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Comparison of the *pragmatics checklist* to the *language use inventory* for assessment of pragmatic language use in young children who are deaf or hard of hearing

by

Daphne Darling

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Committee Approval

To the Graduate Faculty:
The members of the committee appointed to examine the thesis of Daphne Darling find it satisfactory and recommend that it be accepted.

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Table of Contents

List of Figures

List of Tables

Comparison of the *pragmatics checklist* to the *language use inventory* for assessment of pragmatic language use in young children who are deaf or hard of hearing

Thesis Abstract – Idaho State University

The purpose of this study was to offer clinicians information regarding which assessment tool (Language Use Inventory or Pragmatics Checklist) is most appropriate to provide to families of children who are Deaf or Hard of Hearing (DHH) for variables that caregivers and providers might find important, or necessary to consider and to assess the pragmatic language abilities of children who are DHH using both the Language Use Inventory (LUI) and the Pragmatics Checklist. Three mothers of preschoolers who are DHH completed the LUI, and the Pragmatics Checklist followed by a Parent Perception Survey for each assessment. Both assessments and the Parent Perception survey were analyzed for trends within and across participants. Results indicated that all preschoolers showed pragmatic deficits below their age. Providers may want to utilize the Pragmatics Checklist as a potential screener for pragmatic abilities and utilize the LUI as a more in-depth assessment used to set goals or as a comparison to a normative group.

Keywords: Pragmatics, Deaf and Hard of Hearing, Assessment Tools, Language Use Inventory, Pragmatics Checklist

Comparison of the pragmatics checklist to the language use inventory for assessment of pragmatic language use in young children who are Deaf or Hard of Hearing.

Pragmatics is the ability to utilize linguistic resources (such as words, signs, grammatical structures, and prosodic features) to support effective social interaction (Szarkowski, A., Young, A., Matthews, D., & Meinzen-Derr, J., 2020). Pragmatic development is essential to young children's social-cognitive development and linked to educational success (Szarkowski et al., 2020; Thagard et al., 2011; Yoshinaga-Itano et al, 2020). Early pragmatic milestones, such as the ability to use joint attention and social vocalizations and gestures in infancy, are critical precursors of formal language (Szarkowski et al., 2020). Delays and deficits in pragmatic abilities have negative impacts on well-being, behavior, literacy skills, self-confidence, motivation, and social adjustment (Most et al., 2010) In contrast, successful pragmatic skills have been linked to greater success in educational settings (Thagard et al., 2011; Yoshinaga-Itano et al, 2020).

Pragmatic development can be challenging for children who are Deaf or Hard of Hearing (DHH) due to a potential lack of "overhearing" social language interactions in their environments, and research has shown that overhearing and incidental language accounts for up to 90% of daily language learning (Wischmann et al., 2022).Yet pragmatic skills are often not explicitly addresses in the assessment process (Kelly et al., 2019; Most et at., 2010; Mood et al., 2020; Shoeib et al., 2016), in part, because there are few standardized assessments that address pragmatic skills of young children. In recent years, pragmatic checklists have been used as best practice for evaluating pragmatics of children who are DHH (Szarkowski et al., 2020; Toe et al., 2019; Toe et al., 2020); however, pragmatic checklists lack standardization and may require background knowledge of pragmatics and/or use clinical jargon, making it difficult for

caregivers or adults familiar with the child to understand and difficult to complete (Elleseff, 2018).

The Language Use Inventory (LUI; O'Neil, 2009) is a standardized parent-report questionnaire used to examine the pragmatic skills of children 18 to 47 months of age. The *LUI* is a caregiver-completed instrument. Because it is completed by the caregiver, it offers unique insights to a child's overall language use in the home. However, there is limited research to comparing the *LUI* to the *Pragmatics Checklist*. In this study, we examined how the *LUI* compares to *the Pragmatics Checklist* by Goberis, (1999) adapted from Simon, C.S., (1984) for variables that caregivers and providers might find important, or necessary, to consider such as: the time it took caregivers to complete the assessments, the clarity and usefulness of the instructions and results, the ability for caregivers to use the results to set goals for their children, and caregivers' willingness to complete the assessments again. The second objective of this study was to assess the pragmatic language abilities of all participants using the *LUI* and the *Pragmatics Checklist* and examine the trends of their results across and within participants.

Literature Review

Typically Developing Pragmatic Skills

Pragmatic development begins in infancy, with milestones including joint attention and using social vocalizations and gestures. It is important for timely pragmatic development as there is a direct correlation between pragmatic abilities and formal language (Shoeib et al. 2016, Toe et al. 2019, Toe et al. 2020). It is also important to note pragmatic skills are vital to maintaining relationships with others (Szarkowski et al., 2020). Later pragmatic skills include responding to

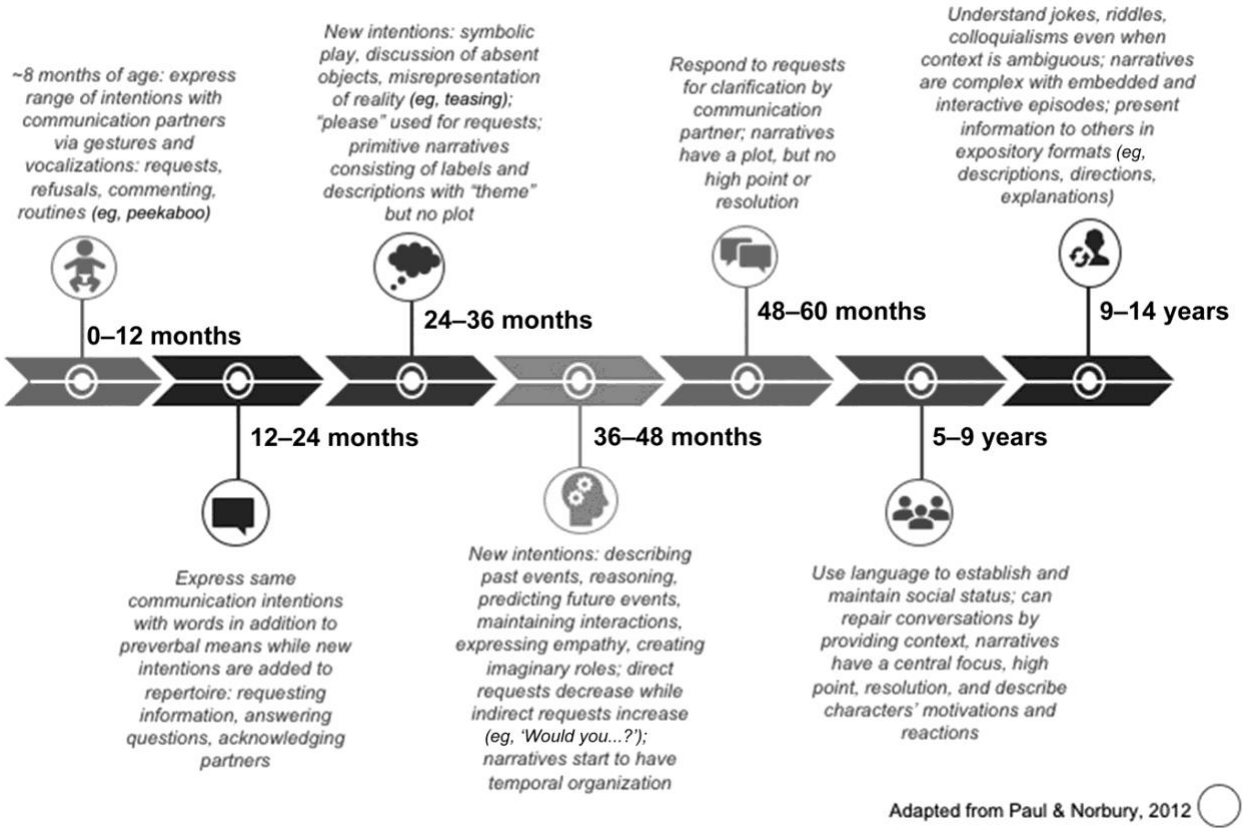

Figure 1 Timeline of pragmatic development from birth to adolescence.

