogram was obtained for information related to degree and configuration of hearing loss.

Performance on the LUI

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The LUI scores were analyzed by the LUI total, the three subtests, Part 1, Part 2, and Part 3, then by sections (e.g., Section A, B, etc.), and finally by individual items. Hearing related factors (e.g., degree and configuration of hearing loss, age enrolled in EI, maternal education level) were all compared to the LUI total score and the three parts. Lastly, demographics profiles of the children with the highest scores in the LUI total percentile score, as well as Parts 1, 2, and 3 are outlined.

LUI Total and Parts Analysis

The mean percentile of the LUI total percentile was 8.33 ($SD = 13.45$). For Part 1, child's communication with gestures, the mean was 72.13 ($SD = 35.19$), however there was not an even distribution of scores. Figure 1 illustrates the distribution of the percentile scores of Part 1, notably 46% ($n = 11$) children scored in the 99th percentile. Part 2, child's communication with words, had a mean percentile of 30.13 ($SD = 42.76$) and Figure 2 demonstrates the bimodal distribution of the percentile scores of Part 2. The majority 54% ($n = 13$) of the children scored in the first percentile on Part 2 with the next highest group being 25% ($n = 6$) of the children scoring in the 99th percentile. Part 3, child's longer sentences, had a mean score of 8.42 ($SD = 12.65$). Figure 3 demonstrates how 46% ($n = 11$) of the children scored in the first percentile of Part 3.

Section Analysis

As shown in Table 3, section analysis revealed the three lowest percentile scores were: N: How your child is building longer sentences and stories ($M = 11.83$, $SD = 13.41$, score range: 0 to 27), followed by Section H: Questions and comments about themselves or others ($M = 12.67$, $SD = 23.98$, score range: 0 to 36), and third Section M: Adapts conversation to other people ($M = 13.33$, $SD = 16.72$, score range: 0 to 13). The three section with the highest percentile scores

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included: Section D: Requests for help ($M = 42.21$, $SD = 44.63$, score range: 0 to 7), followed by Section C: Types of words used ($M = 31.84$, $SD = 44.89$, score range: 0 to 21), and third Section J: Teasing and your child's sense of humor ($M = 25.88$, $SD = 23.92$, score range: 0 to 3).

Item analysis

In addition to looking at each section individually, each item for every child was scored as correct with a score of one point (as defined above), or incorrect with a score of zero. Two items had no correct response, question N:16, Begins to use *perhaps* and question K:11 rehearses talk for future interactions. Nine items had only one correct responses each, question H:31, asks someone why they won't do something, K:11 rehearses talk for future interactions, K:12 asks to be told a familiar story about a family event, M:14 states that he/she is certain by using *know*, N:1 began to use *wish*, N:7 began to use *must*, N:8 began to use *might*, N:15 began to use *possibly*, N:26 began to use *but*. See Tables 4 and 5 for a complete list.

The 10 items that were answered correctly most often were: item C:1 began to say types of people had 23 (of 24) correct responses; two items had 22 correct responses A:10 tries to get help using gestures and B:2 brings to you, show to you, or give you something he/she finds interesting; four items had 21 correct responses A:1 takes your hand, push it, or lead you, to what he/she wants, A:3 lift his/her arms to ask to be carried, A:5 reach for or point to what he/she wants, and A:7 look where something is that he/she wants you to get; and finally three items had 20 correct responses A:6 get in a starting position so that you will play a game again, C:2 begins to say types of food items, and C:9 begins to say *no* or *yes*.

Outcomes by Degree of Hearing Loss

Degree of hearing loss was obtained from audiological and/or parent report. Descriptive analysis was used to create Figure 4, which depicts the relationship between the degree of

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hearing loss, age, and total LUI scores. See also, Table 7 depicting these data. Within the age group 21 to 24 months, the children with moderate to moderately severe or severe losses had the highest LUI total percentile scores, 6.5 (moderate to moderately severe losses: $n = 2$, $M = 6.5$, $SD = 5.5$ range: 0 to 12), then the child with a profound loss with a LUI total percentile score of 3.5, and finally the child with a mild loss with a LUI total percentile score of 2.5. Within the age group 25 to 30 months, the children with moderate to moderately severe hearing losses had the highest mean percentile score ($n = 3$, $M = 14.8$, $SD = 18.5$, range: 1 to 41), followed by children with mild losses ($n = 2$, $M = 14.5$, $SD = 13.5$, range: 1 to 28), and then the child with a severe loss ($n = 1$, percentile score of 1). There no children within the age group 25 to 30 months with a profound loss. Within the group of children age 31 to 34 months of age, children with moderate to moderately severe losses yielded the highest mean percentile score ($n = 4$, $M = 5.75$, $SD = 8.2$, range: 1 to 20), followed by children with mild losses ($n = 2$, $M = 2.25$, $SD = 1.25$, range: 1 to 3.5), and finally those children with severe losses ($n = 2$, $M = 1.25$, $SD = 0.25$, range: 1 to 1.5). In the oldest age group 35 to 38 months, children with mild losses scored higher ($n = 2$, $M = 25$, $SD = 24$, range: 1 to 49), than the children with moderate to moderately severe losses ($n = 2$, $M = 1$, range: 1 to 1), and the child with a severe loss (total LUI percentile: 1).

Outcomes by Age of Hearing Loss Diagnosis

Descriptive analysis, depicted in Figure 5, revealed that children ages 21 to 24 months were diagnosed with a hearing loss on average at 4.63 months ($n = 5$, mean LUI total percentile: 5.1). Children within the age group 25 to 30 months were identified at 7.83 months of age ($n = 6$, $M = 12.42$). The children in the next oldest age group, 31 to 34 months were identified on average by 5.04 months ($n = 7$, $M = 3.75$), and finally the age group 35 to 38 months were identified on average by 8.6 months of age ($n = 4$, $M = 10.6$).

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Outcomes by Age of Initial Enrollment in Early Intervention

Figure 6 charts the LUI total scores related to age when children were initially enrolled in EI services, except for the five children for whom age of enrollment was not reported. Within the age group 21 to 24 months of age, children enrolled in EI at ages five to six months of age had the highest score ($M: 40$, range: 29 to 51, $n = 2$), then the children enrolled by 1 month of age ($M: 16$, range: 10 to 22, $n = 2$), and finally the child enrolled at 13 months of age (score: 2); no children within this age range were initially enrolled in EI within two to four months of age.

The child who had the highest total LUI scores within the 25 to 30 months of age group, was initially enrolled in EI at five months of age, (score: 99), followed by the child enrolled at one months of age (score: 86, $n = 1$), then the child enrolled at three months of age (score: 80, $n = 2$), and finally children enrolled ages seven to 32 months (mean: 12, range: 2 to 22, $n = 2$).

The highest scoring child within the age group 31 to 34 months was initially enrolled in EI at two months of age (score: 63), followed by children enrolled by seven to 32 months of age ($M: 61$, range: 23 to 92, $n = 3$), and finally children enrolled by 1 month ($M: 35$, range: 14 to 56, $n = 2$). No children within this age group were initially enrolled at two to four months of age.

Within the oldest age group from 35 to 38 months of age, the highest scoring child was initially enrolled in EI at 2 months of age (score: 124), followed by a child enrolled at 5 months of age (score: 83), and finally the child enrolled at 1 month of age (score: 0). There were no children within this age group who were enrolled at seven months of age.

Outcomes by Age Fit with Hearing Technology

Figure 7 depicts LUI total scores as organized into three age groups for age initially fit with hearing technology (2 to 4 months, 5 to 7 months, and 8 to 22 months), compared to age in months (e.g., 21 to 24 months). This combination bar and line graph depicts the inverse

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relationship between trend of the mean LUI score and age initially fit with hearing technology.

Two participants did not report their child's age when initially fit with hearing technology.

Within the group of children fit with technology between the ages of 2 to 4 months, the highest scoring children were in the oldest age group, 35 to 38 months, and had a mean LUI total score of 117 (range: 83 to 144, $n = 3$). The next highest scoring children fit 2 to 4 months of age were 25 to 30 months of age ($M = 90$, range: 80 to 99, $n = 2$), followed by the 32 month-old child (score: 56), and finally the 22 month-old child (score: 10).

Within the bar graph cluster of children fit with technology between the ages of 5 to 7 months, the 26 month-old child had the highest LUI total score of 86, followed by the children age 31 to 34 months ($M = 70$, range: 31 to 109, $n = 2$), then children age 21 to 24 months ($M = 34$, range: 22 to 51, $n = 3$), and finally the oldest child in the group, 35 months-of-age (score: 0).

The third and final cluster is comprised of children fit between the ages of eight to 22 months. Children age 31 to 34 months yielded the highest score of the group ($M = 49$, range: 14 to 92, $n = 4$), followed by children age 25 to 30 months ($M = 14$, range: 2 to 22, $n = 3$), and finally the 22 month-old child (score: 2).

Outcomes by Maternal Education Level

All participants reported maternal level of education: one participant completed the 11th grade, six earned a high school diploma, six a vocational degree, two an associate's degree, six a bachelor's degree, three a master's degree, and none had completed a doctorate degree. Figure 8 depicts the mean LUI total percentile score grouped by maternal education level with one trend line indicating the mean child age in months.

The highest mean LUI total percentile score was achieved by the Bachelor's degree group ($M = 20$, range: 1 to 41, mean age: 30.17 months, $n = 6$), then the Master's degree group

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($M = 17$, range: 1 to 49, mean age: 33 months, $n = 3$), followed by the participant who completed the 11th grade (percentile: 3.5, age: 32 months, $n = 1$), then the Vocational degree group ($M = 2.17$, range: 1 to 6.5, mean age: 28 months, $n = 6$), then the High School diploma group ($M = 1.67$, range: 1 to 3.5, mean age: 31 months, $n = 6$), and finally the Associate's degree group ($M = 1.25$, range: 1 to 1.5, mean age: 27 months, $n = 2$).

Correlation Analysis of Hearing Related Factors

Correlation analysis was performed with all hearing related factors (degree and configuration of hearing loss, age of hearing loss identification, age of enrollment in early intervention, age initially fit with hearing technology, and maternal education level) using Pearson correlations and findings indicated that maternal level of education was a significant predictor for the LUI total percentile score ($r = 0.5367$, $p = 0.0069$) and score on Part 3 ($r = 0.5162$, $p = 0.098$). No other significant correlations were found between other hearing related factors and children's percentile scores on the LUI scores on Part 1 or Part 2. Stepwise regression analysis demonstrated that maternal education level was a significant predictor ($p = 0.0069$) for the LUI total percentile score, accounting for 29% of the variance, see stepwise regression plot in Figure 9. The Stepwise regression analysis also revealed that degree of hearing loss ($p = 0.0865$) and maternal education level ($p = 0.0126$) were together ($p = 0.01$) significant predictors on Part 3 of the LUI, accounting for 36% of the variance.