Figure acquired from Toe. et al., 2020, adaptation from Paul & Norbury, 2012

unforeseen conversational turns, choosing appropriate facial expressions in context, and drawing inferences of meaning from communication partners.

During preschool years (36-48 months of age), there is an expansion of language intentions. Pragmatic milestones for this age range include describing past events, reasoning, maintaining interactions, indirect requests increase, and narratives begin to have temporal organization (Toe et al., 2020). During this time, children also start developing an understanding of beliefs, specifically being able to distinguish lies from sincere false statements, by understanding a speaker's communicative intentions. This skill undergoes rapid development in the preschool years (Kelly et al., 2019).

In preparation for kindergarten, there is a positive relationship between school readiness and pragmatic language competency (Thagard et al., 2011). As children enter kindergarten, their

pragmatic milestones begin to include providing clarification for communication partners, and narratives contain plots but no high point or resolution. Appropriate development of these pragmatic skills are necessary for success in education as well as developing and maintaining peer relationships at the school-age level (Thagard et al., 2011). For children who are DHH, this is especially challenging (Szarkowski et al., 2020).

Pragmatic Development and Possible Delays in Children Who are Deaf or Hard of Hearing

In their early years, children who are DHH often experience limited access to conversations and social/language interactions (Kelly et al., 2019; Most et at., 2010; Mood et al., 2020; Shoeib et al., 2016). This limited exposure to conversation and natural language interactions varies based off several relational factors. Due to this limited exposure, children who are DHH face barriers to successful social inclusion and deficits in pragmatic competencies. Limited access to linguistic exchanges, delays the development of key pragmatic skills (Kelly et al., 2019).

There are a variety of factors that contribute to the unique ways infants and toddlers who are DHH develop pragmatic skills (Mood et al, 2020), such as attending to interactions with others (specifically caregivers), supporting the development of theory of mind (through describing thoughts and beliefs), and providing an adequate number of accessible opportunities for social communication interactions (Mood et al., 2020). To effectively support development pragmatic abilities of children who are DHH, providers need to have tools to specifically assess a child's pragmatic strengths and needs to coach families and make referrals for any support as needed (Mood et al., 2020).

For example, children who are DHH may have challenges understanding the communication intents of speakers, a skill that typically emerges in the preschool years. Kelly et

al. (2019) examined 26 children with severe-to-profound HL to see if a delay was present in their ability to understanding a speaker's communicative intentions compared to their age-matched hearing peers. The 26 children who are DHH had limited access to linguistic exchanges compared to their hearing peers. This was based on their limited vocabulary size and a delay in other areas of language (Kelly et al., 2019). Their findings showed that children who are DHH were delayed in identifying false statements from true statements from communication partners, when matched for chronological age. Their findings also concluded that children who are culturally and linguistically Deaf[1], who experienced early access to conversations with their Deaf parents demonstrated no delay. Finally, their findings suggested limited access to conversation and linguistic exchanges will result in delay the pragmatic skill of understanding speaker communication intent (Kelly et al., 2019).

In a similar study, Most, et al. (2010) studied the different pragmatic abilities of 13 children who were DHH (using cochlear implants [CIs] and hearing aids [HAs]) compared to 13 children without who were not DHH, to determine discrepancies. All participants had similar chronological and linguistic ages. The *Pragmatic Checklist* (Goberis, 1999) was used to examine a spontaneous 15-minute conversation with a familiar adult, including 29 parameters under verbal, paralinguistic, or nonverbal communication. These parameters evaluated if responses were appropriate (neutral or contributed to the conversation) or inappropriate (impaired the conversation).

The results found that children who are DHH were more varied in their pragmatic functions and had greater incidents of inappropriate pragmatic behavior than children who are

[1] Deaf is capitalized to differentiate individuals who are culturally and linguistically Deaf (using American Sign Language) from the general term DHH used throughout the paper.

not DHH. There were no significant differences in outcomes between children who are DHH, who used CIs compared to HAs. The CI users had a mean of 64.58% appropriate pragmatic behaviors, HA users had a mean of 67.64% appropriate pragmatic behaviors, and children who are not DHH had a mean of 85.15% appropriate pragmatic behaviors. These findings provide evidence that children who are DHH differ pragmatically from children who are not DHH. Most et al., concluded that because children who are DHH lack exposure to communication interactions (in contrast to their hearing peers), they will be less likely to acquire the range of pragmatic skills required for age-appropriate social interaction.

Delays in pragmatic abilities for children who are DHH in early childhood and preschool years, can contribute to difficulty finding and maintaining critical social relationships with peers. Shoeib et al., (2016) examined the pragmatic language abilities of 27 Arabic-speaking children with sensorineural HL. The aim was to use the results from the study to create a program that would intervene against the effects of early pragmatic language skill disorders on later academic and social abilities. The researchers used the Arabic version of the *Test of Pragmatic Language, 2nd edition,* and both the "Observational Rating Scale" and the "Pragmatic Profile" subtests of the *Clinical Evaluation of Language Fundamental, 4th edition*. The scores were compared with the results of 27 age-matched and gender-matched children who were not DHH.

The results revealed significantly lower pragmatic abilities in children who were DHH compared with children who were not DHH. Male children were significantly more impaired compared with female children. The results also displayed significant correlations between the pragmatic variables and the degree of HL, speech discrimination ability, and the duration of auditory deprivation. Due to these findings, pragmatics has been recommended as an area of necessity to include in a comprehensive clinical assessment (Shoeib et al., 2016).

Sociolinguistic pragmatic competence has a high, positive correlation with academic outcomes for children who are DHH and their hearing peers. Also, general education criterion-referenced test scores have a significantly positive relationship with pragmatic skills. Thagard et al., (2011) investigated the relationships between the sociolinguistic pragmatic competence in 81 DHH students, their degree of hearing loss, communication mode (signed or spoken), and degree of success in general education. The participants were all school-age children from the Cobb County School District in Georgia. The researchers used *The Criterion-Referenced Competency Test* (Georgia Department of Education, 2000) and *The Socio-Pragmatic Skills Checklist for Deaf and Hard of Hearing Students* (Cobb County School District, 1997).

The researchers found that regardless of modality, as the children's pragmatic language competence scores increased, so did their academic achievement as measure by the criterion-referenced tests. These results confirm that there is a positive correlation between pragmatic competency and academic outcomes for children who are DHH (Thagard et al., 2011).

Assessment of Pragmatics

Pragmatic Checklists

It is important for clinicians to provide the best possible assessments in any area of language for children of all modalities and hearing statuses. The assessment of pragmatics is challenging because it requires observations of the child interacting with a communication partner. This can be observed directly during a specific interaction, or through the reflections of a familiar adult such as a parent, caregiver, or educator (Toe et al., 2020). With pragmatic skills requiring the observation of an interaction, they cannot be easily assessed using a standardized test. Due to the complicated nature of pragmatic language, many aspects of pragmatic deficits are not ordinarily evident from performance on standardized language tests (Toe et al., 2020). One

of the most common and widely accepted assessment methods for assessing pragmatic language abilities are pragmatic checklists.

Pragmatic checklists have been identified as best practice for assessing pragmatic skills in children who are DHH for many reasons (Szarkowski et al., 2020; Toe et al., 2019; Toe et al., 2020). Pragmatic checklists offer relatively quick, non-labor-intensive assessment and the ability to observe specific skills "in action". Pragmatic checklists also allow for a familiar adult to provide reflections of observations of specific pragmatic skills that may not be observed by a clinician in an intervention setting (Toe et al., 2020).

Toe et al., (2019) investigated the utilization of checklists to assess pragmatic abilities in school-aged children and adolescents who are DHH. This consisted of a systematic literature review of published literature regarding the assessment of pragmatics in school-aged children and adolescents who are DHH. The research was narrowed down to focus on pragmatic checklists as the method of assessing this population. Within these checklists, nine were identified, and compared on key features. These key features being compared consisted of identification of a theoretical framework or model, the type of pragmatic skills measured, the age range of the child assessed, the information/outputs generated, the primary information for the assessment, and reliability, validity, and normative data. The researchers used the data to provide a comprehensive guide for clinicians, educators, and researchers in selecting an appropriate checklist to assess pragmatic skills for children and adolescents who are DHH. The researchers ultimately found that there was not one single checklist compared that can be used to satisfy all of the different pragmatic skills within various contexts that clinicians and researchers may wish to assess for children who are DHH. The nine pragmatic checklists included in the systemic literature can be observed in a chart found in Appendix F.

Following the 2019 article, Toe et al., published a follow-up study in 2020 in which the authors describe and recommend two "complementary assessment procedures" for young children who are DHH who use spoken language. These assessments include the *Pragmatics Checklist* Goberis et al., (1999) (adapted from Simon, C.S., 1984) and the *Pragmatic Protocol* (Prutting and Kirchner, 1987). The authors of this article support the use of the *Pragmatics Checklist* due to its research with children who are DHH, it can be completed by parents (allowing for a reflection of their child's current pragmatic abilities), it is uses Halliday's 7 Language functions as its theoretical basis for the checklist items, it provides validity data and norms based on 109 typically developing children as its sample, and it is readily available The authors of this article also state that the *Pragmatics Checklist* is a time efficient tool for clinicians and educators, however that parents and caregivers may require additional information and support to interpret the checklist items.

Toe et al., (2020) also provides a table with information regarding six pragmatic assessments including the *Pragmatics Checklist* and can be found in Appendix F. For each assessment, the table lists a description, age group for assessment, who assesses, advantages, disadvantages, reliability, validity, norms, and studies with DHH children. Advantages for the Pragmatics Checklist provided in this table state that the Pragmatics Checklist focuses on purposes of pragmatic behaviors. Disadvantages listed included that the age range is limited to two-seven years of age. Another disadvantage is that some pragmatic skills are not included in the checklist such as turn taking, nonverbal communication, contingency, etc. This table also states that although there is not reliability data, it does provide both validity data and norms based on a sample of 109 typically developing children, with only one study of its use with children who are DHH. The scope of the *Pragmatics Checklist* is limited to the functional

aspects of pragmatics, reported by a potentially biased familiar adult such as a parent, therefore the authors of Toe et al., 2020 state that it cannot be considered a comprehensive tool for the assessment of pragmatic skills. The authors of this article recommend complementing the *Pragmatics Checklist* with the use of a well-established coding protocol containing natural interactions between a child who is DHH and a familiar communication partner such as a parent or teacher.

Goberis et al., (1999) created the *Pragmatics Checklist* (adapted from Simon, C.S., 1984). This checklist has been recently cited as a tool for assessing pragmatic language in children who are DHH (Toe et al., 2019; Toe et al., 2020). The Pragmatics Checklist can be completed by a parent, caregiver, educator, a speech-language pathologist, or an adult familiar with the child. The recommended ages included in this checklist are 24-30 months, 36-42 months, 42-48 months, and 54-60 months of age. This checklist asks the examiner to read the behaviors listed below and mark a choice in the appropriate column that describes how their child uses words/language, no words (gestures – preverbal) or does not yet show a behavior. Toe et al., 2020 describes the Pragmatics Checklist as "Parents to assess if children exhibit a range of communication functions, including: *States Needs (I want…), Gives Commands (Do as I tell you…), Personal (Expresses feelings…), Interactional (Me and you…), Wants Explanations (Tell me why…), Shares Knowledge and Imaginations (I've got something to tell you…)".* The checklist includes the six categories described by Toe et al., 2020 and provides the examiner tallied responses to pragmatic skills at varying levels but does not provide further insight (Goberis et al., 1999).

Language Use Inventory

The *Language Use Inventory* (*LUI;* O'Neil, 2009) is the only standardized parent-report questionnaire that assesses children's pragmatic use of language. The *LUI* was designed to be completed solely by a parent/caregiver. This questionnaire can be given via a paper version or by a secure online version. The *LUI* is recommended for children ages 18-47 months with norms (based on over 3500 children) but can also provide language-age equivalent scores beyond 47 months (O'Neil, 2009). The online version of the *LUI* provides families with instantaneous scores and a report that includes conversion of scores to percentile scores for all subscales in numerical and graph format. The *LUI* allows for both spoken and signed language. The *LUI* also provides an interpretation and description of the scores obtained and the comparison to the normed group.

The *LUI* consists of three main parts: *Part 1: How your child communicates with gestures, Part 2 Your child's communication with words*, and *Part 3: Your child's longer sentences.* Each part of the LUI contains subscales, 12 total (A-N). Each of the subscales assess a child's communication in a wide range of settings and for a broad variety of social communication functions in everyday settings and activities. Table 2 displays all LUI subscales in comparison to the six categories of the Pragmatics Checklist. The LUI provides a total score comprised of parts 2 and 3, as well as individual subscale scores. The LUI also provides families with a Summary of Non-Scored and Text Responses in Part 3. At the end of the LUI is an area for parents to describe the child's health and language background. A sample of the *LUI* can be found in Appendix B.

Pragmatic language assessment warrants difficulty for standardization due to its complex nature (Toe et al., 2020). The LUI provides a standardized, empirically validated measure of children's early language use (i.e, pragmatic language development) and can be given at a very

young age (18-47 months). The LUI has undergone years of development to ensure its internal reliability, discriminative, concurrent, and predictive validity (O'Neil, 2009). The LUI is currently being researched for its use with children who are DHH, as this population is not included in the normed sample.

Table 1.
Characteristics of the LUI and the Pragmatics Checklist

	Language Use Inventory (O'Neil, 2009)	**Pragmatic Checklist (Developed from Simon (1984), adopted by Goberis et al. (2012)**
Primary Informant	Parent/Caregiver	Parents/caregivers and/or educators/providers
Nature of information assessed	Provides a standardized score w/ interpretation	Identifies specific areas of delay-communication intent by complexity
Recommended Age Group	18-47 months-Can also provide language-age equivalent scores beyond 47 months.	2-7 years
Allows for Spoken and Signed Language	Yes	Yes
Comparison Group	Yes (3500 typically developing children)	Yes (109 typically developing children)
Administration	Can be completed online or on paper in person.	Typically administered on paper in person can also be administered online.
Published peer reviewed papers	Mathews et al. (2018) and Dockrell et al. (2014)	Goberis et al. (2012) and Yoshinaga-Itano (2015)

Table 1 Characteristics of the Language Use Inventory and the Pragmatics Checklist

Table 2.

Corresponding Assessment Categories

Language Use Inventory (O'Neil, 2009) (#)=total items within the category	**Pragmatic Checklist (Developed from Simon (1984), adopted by Goberis et al. (2012)** (#)=total items within the category
C: Types of words your child uses (21)	
D: Your child's requests for help (7)	States Needs (I want…) (5)
F: How your child uses words to get you to notice something (6)	States Needs (I want…) (5)
G: You child's questions and comments about things (9)	Wants explanations (5)
H: Your child's questions and comments about themselves or other people (36)	Wants explanations (5)
I: Your child's use of words in activities with others (14)	Gives Commands (Do as I tell you…) (3)
J: Teasing and your child's sense of humor (14)	Shares Knowledge and Imaginations (I've got something to tell you…) (10)
K: Your child's interest in words and language (12)	
M: How your child adapts conversation to other people (15)	Interactional (Me and you..) (15)
N: How your child is building longer sentences and stories (36)	Shares Knowledge and Imaginations (I've got something to tell you…) (10)

Table 2 Corresponding Assessment Categories of the Language Use Inventory and the Pragmatics Checklist

Study Aims

This study had two objectives. The first was to examine how the *LUI* compares to *the Pragmatics Checklist* by Goberis, (1999) adapted from Simon, C.S., (1984), for variables that caregivers and providers might find important, or necessary to consider. These variables included: the time it took caregivers to complete the assessments, the clarity and usefulness of the instructions and results, the ability for caregivers to use the results to set goals for their children, and caregivers' willingness to complete the assessments again. The second objective of this study was to assess the pragmatic language abilities of all participants using the *LUI* and the *Pragmatics Checklist* and examine the trends of their pragmatic language abilities and language complexity across and within participants. The reasoning behind this study is to aid clinicians in

the process of determining which pragmatic assessments are appropriate to provide to families of children who are DHH.