Top Performing Children

Of all of the child's scores, NIWA earned the highest score on both the LUI total (score: 144 and percentile: 49) and Part 3 (score: 116 and percentile: 48). The only disability NIWA is reported to have is a severe unilateral loss, she is 38 months old, uses a hearing aid, diagnosed with her hearing loss at two months-of-age, was three months when initially fit with hearing

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technology, and her mother's highest level of education is a Master's degree. Her age enrolled in early intervention was not provided. See Tables 1 and 2 for demographic information. The items that NIWA missed included items such as: making silly rhymes, plays with the pronunciation of words, rehearses talk for future interactions, and has begun to use words such as: wish, must, if, perhaps, so, and but, please see Table 9 for a complete list.

There were 11 children who scored in the 99th percentile for Part 1. The average age was 28 months, range 21 to 37 months, and 64% ($n = 7$) of the children are female and 36% ($n = 4$) are male. Three of the children (27%) had unilateral losses, while 8 children (73%) had bilateral losses. The mean degree of hearing loss was calculated by coding each degree of hearing loss by the low end of each degree of hearing loss's range in dB HL (mild = 26 dB HL, moderate = 41, moderately severe = 56, severe = 71, and profound = 91). The mean degree of hearing loss for the 11 children was moderately severe with losses ranging from mild to profound. Hearing technology used by these children included: 73% ($n = 8$) used HAs, 18% ($n = 2$) had CI(s), and 9% ($n = 1$) used a bone-conduction aid. Both children with CIs were implanted at 12 months-of-age. The mean age initially fitted with technology was 6.8 months, and omit one child for whom this information was not provided. The mean age enrolled in EI was 2.7 months although one child's age was not reported. Disability status: 45% ($n = 5$) had a disability in addition to a permanent hearing loss (e.g., speech/language delay, developmental/ cognitive delay, vision problem) and 55% ($n = 6$) did not have an additional disability. Maternal level of education included 36% ($n = 4$) of mothers with a Vocational degree, 27% ($n = 3$) with a High School diploma, 27% ($n = 3$) with a Bachelor's degree, and 9% ($n = 1$) with a Master's degree.

Six children, HAHY, KEBR LEWO, NIWA, RODA, VIMA, scored in the 99th percentile for Part 2. The mean age was 34, range 29 to 38 months, and 67% ($n = 4$) of the children are

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female and 33% ($n = 2$) are male. Mean age diagnosed with HL was 5.7 months (range: 1 to 21). Three child (50%) had a unilateral loss, with the other half having bilateral losses. The children's mean degree of hearing losses (calculated as described above) was moderate and included normal to mild ($n = 2$), normal to moderate ($n = 1$), moderately severe ($n = 1$), and severe ($n = 2$). Four of the children used traditional HAs, one child used a bone conduction aid (unilateral loss), and one child had a CI. The mean age initially fitted with technology was 4 months (range: 2 to 7 months). The mean age enrolled in EI was 8.25 months (range: 1 to 22 months), omit two children for whom ages were not provided. Children in this group had no other disability in addition to their hearing loss. Maternal levels of education included High School diploma ($n = 1$), Vocational Degree ($n = 1$), Bachelor's degree ($n = 3$), and Master's degree ($n = 1$).

Within Part 3, use of longer sentences, three children emerged as the top performers, BRJE, NIWA, and RODA. The mean Part 3 percentile was 37.3 (range: 27 to 48), 33% ($n = 1$) were male, while 67% ($n = 3$) were female. Mean age of 31 months, and range: 26 to 38. All of the children had a unilateral loss and degrees included normal to mild, moderately severe, and severe. Mean age identified with HL was 2.7 months (range: 1 to 5). Two of the children used traditional HAs with the third using a bone conduction aid. The mean age initially fit with hearing technology was 4.7 months (range: 3 to 6). Age of enrollment in EI was not reported for two of the children, the third child was enrolled at 1 month of age. None of the children had other disabilities and maternal level of education included Bachelor's degree ($n = 2$) and Master's degree ($n = 1$).

Discussion

This study examined the pragmatic language profile of children who are DHH on the LUI as a way to better understand if this assessment could be used to identify potential areas of

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weakness at earlier ages. The trends that emerged demonstrated deficits in complex language, ToM skills, and phonological awareness. Implications of these findings involve early literacy skills, later academic success in reading and writing, as well as interpersonal relationships.

The current findings demonstrate that communication with gestures are frequently a strength for children who are DHH. Performance began to taper off when communication advanced to words and then a marked drop off occurred with the use of longer sentences. These data suggest that the delayed development of complex language in children who are DHH. This is similar to Foster-Cohen and van Bysterveldt (2016) case study findings in children with Down syndrome suggesting delays in pragmatic language development of children classified as having high and complex needs. Similar to the Foster-Cohen and van Bysterveldt (2016) results, the children in the current study appeared to develop steadily with regards to pragmatic language involving gestures but generally demonstrated delays in complex language. For clinicians who serve children who are DHH and for their families, this is an important finding. It suggests that the facilitating of more complex language development should occur prior to the preschool years. This is particularly important when considering that an age-matched peer 18 to 24 months of age would have a mean length of utterance (MLU) of 1.75; a 27 to 30 month old would be expected to have an MLU of 2.25 (Brown, 1973). Children in Brown's Stage 1, ages 18 to 24 months, would use sentences such as "more juice," "no more" or "doggy go." Semantic relationships would include agent + action (Mommy kiss), agent + object (push truck) or entity + locative (dolly bed) as examples. Children entering Brown's Stage 2, age 27 to 30 months, would begin to use the morphological structures like present progressive (-ing; it going), in (in box), on (on bed), and s-plurals (my toys).

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Clinicians can model techniques and coach parents on their use to develop their child's complex language. For example, expansion is when a word or morpheme (-ing, -s) is added to the child's utterance. A child might say "outside" and an adult would expand this message by saying "go outside." Further sentence development can occur with the use of the technique extensions, which adds additional information to the child's utterance (e.g., child says "doggy go," parent replies "Yes, the doggy is going to bed. He is tired"). Use of the technique could be integrated into typical routines the family has already established such as breakfast or morning routine, playing outside, or bathtime.

Section and item analysis revealed limited proficiency in two aspects of language development: ToM skills and phonological awareness. Sections with the lowest scores included the child's ability to build longer sentences and stories (Section N), questions and comments about themselves or others (Section H), and adapts conversation to other people (Section M). Item analysis revealed deficits in words related to ToM skills like: *perhaps*, *wish*, *remember*, *forget*, *think*, and *hope*, which were used by only three (of 24) children or fewer. Additionally, a mere 13% ($n=3$) of children were reported to change the topic in a way that doesn't leave the parent confused, 8% ($n=2$) of children have been observed to talk to parent, sibling, or playmate about rules, and 92% ($n=22$) of children who do not: ask more detailed questions about people's lifestyles, ask why someone feels the way they do, or asks someone how old they are. These findings suggest that ToM deficits are present at an even younger age than previously seen.

As discussed above, Peterson (2004) compared the ToM skills of children who are DHH, children with ASD, and typically developing children, age four to 12 years-of-age and discovered that children who are DHH, using HAs or CIs, and children with ASD, performed below their age-matched peers. Although performance across these child demographics are

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similar, the reason for these delays are quite different. Peterson (2004) marks the neurobiological hypothesis that would suggest damage within the brain would account for ToM deficits in children with ASD. In the case of children who are DHH, intangible concepts such as mental states have less likelihood of being incidentally learned. This would be a result of lack of acoustic access, which arises from the hearing loss itself. Goberis and colleagues (2012) also found role playing skills, an exercise of ToM, developed later than age-matched children. The current study's findings partially support findings by Goberis and colleagues (2012) in that none of the 24 children were reported to rehearse talk for future interactions (K:11). However, this skill may be developing between ages 21 to 38 months because 54% ($n = 13$) of children in the current study have begun to make dolls or animals talk to each other during pretend play (K:7).

Further, the general delay in ToM skills may be a result of a scarcity of access to this acoustic information. Children who are DHH may not have complete auditory access for incidental learning of these concepts. Even with advanced hearing technology such as digital HAs and CIs, the hearing of children who are DHH may not be improved to the point of normal hearing due to factors such as inconsistent use of hearing technology, distance and noise, amplification levels not achieving levels of normal hearing. As a result, incidental learning is reduced because children who are DHH are not overhearing parents, siblings, or peers talk about abstract concepts like thoughts and feelings.

Early interventionists should be aware of ToM as a potential area of deficit for children who are DHH and provide assessment, intervention, and parent coaching when necessary. Early ToM skills include imitating another's actions, recognizing other's emotions and use of words to express them (e.g., "happy" and "sad"), and pretending to be someone else (e.g., doctor or cashier). One of the first steps in assessing ToM skills in young children would be analyzing a

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language sample looking for the presence or absence of words related to ToM. If words such as *forget, remember think, know, hope, wish* are not present in these language samples, clinicians can support the development of ToM skills by modeling their use (e.g., “I *wish* I could eat ice cream for breakfast” , “I *wonder* if you left your doll by the couch”). Taking periodic language samples would serve to monitor the child’s use of the modeled words. Coaching parents to model and informally monitor the use of these words can be another valuable tool in developing understanding and use of ToM.

Additionally, item analysis revealed deficits in phonological awareness. Only two of the 24 children in the current study make up silly rhymes (J:4), and three children play with the pronunciation of words (K:3). Phonological awareness has been established as one of the strongest predictors for later literacy success (Hulme, et al., 2002). Although the ability to identify words that rhyme is not expected until the preschool years, it is important to model this early literacy concept to young children who are DHH as this is an area of known delay. When children have strong early literacy skills, they experience more success learning to read and write. In turn, they read more, and continue to build their vocabulary knowledge. Children with poorer early literacy skills experience more difficulty learning to read, subsequently read less, and have smaller vocabularies. Children who struggle to read often experience adverse impacts related to academic success and self-esteem (Reynolds, Callihan, & Browning, 2003).

Knowing this, clinicians should regularly monitor young children’s use of rhyming, model rhyming through songs, nursery rhymes, reading books that rhyme, and playing rhyming games. Parent education and coaching of phonological awareness development is an essential piece in early intervention to ensure that this important precursor to literacy develops. Parents could be instructed to read books that contain rhyming words (e.g., Dr. Seuss books) and use

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acoustic highlighting to bring their child's attention to the words that rhyme. Another way to introduce the idea of rhyming to young children is to pair words that rhyme with their name, such as Silly Billy, or Super Cooper.