It is hypothesized that there will be higher caregiver satisfaction of the *LUI's* clarity of instructions/results, usefulness of results, and willingness to use the assessment again. Clarity of instructions/results is described as the easy of understanding of both the instructions of results. Usefulness of results is determined under the parameters of being able to use the results to set goals for their children. It is also hypothesized that caregivers will take less time to complete the *Pragmatics Checklist* than the *LUI* due to it being a shorter and less time-consuming assessment. It is hypothesized that the LUI will provide a more in-depth look into each participant's pragmatic language abilities based on the expansive number of questions and sections that it covers.

Methods

Recruitment

Participants were recruited by a nationally shared flyer on professional sites within the Speech-Language Pathology and Audiology communities, social media, and via email. The flyer included the following information: the required caregiver completion of two assessments (*LUI* and *Pragmatics Checklist*), the estimated time to complete each assessment, the inclusion of two short surveys following completion of each assessment, information about the reports of their child's performance for each assessment, and information about the $50 incentive raffle for an Amazon gift card. Each caregiver met the following inclusion criteria: (a) be a caregiver of a children who is DHH, (b) English was their child's primary language, (c) listening and spoken language (LSL) being their child's primary communication modality (as opposed to American Sign Language), and (d) their child does not have a known diagnosed cognitive impairment.

Only one of the children's' parents (as opposed to both parents) completed the entire assessment battery/study. Participants who fully completed all parts of the research were entered into a raffle in which one participant was chosen at random to win a $50 Amazon gift card. The gift card was awarded using an online program. All participants codes were entered into the program, and one was chosen randomly by this site. This research was approved by the university Institutional Review Board.

Research Design

A randomized, counterbalanced design was used to randomly assign participants to two groups: Group 1 (completion of the *LUI* and subsequent survey first), or Group 2 (completion of the *Pragmatics Checklist* and subsequent survey first), with the order of assessment batteries counterbalanced to control for the role time/focus on pragmatic skills and test fatigue. Caregivers were informed of their designated group and code (to hide their name in the *Pragmatics Checklist)* via email.

Materials

Consent & Intake Forms. The caregivers signed a consent form before taking either the *Pragmatics Checklist* or the *LUI.* The consent form can be found in Appendix E. Prior to beginning the study, participants answered intake questions regarding demographic and contact information. Questions on the intake questionnaire included: Child's date of birth, child's gender, parent's email, "At what age was your child identified with hearing loss?", "Does your child use a hearing technology? If yes, at what age was your child fit with hearing technology?", "What is your child's degree of hearing loss? If unsure, answer: I am unsure", "What is your child's primary communication modality? (Ex. Spoken language or signed language)". The Intake form can be found in Appendix D.

Parent Perception Survey. A survey was created using Qualtrics to obtain information from caregivers after the completion of both the *LUI* and the *Pragmatics* Checklist. The questions included in the Parent Perception Survey ask time spent taking each test, clarity and easy of understanding instructions, clarity and ease of understanding results, usefulness of results to set goals, and willingness to use the test again. A copy of the Parent Perception Survey can be found in Appendix C.

The Language Use Inventory. The Language Use Inventory (LUI) is a standardized parent-report questionnaire for assessing pragmatic language development in children 18 to 47 months of age. The families participating in this study completed this via the online version of the *LUI.* The LUI provided parents with an instruction sheet consisting of the necessary knowledge to complete the LUI. The assessment itself contains three main parts: Part 1: *How your child communicates with gestures*, Part 2: *Your child's communication with words*, and Part 3*: Your child's longer sentences.* At the end of the LUI is an area for parents to describe the child's health and language background. A sample of the *LUI* can be found in Appendix B.

The Pragmatics Checklist. The *Pragmatics Checklist* being used for this study was written by Goberis, (1999) adapted from Simon, (1984). The checklist consists of six categories made up of 45 questions in total. The six categories on the checklist include: *States Needs (I want…), Gives Commands (Do as I tell you…), Personal (Expresses feelings…), Interactional (Me and you…), Wants Explanations (Tell me why…), Shares Knowledge and Imaginations (I've got something to tell you…).* The checklist is ideally completed by caregivers, but can also be completed by an educator, clinician, or an adult familiar with the child. For this study, the caregivers complete an online version of the *Pragmatics Checklist* via a Qualtrics link format that was sent to their email. The investigators received permission from the *Pragmatics Checklist*

authors to format the *Pragmatics Checklist* in an online format via a Qualtrics survey. The *Pragmatics Checklist* can be found in Appendix A.

Procedures

Prior to beginning the study, the caregivers answered intake questions via email (regarding demographic information) and then signed and returned a consent form. The caregivers were then provided access via email to the online version of the *LUI* and the *Pragmatics Checklist* Qualtrics link, along with their designated code (C1, C2, C3). The study required caregivers to complete two online assessments (i.e., the *LUI* and the *Pragmatics Checklist*) sent via email, and complete two Parent Perception Surveys, one after each assessment following the receival of their child's results on the assessment.

All participants (n=3) were randomly assigned to either Group 1 (completion of the *LUI* and subsequent survey first) or Group 2 (completion of the *Pragmatics Checklist* and subsequent survey first). After completing each assessment, the caregivers were provided a report via email regarding their child's performance and results. The *LUI* results were provided automatically by the *LUI* site after submission of the assessment. The *Pragmatic Checklist* results were sent via email as a hard copy version of the digital Qualtrics checklist.

Following completion of the assessments and receival and review of results, caregivers took a short Parent Perception Survey containing questions for each assessment regarding: which test they had just completed, the amount of time spent taking each assessment, clarity of instructions, clarity of results, usefulness of the results, and willingness to use the assessment again. This survey was provided to caregivers via email as a Qualtrics link. Caregivers completed this Parent Perception Survey twice after reviewing the results of both of their child's assessments.

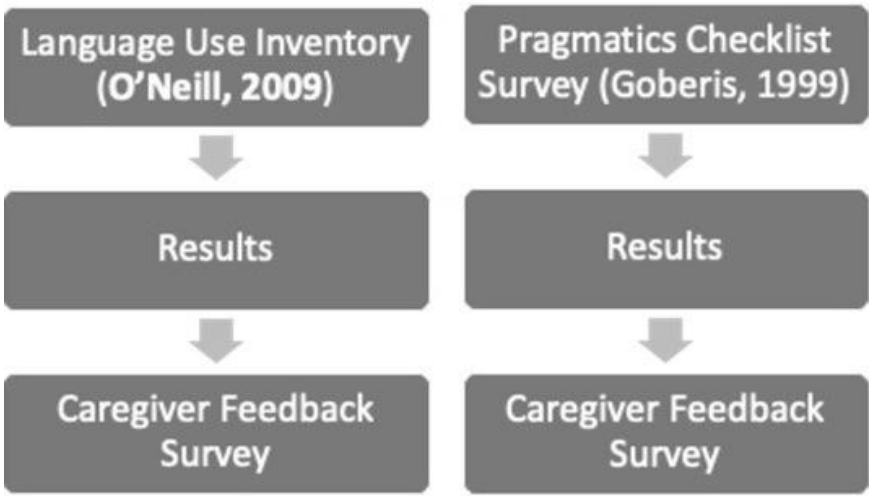

Figure 2 Sequence of research design showing both groups and the progression of parent completion of both assessments.

Analysis

The results of both the Parent Perception Surveys and the assessments individually and across all three participants (LUI & Pragmatics Checklist) were analyzed by descriptive analysis to determine patterns and characteristics of the data for both the Parent Perception Survey and the LUI/Pragmatics Checklist. Qualtrics Survey software, Microsoft Excel, and the LUI.

Parent Perception Survey. Data from the Parent Perception Survey was collected and analyzed using Qualtrics Survey software system and Microsoft Excel. For both assessments (LUI & Pragmatics Checklist) the following variables were examined: The instructions were clear and easy to understand, the results were easy to understand, I will be able to use the results to set goals for my child, willingness to use each assessment again, and time spent completing each assessment. The first three variables were examined using a Likert scale of *Strongly Agree, Agree*, *Neutral, Disagree*, and *Strongly Disagree*. Willingness was examined using a separate Likert scale of *Not Willing* through *Extremely Willing*. Possible responses for time spent completing each assessment included: Less than five minutes, six to ten minutes, 11-15 minutes,

16-20 minutes, 21-25 minutes, and more than 25 minutes. For all the variables, caregivers selected one answer per variable.

Language Use Inventory. Following caregivers' completion of the LUI online, the results were automatically analyzed by the LUI's software, and individual PDFs were generated containing each participant's percentile ranks and subscale scores. These PDFs were analyzed for a participant's profile of pragmatic abilities based on overall percentile scores and subscale percentile scores. For analysis across participants, Microsoft Excel was utilized to compare individual's overall percentile scores for parts 1-3 and their total LUI scores. Item analysis for each subscale of the LUI across participants was also examined for comparison of subscale percentile scores for areas of greater and lower performance. The item analysis for the LUI can be found in Appendix G.

Pragmatics Checklist. Possible responses for each item on the Pragmatics Checklist included *Not Present, Gestures Only (no signs/words), Uses 1-3 Words/Signs, and Uses 4+ Word Sentences*. These choices indicate the complexity level at which the child is performing the pragmatic skill currently. For the purposes of data analysis, these responses were given a numerical value of 1-4 based on the level of language complexity each choice represents beginning with Not Present, through Uses 4+ Word Sentences, this can be observed in Table 3.

Table 3.
Pragmatics Checklist Response Choices and Value Range

Pragmatics Checklist Response Choices	Numeric assignment
Not Present	1
Gestures Only (No Signs/Words)	2
Uses 1-3 Words/Sings	3
Uses 4+ word sentences	4

Table 3 Pragmatics Checklist Response Choices and Value Range

The possible choices on the Pragmatics Checklist were given a numerical value to represent their language complexity level from 1-4. This is visualized in the table above.

Items on the Pragmatics Checklist were then sorted using Microsoft Excel to identify trends across and within participants. Variables examined included: areas lacking in linguistic complexity meaning lower numerical values reported (1 & 2) and areas of higher linguistic complexity reported (3 & 4). This data was also examined by individual item analysis looking at which items across and within participants are missing, meaning parents reported these skills as not present. The individual item analysis for the Pragmatics Checklist can be found in Appendix H. Each of the six areas of the Pragmatics checklist were analyzed for the participant's mean complexity score given the assigned numerical values the individual items. The mean complexity scores and the ranges for each section were compared for individuals and across categories.

Results

Participants

Three caregivers (mothers) of male children with varying degrees of hearing loss between 2;5 and 3;4 years of age participated in this study. Participant demographic information is displayed in Table 4.

Table 4.
Participant Demographic Information

Child ID	Age	Age identified with hearing loss	Hearing technology Y/N?	Age fit with hearing technology	Degree of hearing loss	Primary communication modality used	Location
C1	2;7	Birth	No	N/A	Varying-Auditory Neuropathy Spectrum Disorder (ANSD).	Total Communication	Northwestern United States

C2	2;5	Birth	Yes - Cochlear Implants	7 months of age	Unilateral Moderate Loss	Primarily Auditory Verbal with some ASL	Western United States
C3	3;4	6 weeks of age	Yes- Cochlear Implants	5 months of age	Profoundly Deaf	Listening and Spoken Language in both English and Spanish (English primary)	Northwestern United States

Table 4 Participant demographic information

Participant demographic information obtained during intake following signed consent form.

Parent Perception Survey Results

Time. All three parents spent less time taking Pragmatics Checklist then the LUI, with all parents reporting that the Pragmatics Checklist took less than ten minutes to complete. Parents reported spending between eleven and more than twenty-five minutes to complete the LUI.

Instructions and results. On the Parent Perception Survey, parents provided responses to the following questions 1." The instructions were clear and easy to understand", 2. "The results were easy to understand", and 3. "I will be able to use the results to set goals for my child". Both assessments yielded mixed results for all three questions. Parents agreed (n=1) and strongly agreed (n=2) that the instructions of the LUI were clear and easy to understand. Parents agreed (n=2) and strongly agreed (n=1) that the instructions of the Pragmatic Checklist were clear and easy to understand. Parents agreed (n=2) and were neutral (1) that the results of the LUI were clear and easy to understand. Parents disagreed (n=1), were neutral (n=1), and strongly agreed (n=1) that the results of the Pragmatics Checklist were clear and easy to understand. For use of results on the LUI, parents were neutral (n=2) and agreed (1) that they will be able to use the results to set goals for their child. Parents disagreed (n=1), were neutral (n=1), and strongly agreed (n=1) that they will be able to use the results of the Pragmatics Checklist to set goals for

their child.

Table 5.
Parent Perception Survey Results

Parent Perception Survey Responses	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
LUI					
The Instructions were clear and easy to understand	2	1	0	0	0
The results were clear and easy to understand	0	2	1	0	0
I will be able to use the results to set goals for my child.	0	1	2	0	0
Pragmatics Checklist					
The Instructions were clear and easy to understand	1	2	0	0	0
The results were clear and easy to understand	1	0	1	1	0
I will be able to use the results to set goals for my child.	1	0	1	1	0

Table 5 Parent Perception Survey Responses

Note: Daker orange demonstrates more responses for that variable.

Willingness. The Pragmatic Checklist yielded mixed results on the Parent Perception Survey for willingness to complete either assessment again. All parents reported a range of being *Somewhat Willing* to *Extremely Willing* to complete either assessment again. The LUI portion of the Parent Perception Survey yielded a response range of *Somewhat Willing* to *Extremely Willing* with one selection between these two responses. Overall parents were both *Somewhat Willing* and *Extremely Willing* to complete both assessments again, with no notable differences in willingness to complete either assessment.

Language Use Inventory Results for All Participants

Results of the LUI, shown in Figure 3, reflect pragmatic deficits across all three participants. Children demonstrated the most success with Part 1 *(Gestures)* across all participants with a mean score of 92.3 and range of scores from 84-99. In contrast, Part 2 *(Words)* showed more variation between participants with a range of percentile scores being 6-99 (mean= 40.3). All the participants scored much lower on Part 3 *(Longer Sentences)* with a mean score of 4.6, and a range of 1-10.

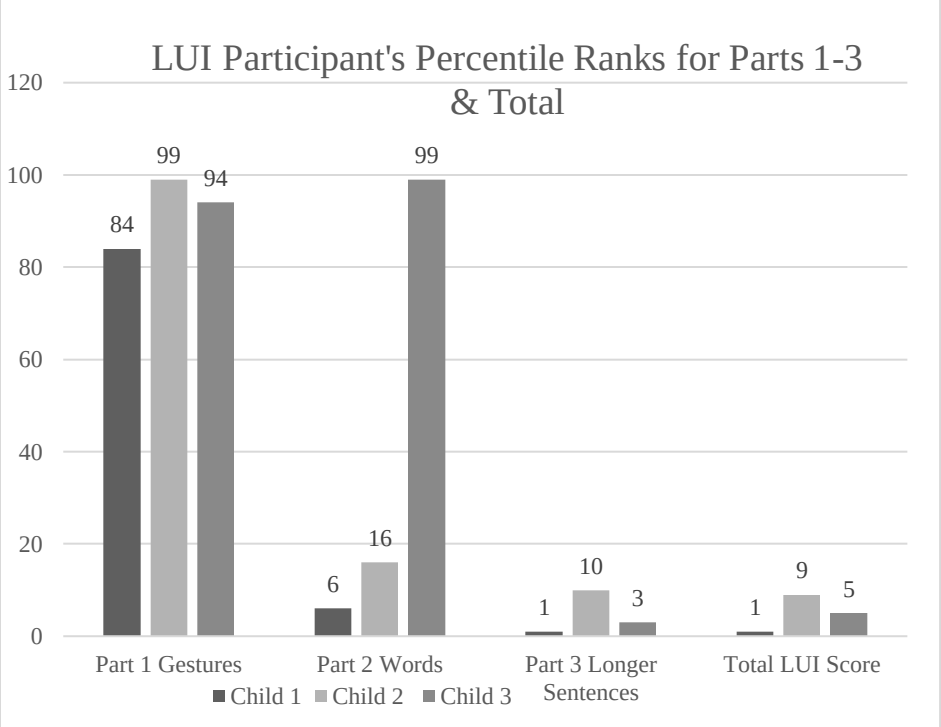

Figure 3 All Participants' LUI Percentile Ranks

LUI parts 1-3 and Total LUI score made up of Parts 2 & 3.