Maternal education level and degree of hearing loss have a positive relationship and account for the variability on the sample's performance on LUI Total scores and Part 3 scores. The influence of maternal level of education on language outcomes is one that cannot be directly influenced, however effective parent coaching can overcome the effects of lower levels of maternal education. Parent-implemented language interventions have been shown to be an effective approach for children age 18 to 60 months of age (e.g., Roberts & Kaiser, 2011). Parent coaching should target increased turn-taking, language development techniques (e.g., expansion), and incorporate the family's everyday routines. Parents can be coached to give an expectant gaze with increased wait time to increase the child's number of turns. Having parents provide their child choices can also increase turn taking skills. Parents can be instructed to provide language models that exemplify the child's language goals with regards to complexity and length. This could be done through the use of expansion. Clinicians and parents can identify advantageous daily routines to target these techniques and strategies. Roberts and Kaiser (2011) found routine-based intervention performed by parents in the home to be readily generalized to other settings and maintained over time.

The positive relationship of degree of hearing loss on the LUI Part 3 scores is confounded by the fact that the three top performers who have moderately severe and severe hearing losses also have unilateral losses. This pattern suggests that children with unilateral losses may benefit from incidental learning of concepts more than children with bilateral losses.

Limitations and Future Directions

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The current study is limited in that a control group of age-matched hearing peers was not included, although this limitation can be addressed somewhat through reference to the norming data of the LUI (O'Neill, 2009). Another limitation is the small sample size; a larger sample size may have revealed stronger correlative relationships. It would be beneficial to have more information about wear time of hearing technology (obtained through data logging or parent report) to help determine why children with milder hearing loss may not be performing as well as children with more significant hearing loss (although use of a cochlear implant may explain these differences). Future directions of study should compare the efficacy of other standardized assessments such as the Clinical Evaluation of Language Fundamentals Fifth Edition (CELF-5; Wiig, Semel, & Secord, 2013) and language sampling examining complexity of language and ToM vocabulary integrated into spontaneous language. Future studies could examine the impact of hearing loss configuration (i.e., unilateral, bilateral) on language outcomes.

Conclusions

This study examined the performance of a sample of young children who are DHH on a measure of language use, the LUI. Results indicate that language use deficits can be observed and addressed at younger ages than previously documented. Specifically, areas of importance include: (1) complex language, (2) ToM, (3) phonological awareness skills, and (4) parent-implemented intervention. The study found the LUI to be a valuable tool in identifying language deficits, qualifying families for services when other assessments had not identified a need, and providing detailed information for pragmatic language intervention.

From the results of this study, intervention targets should focus on the development of length and complexity of utterances, modeling and monitoring words and concepts related to

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ToM, early introduction of rhyming, and the use of parent-coaching to support language development in these areas.

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Language Use InventoryTM

AN ASSESSMENT OF YOUNG CHILDREN'S PRAGMATIC LANGUAGE DEVELOPMENT

Daniela K. O'Neill*, Ph.D.



CHILD'S NAME (first/last) _____ SEX ☐ male ☐ female

CHILD'S DATE OF BIRTH _____
month (e.g., Sept) day year

TODAY'S DATE _____
month (e.g., Sept) day year

NAME OF PERSON PROVIDING THE INFORMATION (first/last) _____

RELATIONSHIP TO CHILD (mother, grandfather, teacher, etc.) _____

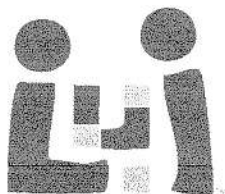
NAME OF PERSON CONDUCTING INTERVIEW, IF APPLICABLE (first/last) _____

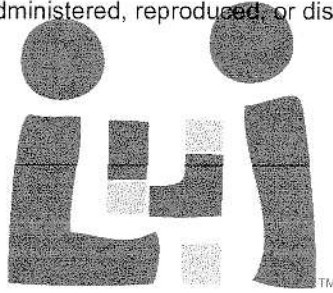
INSTRUCTIONS

As a parent, the information you can provide about your child's communication across a wide variety of settings is unique and valuable.

Please read these instructions carefully before beginning to complete this questionnaire.

1. Please use a mark such as ☒ or ☒ when filling out this questionnaire.
2. It is very important that ALL questions with ☐ receive a mark in one of its circles. Please do not leave any questions unanswered.
3. Please complete the entire questionnaire in a single day if possible, or two at most.
4. If your child speaks a language other than English at home, when answering the questions you should include what your child says in **ANY** language. For example, many questions will ask whether your child uses words for a particular purpose (e.g., to describe what he or she is currently doing); you should respond "yes" even if your child only does so in his or her non-English language.
5. You may consult with other people (e.g., spouse, grandmother, nanny, daycare teacher) about any items on the questionnaire should you find this helpful in deciding on the appropriate response.





PART 1

How your child communicates with gestures

These first two sections, **A** and **B**, will ask you about your child's use of **gestures**. If your child is not using a gesture described below anymore, but did use the gesture in the past, mark the box "not anymore." You will be asked more about your child's use of words later in the questionnaire.

A: HOW YOUR CHILD USES GESTURES TO ASK FOR SOMETHING

At this time, does your child use any of the following gestures to ask you for something, with or without words?

	NEVER	RARELY	SOMETIMES	OFTEN	NOT ANYMORE
1) take your hand, push it, or lead you, to what he/she wants	☐	☐	☐	☐	☐
2) put a toy or book in your lap, or climb into your lap with a toy	☐	☐	☐	☐	☐
3) lift his/her arms to ask to be carried	☐	☐	☐	☐	☐
4) hold up an object to show you what he/she wants (e.g., hold up a cup to ask for milk)	☐	☐	☐	☐	☐
5) reach for or point at what he/she wants	☐	☐	☐	☐	☐
6) get in a starting position so that you will play a game again (e.g., hold his/her feet up so that you will tickle them again)	☐	☐	☐	☐	☐
7) look where something is that he/she wants you to get	☐	☐	☐	☐	☐
8) look at something that he/she wants you to do something with	☐	☐	☐	☐	☐
9) look at you when he/she wants information from you	☐	☐	☐	☐	☐

For each item below, please mark the box that **best applies** to your child at this time:

10) my child tries to get my help using gestures	☐	☐	☐	☐	☐
11) my child uses gestures to get me to play with him/her	☐	☐	☐	☐	☐

B: HOW YOUR CHILD USES GESTURES TO GET YOU TO NOTICE SOMETHING

If your child finds something that **interests** him/her, would he/she use any of the following **gestures**, with or without words?

	YES	NO
1) point at what he/she finds interesting	☐	☐
2) bring to you, show to you, or give you something he/she finds interesting	☐	☐

PART 2

Your child's communication with words

Has your child begun to use at least ONE word regularly on a daily basis?

- ☐ **NO** Please **STOP** here.
- ☐ **YES** Please **CONTINUE** and complete **ALL** of Part 2 and Part 3.

C: TYPES OF WORDS YOUR CHILD USES

Has your child begun to **say** any of the following **types of words**?

Mark "yes" even if your child uses only one of the example words.

	YES	NO
1) people (e.g., mama/mommy or dada/daddy, baby)	☐	☐
2) food items (e.g., juice, milk, cookie)	☐	☐
3) animals (e.g., dog, kitty)	☐	☐
4) body parts (e.g., eye, nose)	☐	☐
5) vehicles (e.g., car, boat, train)	☐	☐
6) toys (e.g., ball, block, doll)	☐	☐
7) clothing (e.g., diaper, shoe, sock)	☐	☐
8) household items (e.g., cup, spoon, bottle, light)	☐	☐
9) "no" or "yes"	☐	☐
10) "up," "down," "open" or "close"	☐	☐
11) "in," "out," "on" or "off"	☐	☐
12) "gone" or "all gone"	☐	☐
13) "there" or "did it" when he/she has succeeded at something	☐	☐
14) "here" or "there"	☐	☐
15) "this" or "that"	☐	☐
16) "go," "going" or "went" (e.g., Go away.; Doggie going.)	☐	☐
17) "do," "doing" or "did" (e.g., Do it.; Did it.)	☐	☐
18) "make," "making" or "made" (e.g., Making cookies.; Made that.)	☐	☐
19) "get," "getting" or "got" (e.g., Get it.; Got cookies.)	☐	☐

What were your child's first three words? (leave blank if you can't remember)

1.

2.

3.

For the items below, please mark the box that **best applies** to your child **at this time**:

	NEVER	RARELY	SOMETIMES	OFTEN
20) it is fairly easy for me to teach my child a new word	☐	☐	☐	☐
21) it is fairly easy for me to know when my child and I are both talking about the same thing	☐	☐	☐	☐

D: YOUR CHILD'S REQUESTS FOR HELP

Does your child **ask for your help**:

- | | YES | NO |
|---|-----------------------|-----------------------|
| 1) by using the word "help" | ☐ | ☐ |
| 2) by telling you what he/she wants by name (e.g., milk, cookie) | ☐ | ☐ |
| 3) by asking you to do something again (e.g., More., Do it again.) | ☐ | ☐ |
| 4) to play a game | ☐ | ☐ |
| 5) by asking you to do something difficult (e.g., to open a door, to carry something heavy) | ☐ | ☐ |
| 6) by asking you to make a toy work, or to fix a toy | ☐ | ☐ |

For the item below, please mark the box that **best applies** to your child **at this time**:

- | | NEVER | RARELY | SOMETIMES | OFTEN |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| 7) my child uses his/her words to ask for my help | ☐ | ☐ | ☐ | ☐ |

E: YOUR CHILD'S INTERESTS

What are your child's three **favourite play activities**?

- 1) _____
- 2) _____
- 3) _____

- | | YES | NO |
|---|-----------------------|-----------------------|
| 4) Does your child seem to be interested in things that you find unusual or that other children of the same age are not interested in? | ☐ | ☐ |

If your answer is yes, please give an example(s):

- | | YES | NO |
|--|-----------------------|-----------------------|
| 5) Does your child seem to be excessively interested in one thing? | ☐ | ☐ |

If your answer is yes, please give an example(s):

PART 3

Your child's longer sentences

As you begin Part 3, please note that if your child is using only a few words, you will likely be answering "no" to many questions. However, it is very important that you **fill out ALL of Part 3** as this will provide the best overall picture of your child's communicative ability.