The results of child performance on each of the subscales is shown in Table 6. Participants collectively scored highest on Subscale D (*Your child's request for help*) with an

average percentile rank of 80.6 and a range of 44-99. Areas of greatest difficulty for all participants included subscales H (*Your child's questions and comments about self and others*), I (*Your child's use of words in activities with other*s), M (*How your child adapts conversation to other people)*, and N (*Building longer sentences and stories*) with ranges of percentile scores of 1-30. Participants showed strengths in subscales C (*Types of words your child uses)*, D (*Your child's request for help)*, F (*How your child uses words to get you to notice something)*, G (*Your child's questions and comments about things)*, and J (*Teasing and your child's sense of humor)*. Child 1 scored lower on all subscales and on the total LUI score. Subscale N (*Building longer sentences and stories*) was the lowest subscale across participants with a range of 1-8.

Table 6.
All Participant's Results on the LUI Subscales

All Participant's LUI Subscale Percentage Ranks	C1	C2	C3	Mean
Subscale C: Types of words your child uses	2	6	99	35.6
Subscale D: Your child's request for help	44	99	99	80.6
Subscale F: How your child uses words to get you to notice something	1	65	40	35.3
Subscale G: Your child's questions and comments about things	1	3	99	34.3
Subscale H: Your child's questions and comments about self and others	1	8	11	6.6
Subscale I: Your child's use of words in activities with others	1	30	11	14
Subscale J: Teasing and your child's sense of humor	5	55	1	20.3
Subscale K: Your child's interest in words and language	1	51	7	19.6
Subscale M: How your child adapts conversation to other people	1	36	7	14.6
Subscale N: How your child is building longer sentences and stories	1	8	1.5	3.5

Table 6 All Participants' results on the LUI Subscales.

Pragmatic Checklist Results All Participants

Results of the pragmatic checklist were analyzed using numerical values to correlate with the possible selection of Not Present, Gestures Only (no signs/words), Uses 1-3 Words/Signs, and Uses 4+ Word Sentences. The numerical values and related selections are based on the language use complexity level of 1-4. Responses from the three caregivers who participated in the study are displayed in Table 7 with the highest overall mean language complexity levels in the section *States Needs (I want…)* with a range of 2.8-3.8 and a total mean complexity score of 3.33. The section with the lowest overall complexity levels across participants was *Personal (Expresses Feelings…)* with a range of 1.3-2.9 and a total mean complexity score of 1.88. The section *Interactional (Me and you…)* showed slightly higher results with a range of 1.4-2.5 and a total mean complexity score of 1.89.

Table 7.
Averages of all Participants mean complexity scores on the Pragmatics Checklist

Checklist Categories	Average of All Participant's Mean Complexity Scores	Range (1-4)
States Needs (I want…)	3.33	2.8-3.8
Gives Commands (Do as I tell you…)	2.11	1-3.6
Personal (Expresses Feelings…)	1.88	1.3-2.9
Interactional (Me and you…)	1.89	1.4-2.5
Wants Explanations (Tell me why…)	1.93	1-2.6
Shares Knowledge and Imaginations (I've got something to tell you…)	2.08	1.2-3

Table 7 Averages of all participants mean complexity scores on the Pragmatics Checklist

Ranges of these scores 1-4 with 1 (Not present), 2 (Gestures only [no words/signs]), 3 Uses 1-3 Words/Signs, Uses 4+ Word Sentences.

Analysis of Language Use Inventory & Pragmatics Checklist Subscales and Questions

An examination of the individual subscales on the LUI and individual questions on the Pragmatics Checklist revealed strengths and weaknesses across participants and assessments on specific subscales and questions. As seen in Appendix G, participant's raw scores on the subscales of the LUI were analyzed and reported for the percentage of items correct. This analysis showed that participants scored the lowest percentages of items correct in Subscale J (*Teasing and your child's sense of humor*) with a percentage of items correct of 13 percent and Subscale N (*How your child is building longer sentences and stories*) with a percentage of items correct of 16 percent. Participants scored the highest percentages of correct in Subscales A (*How your child uses gestures to ask for something*), SubscalSue D (*Your child's requests for help*), Subscale B (*How your child uses gestures to get you to notice something*), and Subscale C (*Types of words your child uses*), with corresponding subsequent percentages being 97%, 95%, 83% and 79%. These areas of success are comparable to individual questions on the Pragmatic Checklist with the highest levels of mean language complexity.

The analysis of the items from Pragmatics Checklist seen in Appendix H displays participants greatest strengths and weaknesses on individual questions within each section of the Pragmatics Checklist. Participants showed least developed skills, (e.g., the lowest mean language complexity scores from 1-4 representing 1 *Not present,* 2 Ge*stures only (no words/signs),* 3 *Uses 1-3 word sentences,* or 4 *Uses 4+ word sentences*), on questions 11 (*Provides excuses or reasons*), 12 (*Offers an opinion with support*), 15 (*Provides pertinent information on request [2 or more of the following: name, address, phone number, birthdate]),* 20 (*Introduces new topics in conversations appropriately (does not just start talking in the middle of a topic),* 22 *(Ends a conversation [doesn't just walk away]),* 23 *(Interjects appropriately into an already established conversation with others),* 30 *(Makes promises),* 35 *(Asks questions to make predictions [What*

will happen if...]), and 43 *(Compares and contrasts qualities of two objects, actions, or situations).* These questions all received a mean language complexity score of 1, meaning these skills were all reported as *Not present* by all three caregivers who completed the Pragmatics Checklist.

Overall, children demonstrated the most complexity (3.33) in the section *States Needs (I want…).* All five of these questions were all reported with a mean language complexity score of 3 and above with a range of 3-3.66. This is comparable to the high percentages of items correct found in Subscale D (*Your child's request for help*) of the LUI. Participants also showed high levels of success with questions 16 *(Interacts with others in a polite manner),* 17 *(Uses appropriate social rules such as greetings, farewells, thank you, getting attention),* and 18 *(Attends to the speaker),* with all three questions reporting a mean language complexity score of three meaning all children are completing these skills by using 1–3-word sentences. These questions were all part of the *Interactional (Me and you...)* section.

Individual Child Results (*LUI, & Pragmatics Checklist*)

C1 LUI. Observed in Figure 4, Child 1 showed most developed skills in Part 1 (*Gestures*) of the LUI, scoring in the 84th percentile. As language complexity within the LUI parts increased, C1's performance decreased with lower scores in Part 2 (*Words*) of 6th percentile and Part 3 (*Longer Sentences*) 1st percentile. C1 scored an overall total LUI score in the 1st percentile.

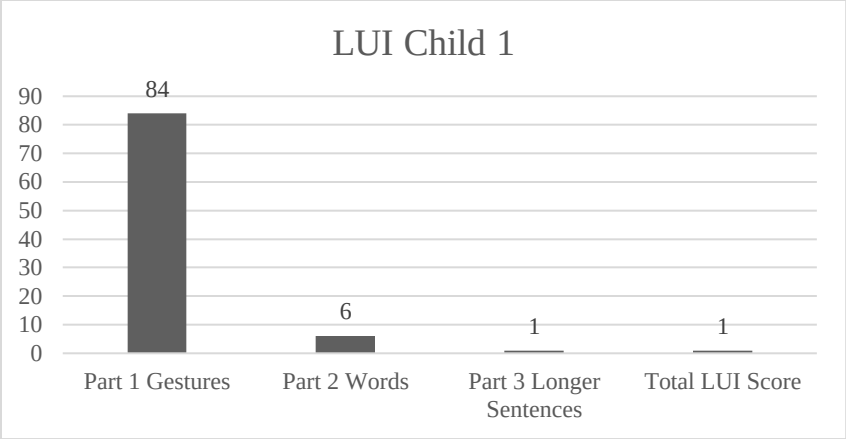

Figure 4 C1's performance on LUI parts 1-3 and Total LUI score comprised of Parts 2 and 3.

Figure 5 displays C1's subscale percentile ranks. Scores reported in subscales C-N revealed a range of 1-44th percentile ranks. Much like the other participants, C1 scored highest in Subscale D (*Your child's requests for help*) in the 44th percentile. C1's next highest percentile rank was seen in Subscale J (*Teasing and your child's sense of humor*) with a percentile of 5. The LUI for this child displays language use consisting of mostly gestures to make requests and gain attention, and words being used primarily for requesting help. Longer sentences are mostly not present with use of longer sentences only being observed in subscales J (*Teasing and your child's sense of humor*) and subscale K (*Your child's interested in words and language*).

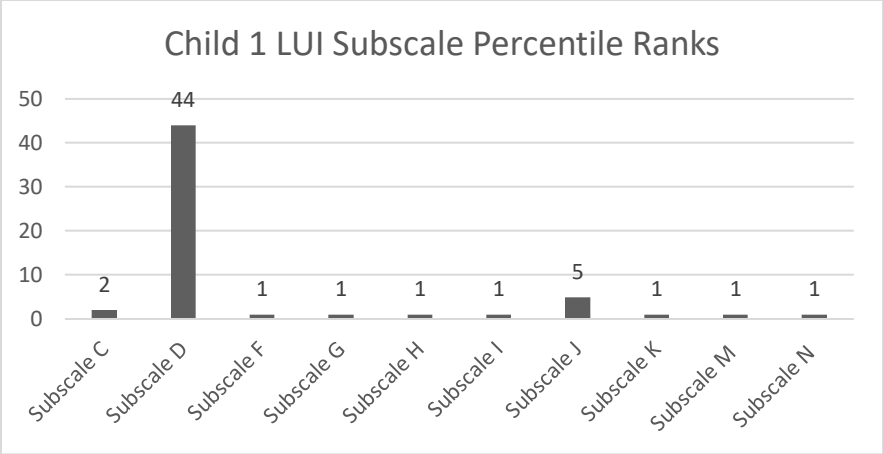

Figure 5 C1's performance on LUI Subscales C-N.

Subscale C (Types of words your child use), Subscale D (Your child's request for help), Subscale F (How your child uses words to get you to notice something), Subscale G (Your child's questions and comments about things), Subscale H (Your child's questions and comments about self and others), Subscale I (Your child's use of words in activities with others), Subscale J (Teasing and your child's sense of humor), Subscale K (Your child's interest in words and language), Subscale M (How your child adapts conversation to other people), Subscale N (How your child is building longer sentences and stories).

C1 Pragmatics Checklist. C1 displayed overall low language complexity levels on the Pragmatics Checklist as seen in Table 8, with a range of 1-2.8. C1 showed highest complexity in *States Needs (I want…).* C1 displayed lowest complexity levels in categories *Gives Commands (Do as I tell you…)* and *Wants Explanations (Tell me why…)* with both categories scoring a complexity level of 1 meaning skills within these areas are not present currently. Many of the individual items and overall categories for this child were listed as *Not Present* for any language complexity level. This contrasts with the Part 1 (*Gestures*) score on the LUI in which they scored within the 44th percentile indicating skills listed on the LUI are present at the gestural level. C1 showed gesture use in Subscale J (*Teasing and your child's sense of humor)* which is most comparable to the Pragmatics Checklist category *Shares Knowledge and Imaginations (I've got something to tell you…)* in which all items were marked as *Not Present* at any language level including gestures.

Table 8.
C1's Performance on the Pragmatics Checklist

Pragmatics Checklist Categories	C1 Mean Complexity Score Possible Scores (1-4)
States Needs (I want…)	2.8
Gives Commands (Do as I tell you…)	1
Personal (Expresses Feelings…)	1.28
Interactional (Me and you…)	1.46
Wants Explanations (Tell me why…)	1
Shares Knowledge and Imaginations (I've got something to tell you…)	1.2

Table 8 C1's Performance on the Pragmatics Checklist

Possible scores range from 1-4 with 1 (Not present), 2 (Gestures only [no words/signs]), 3 Uses 1-3 Words/Signs, Uses 4+ Word Sentences.

C2 LUI. Figure 6 displays C2's performance on the LUI parts 1-3 and their total LUI score. C2 scored in the 99th percentile for Part 1 (*Gestures*) of the LUI. C2 scored lower in Part 2 (*Words*) with a percentile rank of 16 and Part 3 (*Longer sentences*) with a percentile rank of 10. This child is the youngest chronologically at 2 years and 5 months of age. Their overall total LUI score was a 9 which is far below normal limits.

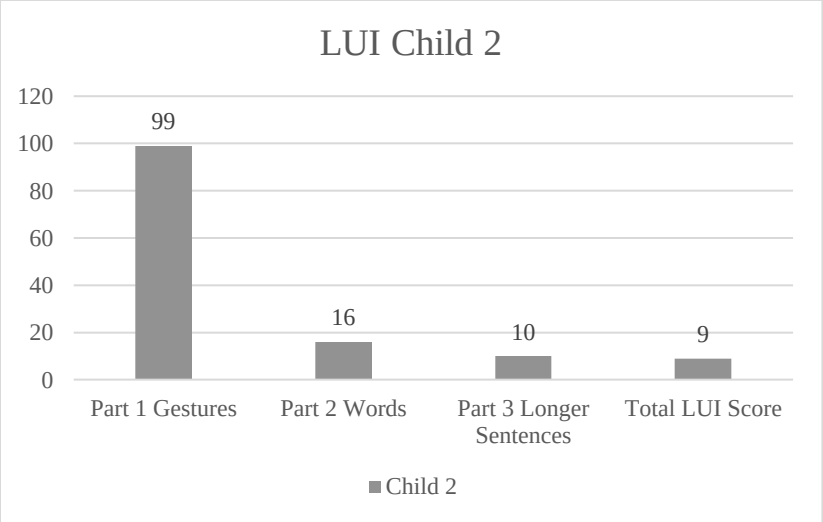

Figure 6 C2's performance on LUI parts 1-3 and Total LUI score comprised of Parts 2 and 3.

Part 2 (*Words*) consists of two subscales, C (*Types of words your child uses*) and D (*Your child's request for help).* As seen in Figure 7, C2's Subscale D (*Your child's request for help)* was their greatest area of strength scoring in the 99th percentile. In contrast, Subscale C (*Types of words your child uses*) was in the 6th percentile, below normal limits. Part 3 (*Your child's longer sentences)* is made up of subscales F-N. C2 showed a range of percentile ranks in these subscales of 3-65 with Subscale F (*How your child uses words to get you to notice something*) being the highest area of strength within this part and Subscale G (*Your child's questions and comments about things*) being their lowest scored area.

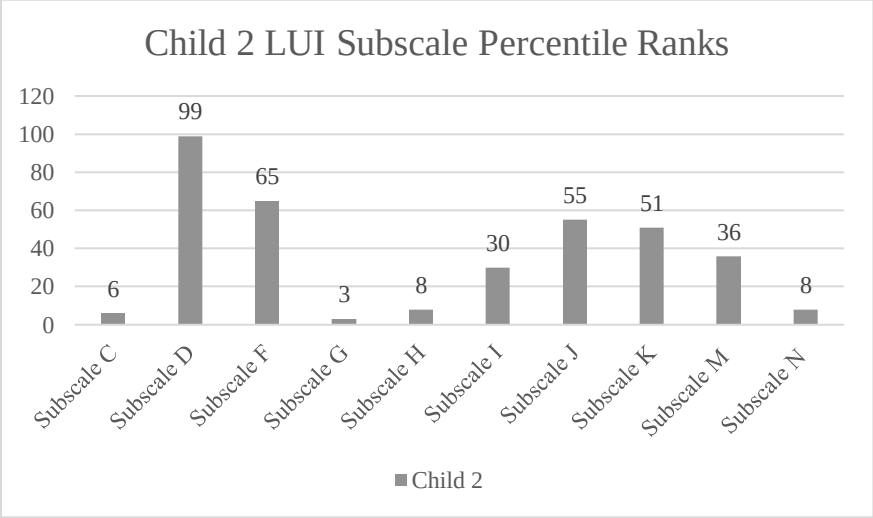

Figure 7 C2's performance on LUI subscales C-N.