First, as an estimate of **how long** your child's sentences currently are, please answer the following two questions:

	NEVER	RARELY	SOMETIMES	OFTEN
Has your child begun to use sentences of more than 2 words ?	☐	☐	☐	☐
Has your child begun to use sentences of more than 4 words ?	☐	☐	☐	☐

F: HOW YOUR CHILD USES WORDS TO GET YOU TO NOTICE SOMETHING

Does your child ever try to **get your attention** by doing any of the following things?

	YES	NO
1) naming something he/she is interested in (e.g., Kitty!; Airplane!)	☐	☐
2) asking you to "Look!" or "Watch me!"	☐	☐
3) asking "Can I try?", "Can I do it?" or something similar	☐	☐
4) saying "You know what?" or "Guess what?"	☐	☐

For the item below, please mark the box that **best applies** to your child **at this time**:

	NEVER	RARELY	SOMETIMES	OFTEN
5) my child uses words to ask me to look at him/her, or at what he/she is doing	☐	☐	☐	☐
6) my child uses words to ask me to look at something he/she is interested in	☐	☐	☐	☐

G: YOUR CHILD'S QUESTIONS AND COMMENTS ABOUT THINGS

When **talking about things** like toys, does your child ever talk about or ask about:

	YES	NO
1) what something is (e.g., What's this?; What's that?)	☐	☐
2) where something is (e.g., Where's dolly?; Ball's in the box.)	☐	☐
3) more information about something such as what it is used for (e.g., What's that for?)	☐	☐
4) why something happened (e.g., Why did that car stop?)	☐	☐
5) what something is doing (e.g., Car's going.)	☐	☐
6) who something belongs to (e.g., Daddy's car.; Mine.; Mommy's.)	☐	☐
7) how something tastes, sounds, feels or smells (e.g., yummy, loud, soft, stinky)	☐	☐
8) how something looks or what he/she thinks of it (e.g., its colour, shape; whether it's broken, pretty)	☐	☐
9) how something is similar to something else (e.g., Just like Daddy's.)	☐	☐

H: YOUR CHILD'S QUESTIONS AND COMMENTS ABOUT THEMSELVES OR OTHER PEOPLE

Which of the following things have you heard your child talk about?

Note: It's okay if your child does not use "I" or uses his/her own name or "me" instead of "I" in these examples.

	YES	NO
1) what his/her own name is (e.g., My name's Alicia.; I'm Brendan.)	☐	☐
2) who someone is or what their name is (e.g., Who's that?; What's your name?)	☐	☐
3) where he/she is (e.g., I'm in here.)	☐	☐
4) where someone else is (e.g., Where's Daddy?; Mommy's here.)	☐	☐
5) what he/she is doing (e.g., I'm helping mommy.)	☐	☐
6) what another person is doing (e.g., Baby's sleeping.)	☐	☐
7) what he/she wants or doesn't want (e.g., I want ice cream.; I don't want it.)	☐	☐
8) what someone else wants or doesn't want (e.g., Ben wants the truck.)	☐	☐
9) whether he/she likes or dislikes something (e.g., I don't like apples.)	☐	☐
10) what someone else likes or dislikes (e.g., Do you like carrots?; Daddy likes ice cream.)	☐	☐
11) say how old he/she is (e.g., I'm three.)	☐	☐
12) ask someone how old they are (e.g., How old are you?; Are you six?)	☐	☐
13) how he/she is feeling physically (e.g., tired, cold, thirsty, sick, hungry)	☐	☐
14) how someone else is feeling physically (e.g., Mommy sick?)	☐	☐
15) how he/she is behaving (e.g., silly, nice, bad)	☐	☐
16) how someone else is behaving (e.g., Jamie's being mean.; That boy's nice.)	☐	☐
17) what he/she thinks of something (e.g., pretty boat, nice pictures, yucky broccoli, good cookies)	☐	☐
18) what someone else thinks of something (e.g., Daddy thinks broccoli is yucky.)	☐	☐
19) what he/she wants or has to do (e.g., I want to play.; I have to put shoe on.)	☐	☐
20) what someone else wants or has to do (e.g., Mommy wants to sleep.)	☐	☐
21) what he/she is going to do (e.g., I'm gonna draw a house.)	☐	☐
22) what someone else is going to do (e.g., Daddy's gonna buy me an ice cream.)	☐	☐
23) how he/she feels emotionally (e.g., sad, happy, angry)	☐	☐
24) how someone else feels emotionally (e.g., Baby sad?)	☐	☐
25) why someone feels the way they do (e.g., Why are you sad Mommy?)	☐	☐
26) that he/she wants to do something on his/her own (e.g., I want to do it.; Me do it.)	☐	☐
27) how he/she can or can't do something (e.g., I can run fast.; I can't draw a dog.)	☐	☐
28) how someone else can or can't do something (e.g., You can't see me.; You can't do it?)	☐	☐
29) ask someone how they did something (e.g., How'd you do that?)	☐	☐
30) ask why someone is doing or did something (e.g., Why's that boy crying?)	☐	☐
31) ask someone why they won't do something (e.g., Why won't you play with us?)	☐	☐
32) ask more detailed questions about people's lifestyles (e.g., Do you have a bike?; Do you live here?)	☐	☐

For each item below, please mark the box that **best applies** to your child at this time:

	NEVER	RARELY	SOMETIMES	OFTEN
33) my child makes comments or asks about objects	☐	☐	☐	☐
34) my child makes comments or asks about people	☐	☐	☐	☐
35) my child's questions and comments are usually appropriate and relevant (not strange or out-of-place)	☐	☐	☐	☐
36) my child uses language in a spontaneous and natural way that does not seem mechanical, memorized, or part of a routine	☐	☐	☐	☐

I: YOUR CHILD'S USE OF WORDS IN ACTIVITIES WITH OTHERS

Does your child do any of the following?

- | | YES | NO |
|---|-----------------------|-----------------------|
| 1) ask an adult to show him/her how to do something | ☐ | ☐ |
| 2) like to show other people how to do something | ☐ | ☐ |

If your child were **playing a game** such as rolling a ball down a slide with you or another child, would your child do any of the following things?

- | | | |
|---|-----------------------|-----------------------|
| 3) describe what he/she is doing (e.g., I'm eating.; I'm getting the ball.) | ☐ | ☐ |
| 4) describe what another person in the game is doing (e.g., Mommy's next.; You dropped it.) | ☐ | ☐ |
| 5) repeat something the other person said (e.g., Down it goes.) | ☐ | ☐ |
| 6) tell another person what to do in the game (e.g., Do it again.; Wait!) | ☐ | ☐ |
| 7) tell another person to stop doing something (e.g., Don't do that.; Stop!) | ☐ | ☐ |
| 8) describe something they are doing with someone else (e.g., We're jumping.) | ☐ | ☐ |
| 9) ask for a turn (e.g., My turn now.) | ☐ | ☐ |
| 10) ask another person in the game about something (e.g., Is that your ball? My turn?) | ☐ | ☐ |

Does your child talk with you, a brother or sister, or playmate about any of the following things?

- | | | |
|---|-----------------------|-----------------------|
| 11) toys | ☐ | ☐ |
| 12) TV, movies, video or computer games | ☐ | ☐ |
| 13) games to play | ☐ | ☐ |
| 14) rules | ☐ | ☐ |

J: TEASING AND YOUR CHILD'S SENSE OF HUMOUR

Does your child **laugh or try to make others laugh** by doing any of the following things?

- | | YES | NO |
|--|-----------------------|-----------------------|
| 1) saying wrong things in a teasing way (e.g., giving the wrong name for something even though you know he/she knows the right name for it) | ☐ | ☐ |
| 2) teasing others by calling them silly names (e.g., You're silly.; You're poopy.) | ☐ | ☐ |
| 3) doing something wrong in a teasing way (e.g., putting puzzle pieces in the wrong place even though you know he/she knows how to do the puzzle) | ☐ | ☐ |
| 4) making up silly rhymes | ☐ | ☐ |
| 5) telling jokes | ☐ | ☐ |

If your child has begun to **tease** you or others in a funny or friendly way or begun to try to do things to make you laugh, can you give **one example** of one of the most recent things he/she has done?

K: YOUR CHILD'S INTEREST IN WORDS AND LANGUAGE

Have you noticed that your child does any of the following things?

	YES	NO
1) answers questions that you ask while reading books	☐	☐
2) imitates words or phrases you say or that he/she has heard on TV or video	☐	☐
3) plays with the pronunciation of words (e.g., tries saying words different ways, rhymes)	☐	☐
4) answers "What colour?" questions with a colour name (colour name doesn't have to be correct)	☐	☐
5) answers "How old are you?" or "How many?" with a number (number doesn't have to be correct)	☐	☐
6) likes to count or point as someone else is counting	☐	☐
7) during pretend play, he/she makes the dolls or animals talk to each other	☐	☐
8) talks about what other people said (e.g., My mommy said...)	☐	☐
9) asks about the meaning of words that are new for him or her (e.g., What's a caterpillar?)	☐	☐
10) is interested in logos and the writing on toys and objects such as store signs or billboards	☐	☐
11) rehearses talk for future interactions, such as meeting new children	☐	☐
12) asks to be told a familiar story about a family event (e.g., the day he/she was born)	☐	☐

L: YOUR CHILD'S INTERESTS WHEN TALKING

	YES	NO
1) Does your child talk about some things that you find unusual ? If yes, please give an example(s):	☐	☐

2) Does your child seem to talk only about one topic excessively ? If yes, please mention what this one topic is:	☐	☐

3) When your child talks, does it seem like he/she is often just repeating word-for-word what he/she has heard without really understanding what it means?	☐	☐
4) Does your child ever make up new words that you find interesting or out-of-the-ordinary (e.g., making up the name "bumblenest" for "beehive")?	☐	☐
If your answer is yes, please give an example(s):		

5) What would you say are the three things your child talks about most ?		
1. _____		
2. _____		
3. _____		

M: HOW YOUR CHILD ADAPTS CONVERSATION TO OTHER PEOPLE

- | | YES | NO |
|--|-----------------------|-----------------------|
| 1) If you ask your child a question, does he/she usually stay on the topic and try to answer as best as he/she can? | ☐ | ☐ |
| 2) If your child doesn't understand something you have said to him/her, does he/she usually say something like "Huh?", "What?" or "What did you say?" to try to better understand you? | ☐ | ☐ |
| 3) If you said "Give me that one," and your child was not sure which one you wanted, would he/she try to make sure which one you wanted asking you a question like "This one?" | ☐ | ☐ |
| 4) When listening to a story, does your child ask relevant questions or make relevant comments? | ☐ | ☐ |
| 5) If you are talking with someone else and your child is nearby, does your child sometimes join in with a comment related to what you are talking about? | ☐ | ☐ |

Suppose you and your child had spent the day at the zoo, and that evening Grandma (or someone else in the family) was interested in what happened. Could your child:

- | | YES | NO |
|---|-----------------------|-----------------------|
| 6) tell Grandma about the zoo if given prompting questions such as "What did you see at the zoo today?" | ☐ | ☐ |
| 7) tell Grandma about it spontaneously, without needing much adult help or prompting | ☐ | ☐ |

Does your child talk about past events in any of the following ways?

- | | YES | NO |
|---|-----------------------|-----------------------|
| 8) he/she will mention something that just happened (e.g., My dolly broke.; Daddy spilled it.) | ☐ | ☐ |
| 9) he/she will try to answer when asked to tell someone about something (such as when asked "Tell Daddy what you saw today.") | ☐ | ☐ |
| 10) he/she will try to answer when you ask "Do you remember..." | ☐ | ☐ |

Suppose you came home and hadn't seen your child all day. Would he/she:

- | | YES | NO |
|--|-----------------------|-----------------------|
| 11) say something about what he/she is currently doing (e.g., I'm making cookies!) | ☐ | ☐ |
| 12) spontaneously tell you about an earlier event of that day, that you did not know about | ☐ | ☐ |

Does your child ever use the word "know" or "think" in any of the following ways?

- | | YES | NO |
|--|-----------------------|-----------------------|
| 13) says "You know what?" before telling you something | ☐ | ☐ |
| 14) states that he/she is certain by using "know" (e.g., I know that's a hamster.) | ☐ | ☐ |
| 15) uses "think" when he/she is not sure (e.g., I think it's in the drawer.) | ☐ | ☐ |

Please check that you have responded "yes" or "no" to all the 15 questions in this section M before continuing to section N

N: HOW YOUR CHILD IS BUILDING LONGER SENTENCES AND STORIES

Please mark any of these **words** that your child has begun to use:

	YES	NO		YES	NO		YES	NO
1) wish	☐	☐	8) might	☐	☐	15) possibly	☐	☐
2) hope	☐	☐	9) could	☐	☐	16) perhaps	☐	☐
3) forgot	☐	☐	10) can	☐	☐	17) after	☐	☐
4) think	☐	☐	11) would	☐	☐	18) going to (gonna)	☐	☐
5) know	☐	☐	12) will	☐	☐	19) before	☐	☐
6) remember	☐	☐	13) maybe	☐	☐	20) later	☐	☐
7) must	☐	☐	14) if	☐	☐	21) want to (wanna)	☐	☐

	YES	NO
22) and (e.g., We saw trains and planes and trucks.)	☐	☐
23) then (e.g., ... and then we saw rabbits.)	☐	☐
24) because (e.g., I'll help you, 'cause I'm the fireman.)	☐	☐
25) so (e.g., It's not cooked yet, so it has to go in the oven.)	☐	☐
26) but (e.g., Now I'm big, but I used to cry.)	☐	☐
27) well (e.g., Well , I think it's here.)	☐	☐
28) just (e.g., I'm just taking it for a little while.; I'm just helping.)	☐	☐
29) next (e.g., Next , we saw bears.)	☐	☐
30) when (e.g., When it's night, I go to bed.)	☐	☐
31) actually (e.g., Actually , I don't like tomatoes.)	☐	☐

When your child tells you a story, or part of a story:

	YES	NO
32) can you follow who the people are in the story?	☐	☐
33) can you usually follow what is happening in the story?	☐	☐
34) can your child link the events in the story in a way that makes sense?	☐	☐
35) can your child change the topic in a way that doesn't leave you confused?	☐	☐
36) does he/she sometimes use words such as "today," "yesterday," or "tomorrow"?	☐	☐

Please double check that you have not accidentally skipped over any of the questions.

Date completed (month/day/year): _____
 month (e.g., Sept) / day / year

Please continue to the next page to complete the section,
Your Child's Health and Language Background

YOUR CHILD'S HEALTH AND LANGUAGE BACKGROUND

Please complete this final section about your child's health and language background. It will help to provide a more complete and accurate picture of your child's language development.

YOUR CHILD'S BIRTH

Please tell us your child's weight at birth: _____ lbs _____ oz ~~-or-~~ _____ kg _____ g

YES NO

Was your child **born prematurely**? ☐ YES ☐ NO

If yes, **how many weeks** prematurely was your child born? _____

YOUR CHILD'S HEALTH

Has your child had any of the following health problems:

	YES	NO		YES	NO
a) substantive birth complications (e.g., seizures)	suspected? ☐	☐	diagnosed? ☐	☐	☐
b) speech or language problem or delay?	suspected? ☐	☐	diagnosed? ☐	☐	☐
c) hearing loss	suspected? ☐	☐	diagnosed? ☐	☐	☐
d) developmental disability (e.g., autism)	suspected? ☐	☐	diagnosed? ☐	☐	☐
e) any other major health problem (describe below)	suspected? ☐	☐	diagnosed? ☐	☐	☐

If you answered **yes** to any of the above, please describe below:

EXPOSURE TO OTHER LANGUAGES

In what **country** was your child born? _____

YES NO

Has your child been exposed to English from birth? ☐ YES ☐ NO

If **No**, at what age (in months, e.g., 18 months) was your child first exposed to English? _____ months

YES NO

Is your child **currently** regularly exposed to one or more languages other than English? ☐ YES ☐ NO

If **No**, thank you! You have finished the questionnaire

If **Yes**, please continue with the questions on page 13.

EXPOSURE TO OTHER LANGUAGES (continued)

Please indicate below your best estimate of how much of the time your child is regularly exposed to a **language(s) other than English**. In doing so, please remember to include all the main adults with whom your child regularly interacts (e.g., daycare/preschool teachers, grandparents).

The **percentage of time my child is exposed to language(s) other than English** is about:

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

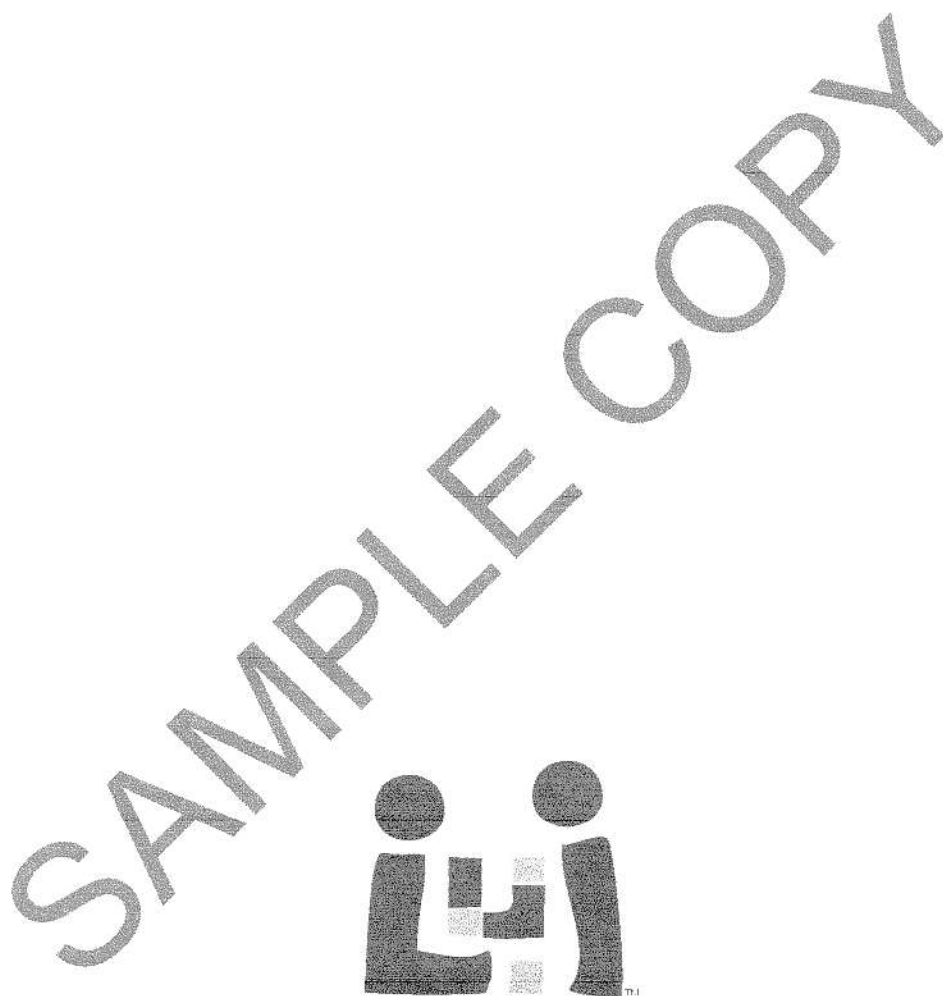
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Please list all the languages that your child is exposed to by the main adults he or she interacts with (e.g., mother, father, grandparents, babysitter, daycare members).

Languages my child is exposed to (list below):

Person(s) who speak that language:

- | | |
|----------|-------|
| 1. _____ | _____ |
| 2. _____ | _____ |
| 3. _____ | _____ |
| 4. _____ | _____ |



Thank you very much for completing this questionnaire!

You can learn more about the Language Use Inventory™ on our website:
www.knowledgeindevelopment.ca

Idaho Collaborative Assessment Project: ICAP
INITIAL DEMOGRAPHIC FORM

NOTE: To be completed by the parent and/or the early intervention provider the first time the child is assessed with ICAP

GENERAL INFORMATION:

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

Child's Name: _____

Parents' names: _____ Phone: _____

Address: _____ City: _____

State: _____ Zip Code: _____

Parents' e-mail address: _____

Birthdate of child: ____/____/____ Gender of child: ____Boy ____Girl
mon day year

1. Family qualifies for Medicaid or state equivalent: ____yes ____no ____unknown
(Qualifies based on income; if qualifies but does not receive assistance, still check "yes")

2. Ethnicity of child: ____Hispanic/Latino ____NOT Hispanic/Latino

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

____White ____Native Hawaiian or Other Pacific Islander
____Black or African American ____American Indian or Alaska Native
____Asian ____Other (Please specify: _____)

4. Languages used at home with the child: (Please check all that apply)

____Spoken English ____Spanish
____Sign Language ____Other (Specify: _____)

HEARING INFORMATION:

1. Did the child fail a newborn hearing screening? ____yes ____no ____did not 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: _____ months of age

4. Age at which first received amplification: _____ months of age

5. 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 _____

6. Current hearing aid/CI use: ☐ <3 hrs/day ☐ 3-5 hrs/day
☐ 6-10 hrs/day ☐ 11+ hrs/day

7. Age at which intervention specific to hearing loss first started: _____ months of age

8. Cause of hearing loss: ☐ Unknown ☐ Anoxia at birth
☐ CHARGE syndrome ☐ Chemotherapy
☐ Cytomegalovirus (CMV) ☐ Down syndrome
☐ Enlarged Vestibular Aqueduct (EVA)
☐ Genetic/Hereditary ☐ Goldenhar syndrome
☐ High fever ☐ Maternal rubella
☐ Meningitis ☐ Prematurity
☐ Treacher Collins ☐ Usher's syndrome
☐ Viral infection ☐ Waardenburg's syndrome
☐ Other (Please specify: _____)

9. 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

3. 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

4. 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

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's Degree		
Bachelor's Degree		
Master's Degree		
J.D. or Ed.D		
M.D.		
Ph.D.		

ADDITIONAL DISABILITIES

☐ No other disabilities	☐ Vision problem/impairment
☐ Brain damage/injury	☐ Seizures/Epilepsy
☐ Cerebral palsy (CP)	☐ Emotional/Behavioral problem
☐ Specific learning problem (LD)	☐ Motor problem
☐ Developmental/Cognitive delay	☐ Central processing disorder
☐ Autism/PDD	☐ Cleft lip/palate
☐ Balance disorder	☐ Sensory/Motor integration problem
☐ Other disability. Please explain: _____	

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

PRESENT PROGRAMMING:

1. Have you heard of Families for Hands & Voices (or Guide by Your Side)? Yes No
2. Do you receive the Hands & Voices newsletter? Yes, currently Used to No, never
3. Has a representative from Hands & Voices (or Guide by Your Side) ever called you on the phone? Yes No
4. Have you ever received an in-person visit from a representative from Hands & Voices (or Guide by Your Side)? Yes No
5. Do you attend a sign language class? Yes, currently Used to No, never
6. Does a teacher/mentor *who is deaf* come to your home to teach you sign language?
 Yes, currently Used to No, never
7. Is your child regularly in daycare for 20 hours or more per week: ____yes* ____no
 *If yes, does the early interventionist work with the provider? ____yes ____no

Complete the table below regarding intervention services your child/family currently receives at least once a month. List each intervention just ONCE (wherever it fits best)

Type of Intervention	Sessions per month	Minutes per session
Early intervention <u>in home</u> related to hearing loss (or at daycare/other "natural environment") Interventionist's Name: _____ Program/Agency's Name: _____		
Early intervention (individual) <u>outside</u> the home related to hearing loss loss (e.g., in a clinic, hospital, private therapist's home, etc.) Interventionist's Name: _____ Clinic /Facility's Name: _____		
Early intervention (toddler) <u>group</u> Interventionist/Teacher's Name: _____ Facility/School's Name: _____		
Speech or auditory therapy <u>in</u> the home Speech Therapist's Name: _____ Program/Agency's Name: _____		
Speech or auditory therapy (individual) <u>outside</u> the home Speech Therapist's Name: _____ Clinic/Facility's Name: _____		
Occupational Therapy (OT)		
Physical Therapy (PT)		
Other, please describe: _____		

Does your child attend pre-school? Yes No If yes, please complete the following:

Name of School: _____ Teacher's Name: _____

Type of School Setting	Sessions per	Minutes per session
Pre-school primarily for deaf/hard-of-hearing children		
Pre-school primarily for children with a variety of special needs		
Pre-school primarily for hearing children		

APPLICATION OF THE LANGUAGE USE INVENTORY

Table 1. *Child Demographic Information*

Child	Age in Months	Gender	Presence of other disabilities	Total LUI Score	Total LUI Percentile	Languages exposed to	Birth History	Maternal Education Level
ABLE	21	F	Speech-language problem/delay	22	3.5	English & ASL	normal	High School Diploma
ADLO	22	F	Motor problem & speech-language problem/delay	2	1	English & other not indicated	36 weeks premature	Associate's Degree
AUHO	33	F	Speech-language problem/delay	63	1	English	normal	Vocational Degree
BRJE	26	F	None	86	28	English & ASL	normal	Bachelor's Degree
COAF	25	M	Dev/Cognitive delay, Vision problem & speech and language delays	19	1	English & ASL	normal	Vocational Degree
DAKI	22	M	None	10	2.5	English & ASL	normal	Vocational Degree
ELGO	32	F	Vision problem	31	1	English	normal	Bachelor's Degree
FALI	31	F	Dev/Cognitive delay, ASD, Vision problem, speech delay	23	1	English & ASL	normal	Vocational Degree
HAHY	36	F	None	83	1	English & ASL	normal	Vocational Degree
IARE	30	M	Dev/Cognitive delay, ASD, & speech-language delay	22	1	English & ASL	normal	High School Diploma
INRE	32	F	None	92	3.5	English & ASL	normal	11th grade completed
IRME	38	M	Dev/Cognitive delay & speech-language delay	13	1	English & other not indicated	normal	High School Diploma
JAMC	32	M	Speech-language delays	67	1.5	English & ASL	normal	Associate's Degree

APPLICATION OF THE LANGUAGE USE INVENTORY

JOAD	30	M	Dev/Cognitive delay, ASD, Vision problem, speech-language delays	2	1	English	normal	Master's Degree
KEBR	34	M	None	109	20	English, Spanish & ASL	normal	Bachelor's Degree
KIJA	32	F	Speech-language delays	56	1	English & ASL	normal	High School Diploma
LEWO	37	F	None	124	1	English, Cantonese & ASL	normal	Bachelor's Degree
LOBR	35	M	Dev/Cognitive delay, Sensory/Motor Integration, Vision problem, & speech-language delays	0	1	English & ASL	37 weeks premature	High School Diploma
NIWA	38	F	None	144	49	English	normal	Master's Degree
RESQ	21	F	None	29	6.5	English & other not indicated	36 weeks premature	Vocational Degree
RODA	29	M	None	99	41	English	normal	Bachelor's Degree
TAWI	23	F	None	51	12	ASL	normal	Bachelor's Degree
TRSC	31	M	Dev/Cognitive delay, Global dev delay, speech-language delays	14	1	English & ASL	2 weeks premature	Master's Degree
VIMA	30	F	None	80	2.5	English & Spanish	4.5 weeks premature	High School Diploma

Abbreviation notes: Developmental (Dev), Autism Spectrum Disorder (ASD), and American Sign Language (ASL),

APPLICATION OF THE LANGUAGE USE INVENTORY

Table 2. *Child Demographic Information Related to Hearing Loss*

Child	Type of Loss	Degree of Loss	Age Identified with Loss	Technology used	Age Fit with Technology	Age Enrolled in Early Intervention
ABLE	Bilateral	profound	1.5	Cochlear implants	6	1
ADLO	Unilateral	mild to moderately severe	13	Hearing aid	13	13
AUHO	Bilateral	mild to moderate	not provided	Hearing aid	not provided	2
BRJE	Unilateral	moderately severe	1	Bone conduction aid	5	1
COAF	Bilateral	mild	20	Hearing aid	22	not provided
DAKI	Bilateral	moderate to severe	1	Hearing aid	3	1
ELGO	Unilateral	normal to mild	2	Hearing aid	6	not provided
FALI	Bilateral	mild	17	Hearing aid	20	18
HAHY	Bilateral	severe	0.5	Cochlear implants	3	5
IARE	Unilateral	mild to moderate	21	Hearing aid	22	22
INRE	Bilateral	mild to moderately severe	20	Hearing aid	22	20
IRME	Bilateral	mild	not provided	Hearing aid	not provided	not provided
JAMC	Bilateral	normal to mild	16	Hearing aid	16	32
JOAD	Unilateral	severe	13	None	13	14
KEBR	Bilateral	normal to mild	5	Hearing aid	7	not provided
KIJA	Bilateral	mild to moderate	1	Hearing aid	2	1

APPLICATION OF THE LANGUAGE USE INVENTORY

LEWO	Bilateral	normal to moderate	1	Hearing aid	2	2
LOBR	Not provided	moderate	1	Hearing aid	6	1
NIWA	Unilateral	severe	2	Hearing aid	3	not provided
RESQ	Unilateral	normal to mild	3	Hearing aid	6	5
RODA	Unilateral	moderate to severe	2	Hearing aid	3	5
TAWI	Bilateral	moderately severe	0.75	Hearing aid	6	6
TRSC	Bilateral	mild to moderate	1	Cochlear implants	15	1
VIMA	Unilateral	moderately severe	1	Bone conduction aid	3	3

Note: Age is in months.

APPLICATION OF THE LANGUAGE USE INVENTORY

Table 3. *Analysis by Section*

Section and description	Question Types	Mean Score (SD)	Percentile (SD)	Score Range	Max Score
A: Use of gestures to ask for something	11, five-point Likert-type scale	8.79 (2.90)	-	3 to 11	11
B: Use of gestures to get you to notice something	2 yes/no questions	1.63 (0.71)	-	0 to 2	2
C: Types of words used	19 yes/no, 3 short-answer, 2, four-point Likert-type scale	12.42 (7.38)	31.84 (44.89)	0 to 21	21
D: Requests for help	6 yes/no, 1 four-point Likert-type scale	4.33 (2.63)	42.21 (44.63)	0 to 7	7
E: Child's interests	1 short-answer, 2 yes/no, 4 yes/no	Data no analyzed			
F: Words to get you to notice something	2, four-point Likert-type scale	2.50 (2.06)	18.88 (26.05)	0 to 6	6
G: Questions and comments about things	9 yes/no	3.46 (3.40)	22.96 (37.08)	0 to 9	9
H: Questions and comments about themselves or other people	32 yes/no, 4 Likert-type scale	10.92 (10.96)	12.67 (23.98)	0 to 36	36
H: Questions and comments about themselves	16 yes/no, 2, four-point Likert-type scale	5.33 (5.15)	20.17 (31.94)	0 to 14	18
H: Questions and comments about others	16 yes/no, 2, four-point Likert-type scale	4.04 (4.65)	15.63 (25.09)	0 to 18	18
I: Use of words in activities	14 yes/no	5.63 (5.04)	25.46 (34.85)	0 to 14	14

APPLICATION OF THE LANGUAGE USE INVENTORY

with others					
J: Teasing and sense of humor	5 yes/no	.88 (1.15)	25.88 (23.92)	0 to 3	5
K: Interest in words and language	12 yes/no	3.63 (3.16)	17.63 (22.65)	0 to 10	12
L: Interests when talking	1 yes/no, 3 yes/no with conditional short-answer	Data not analyzed			
M: Adapts conversation to other people	15 yes/no	3.63 (3.89)	13.33 (16.72)	0 to 13	15
N: Building longer sentences and stories	36 yes/no	4.33 (6.84)	11.83 (13.41)	0 to 27	36

Note: four-point Likert-type scale (*never, rarely, sometimes, often*), five-point Likert-type scale (*never, rarely, sometimes, often, not anymore*)

APPLICATION OF THE LANGUAGE USE INVENTORY

Table 4. *Item Analysis for Most Frequently Missed Items*

Section: Item Number	Number of Children Scored as Yes	Item Description
N:16	0	begun to use "perhaps"
K:11	0	rehearse talk for future interactions
H:31	1	ask someone why they won't do something
K:12	1	asks to be told a familiar story about a family event
M:14	1	states that he/she is certain by using "know"
N:1	1	begun to use "wish"
N:7	1	begun to use "must"
N:8	1	begun to use "might"
N:15	1	begun to use "possibly"
N:26	1	begun to use "but"

APPLICATION OF THE LANGUAGE USE INVENTORY

Table 5. *Item Analysis for Items Correct by Two Children*

Section: Item Number	Item Description
H:12	Asks someone how old they are
H:25	Asks why someone feels the way they do
H:29	Asks someone how they did something
H:32	Asks more detailed questions about people's lifestyles
J:4	Makes up silly rhymes
J:5	Repeats something another person said
M:13	Says "You know what?" before telling you something
M:15	Uses "think" when he/she is not sure
N:2	Begun to use "hope"
N:9	Begun to use "could"
N:14	Begun to use "if"
N:23	Begun to use "then"
N:28	Begun to use "just"

APPLICATION OF THE LANGUAGE USE INVENTORY

Table 6. *Item Analysis for Items Correct by Three Children*

Section: Item Number	Item Description
F:4	Gets parent's attention by saying "You know what?" or "Guess what?"
H:28	Talks about how someone else can or can't do something
I:14	Talks to parent, sibling, or playmate about rules
K:3	Plays with pronunciation of words
N:3	Begun to use "forget"
N:4	Begun to use "think"
N:5	Begun to use "know"
N:6	Begun to use "remember"
N:11	Begun to use "would"
N:29	Begun to use "next"
N:31	Begun to use "actually"
N:35	Changes the topic in a way that doesn't leave you confused
N:36	Sometimes uses words such as "today," "yesterday," or "tomorrow"

APPLICATION OF THE LANGUAGE USE INVENTORY

Table 7: *LUI Total Percentile Scores by Degree of Hearing Loss and Age*

Age in months	Mild				Moderate to moderately severe				Severe				Profound			
	<i>n</i>	<i>M</i>	SD	range	<i>n</i>	<i>M</i>	SD	range	<i>n</i>	<i>M</i>	SD	range	<i>n</i>	<i>M</i>	SD	range
21 to 24	1	2.5	-	-	2	6.5	5.5	0 to 12	1	6.5	-	-	1	3.5	-	-
25 to 30	2	14.5	13.5	1 to 28	3	14.8	18.5	1 to 41	1	1	-	-	0	-	-	-
31 to 34	2	2.25	1.25	1 to 3.5	4	5.75	8.2	1 to 20	2	1.25	0.25	1 to 1.5	0	-	-	-
35 to 38	2	25	24	1 to 49	2	1	-	1 to 1	1	1	-	-	0	-	-	-

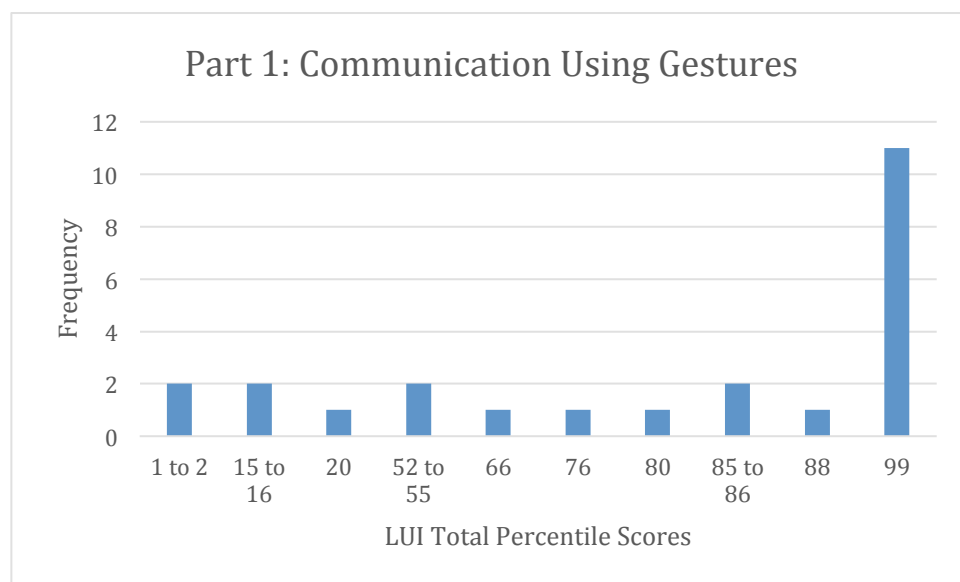
APPLICATION OF THE LANGUAGE USE INVENTORY

Table 8. *Items Missed by Child NIWA*

Section: Item Number	Item Description
A:4	Holds up an object to show you what he/she wants
A:10	My child tries to get my help using gestures
J:4	Making silly rhymes
J:5	Telling jokes
K:3	Plays with the pronunciation of words
K:10	Is interested in logos and the writing on toys and objects
K:11	Rehearses talk for future interactions
K:12	Asks to be told a familiar story about a family event
M:13	Says “You know what?” before telling you something
M:14	States that he/she is certain by using “know”
N:1	Has begun to use “wish”
N:7	Has begun to use “must”
N:8	Has begun to use “might”
N:14	Has begun to use “if”
N:15	Has begun to use “possibly”
N:16	Has begun to use “perhaps”
N:25	Has begun to use “so”
N:26	Has begun to use “but”
N:28	Has begun to use “just”

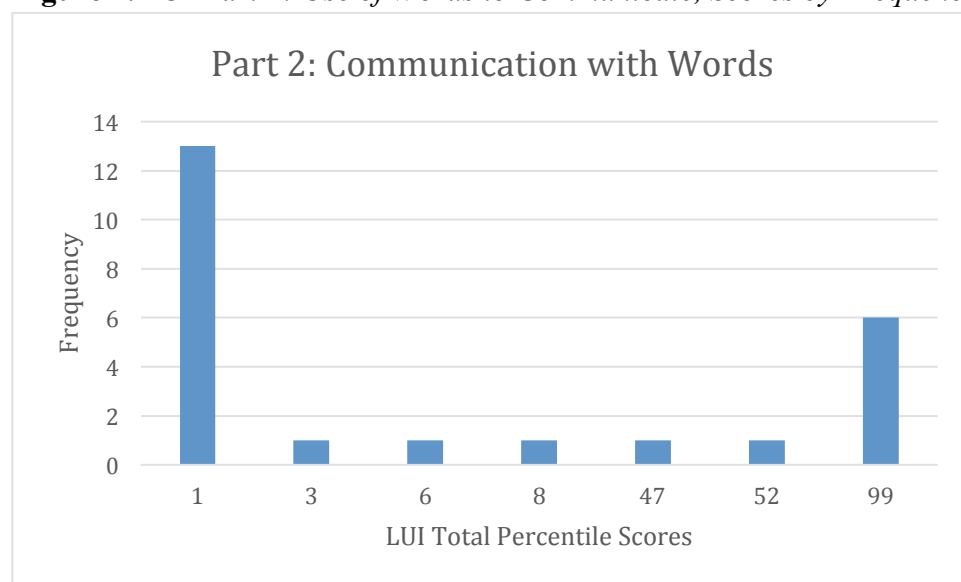
APPLICATION OF THE LANGUAGE USE INVENTORY

Figure 1. *LUI Part 1: Use of Gestures to Communicate, Scores by Frequency*



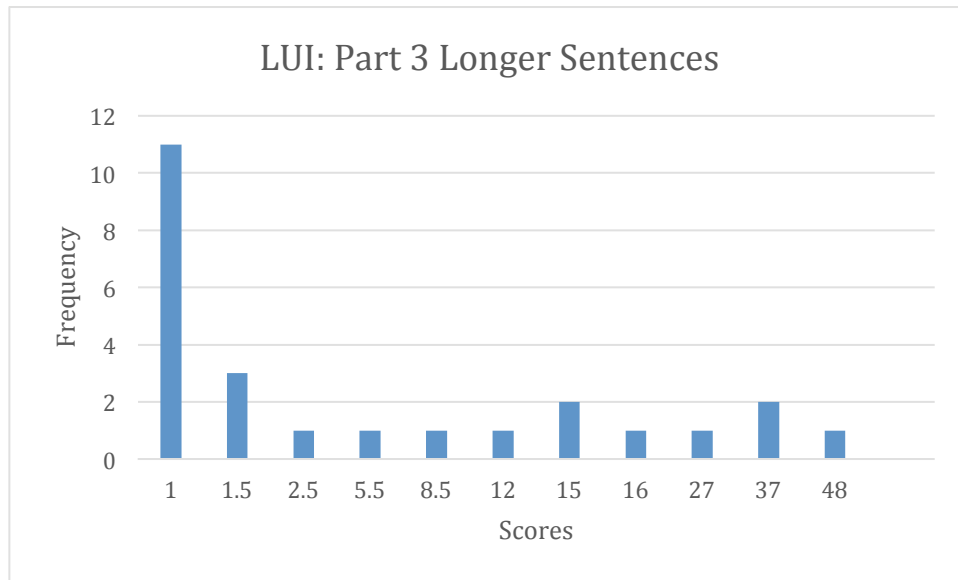
APPLICATION OF THE LANGUAGE USE INVENTORY

Figure 2. *LUI Part 2: Use of Words to Communicate, Scores by Frequency*



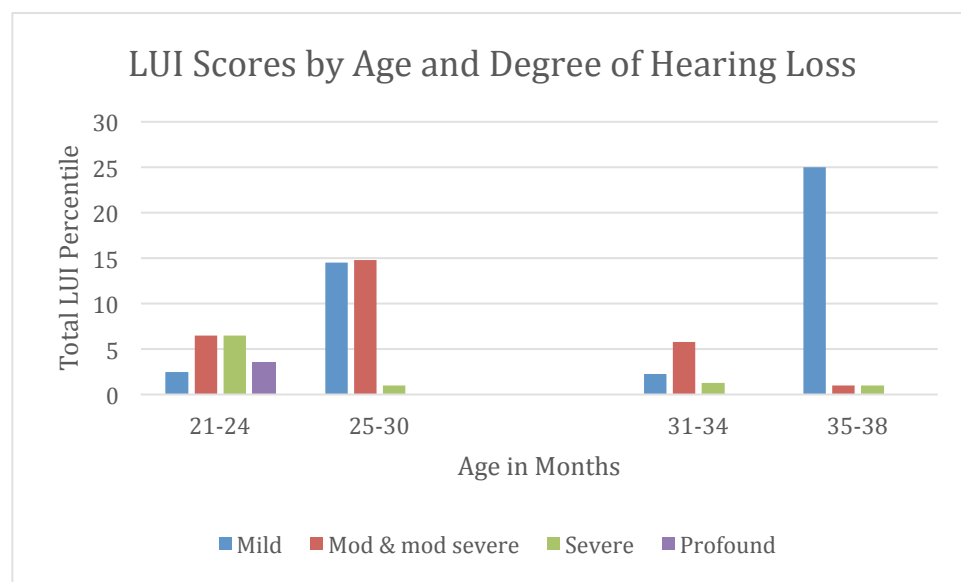
APPLICATION OF THE LANGUAGE USE INVENTORY

Figure 3. *LUI Part 3: Child's Longer Sentences, Scores by Frequency occurrence*



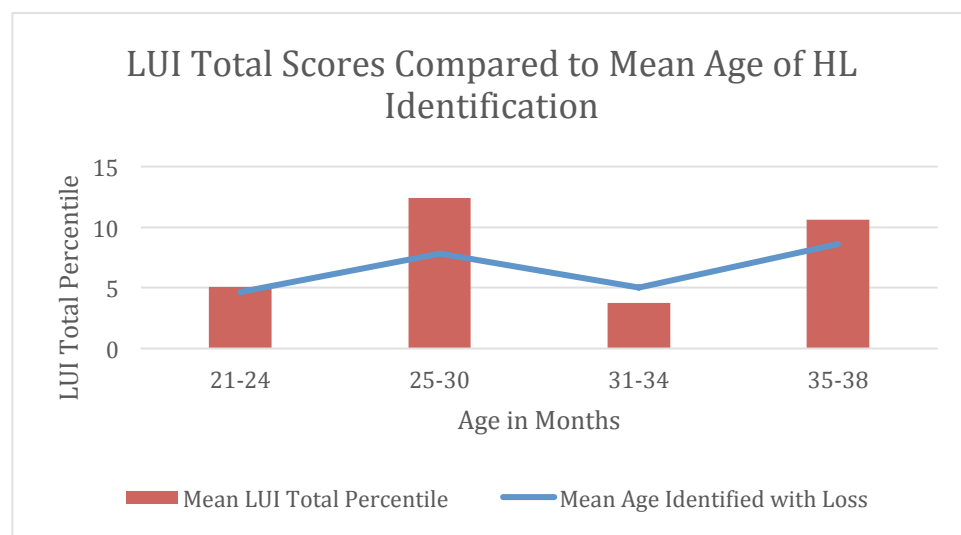
APPLICATION OF THE LANGUAGE USE INVENTORY

Figure 4. *LUI Total Scores by Degree of Hearing Loss and Grouped by Age*



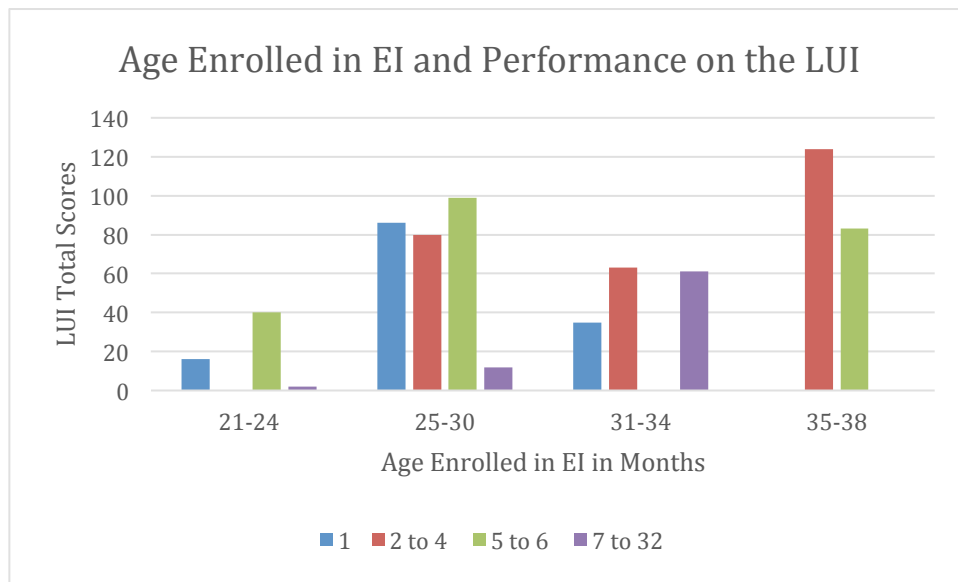
APPLICATION OF THE LANGUAGE USE INVENTORY

Figure 5. *LUI Total Percentile Scores by Age of Hearing Loss Diagnosis*



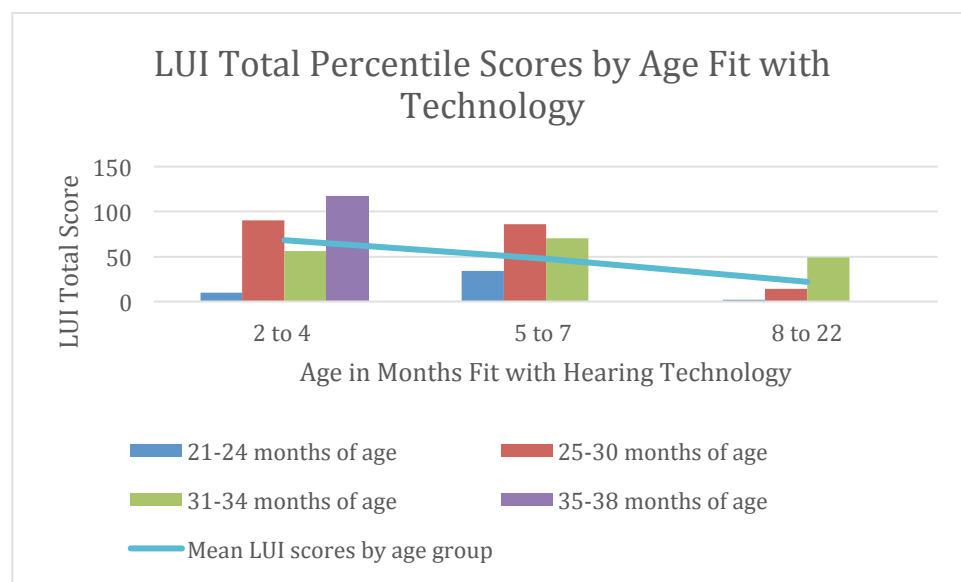
APPLICATION OF THE LANGUAGE USE INVENTORY

Figure 6. *LUI Total Scores by Age of Initial Enrollment in Early Intervention*



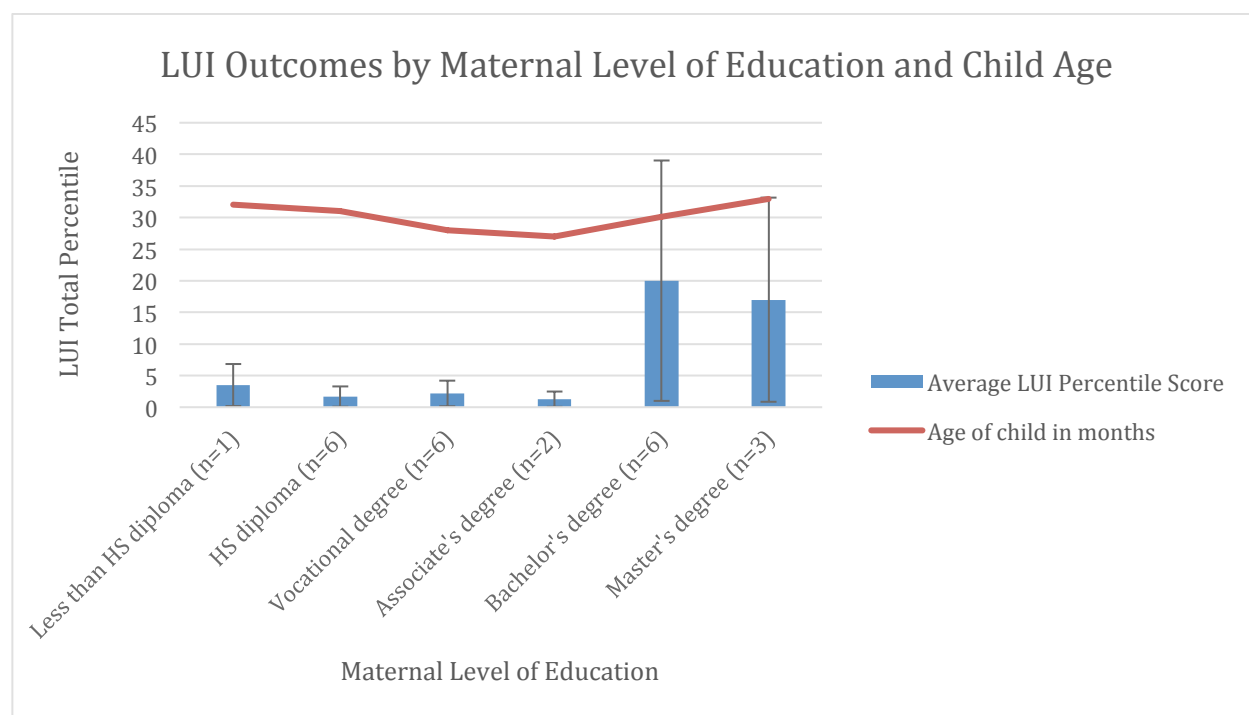
APPLICATION OF THE LANGUAGE USE INVENTORY

Figure 7. *LUI Total Scores by Age Fit with Hearing Technology*



APPLICATION OF THE LANGUAGE USE INVENTORY

Figure 8. *LUI Total Percentile Scores by Level of Maternal Education and Age of Child*



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Figure 9: *Regression Plot of LUI Total Score by Maternal Education*