Subscale C (Types of words your child use), Subscale D (Your child's request for help), Subscale F (How your child uses words to get you to notice something), Subscale G (Your child's questions and comments about things), Subscale H (Your child's questions and comments about self and others), Subscale I (Your child's use of words in activities with others), Subscale J (Teasing and your child's sense of humor), Subscale K (Your child's interest in words and language), Subscale M (How your child adapts conversation to other people), Subscale N (How your child is building longer sentences and stories).

C2 Pragmatics Checklist. C2's complexity level scores on the Pragmatics Checklist show a range of gestures, use of 1-3 words/signs, and some use of 4+ word sentences, as seen in Table 9. In contrast to C1 and C3, C2 showed their highest language complexity scores in the *Gives Commands (Do as I tell you…)* category with a mean complexity score of

3.6. The other two participants showed their highest language complexity levels in the *States Needs (I want…)* category in which C2 scored a mean complexity of 3.4. C2 demonstrated the highest overall language complexity of all three participants on both the LUI with a total score in the 9th percentile and the Pragmatics Checklist with an overall mean complexity score of 2.5, despite being the youngest participant. C2's lowest mean complexity score on the Pragmatics Checklist was in the *Interactional (Me and you…)* category with a score of 1.6. This section on the Pragmatics Checklist is most comparable to Subscale M (*How your child adapts conversation to other people*) on the LUI. C2 scored in the 36th percentile on this LUI subscale.

Table 9.
C2's Performance on the Pragmatics Checklist

Pragmatics Checklist Categories	C2 Mean Complexity Score Possible Scores (1-4)
States Needs (I want…)	3.4
Gives Commands (Do as I tell you…)	3.6
Personal (Expresses Feelings…)	2.9
Interactional (Me and you…)	1.6
Wants Explanations (Tell me why…)	2.2
Shares Knowledge and Imaginations (I've got something to tell you…)	3

Table 9 C2's Performance on the Pragmatics Checklist

Possible scores range from 1-4 with 1 (Not present), 2 (Gestures only [no words/signs]), 3 Uses 1-3 Words/Signs, Uses 4+ Word Sentences.

C3 LUI. Figure 8 displays C3's performance on parts 1-3 on the LUI and their total LUI score. C3 was the only participant to display their highest percentile score on the LUI in Part 2 (*Words*) with a percentile rank of 99. Following closely behind, C3 scored a percentile rank of 94 in Part 1 (*Gestures*). Despite percentile ranks within normal limits on Parts 1 and 2, C3 scored a total LUI percentile rank of 5, far below normal limits. This is due to their lower performance on

Part 3 (*Longer sentences*) with a percentile score of 3. It is important to note that the overall LUI score is comprised from Parts 2 and 3, meaning Part 1 (*Gestures*) is not included in the overall score.

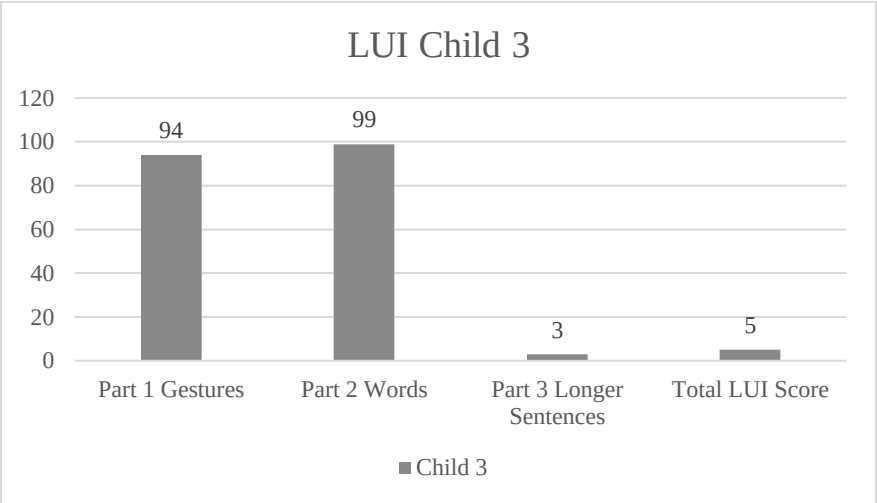

Figure 8 C3's performance on LUI parts 1-3 and Total LUI score comprised of Parts 2 and 3.

As seen in Figure 9, C3 showed strengths in Subscales C (*Types of words your child uses*), D (*Your child's request for help*), F (*How your child uses words to get you to notice something*), and G (*Your child's questions and comments about things*). The range of percentile ranks for these subscales was 40-99. Although C3 did not have the highest Total LUI score, they showed the highest scores across more subscales. Subscales of lowest percentile ranks include Subscale J (*Teasing and your child's sense of humor*) in which no skills were present, and Subscale N (*How your child is building longer sentences and stories*) in which they scored a percentile rank of 1.5.

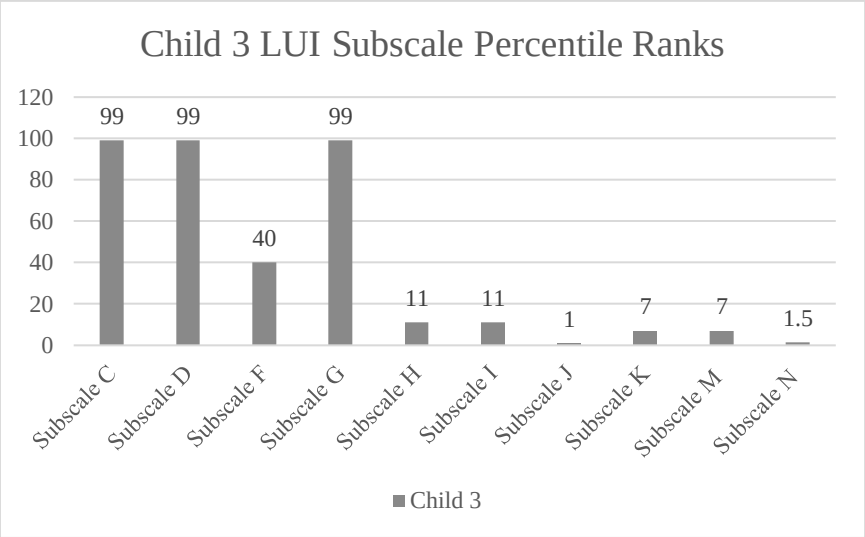

Figure 9 C3's performance on subscales C-N on the LUI.

Subscale C (Types of words your child use), Subscale D (Your child's request for help), Subscale F (How your child uses words to get you to notice something), Subscale G (Your child's questions and comments about things), Subscale H (Your child's questions and comments about self and others), Subscale I (Your child's use of words in activities with others), Subscale J (Teasing and your child's sense of humor), Subscale K (Your child's interest in words and language), Subscale M (How your child adapts conversation to other people), Subscale N (How your child is building longer sentences and stories).

C3 Pragmatics Checklist. C3 displayed an overall mean language complexity score of 2.4 (as seen in Table 10), very close to that of C2's mean language complexity score of 2.5. No gestures were indicated on C3's Pragmatics Checklist. All categories were marked as either *Not Present* or were marked with *Uses 1-3 words/signs* or *Uses 4+ word sentences*. This is not comparable to C3's high performance levels in Part 1 (*Gestures*) on the LUI, scoring in the 94th percentile. Much like C1, C3's highest mean complexity score of 3.8 was reported in *States Needs (I want…)* which is cohesive with their high performance in Subscale D (*Your child's request for help)* on the LUI. C3 also showed strengths on the Pragmatics Checklist in the categories of *Interactional (Me and you..)* with a mean complexity score of 2.5 and *Wants Explanations* with a mean complexity score of 2.6. C3 showed their lowest mean complexity score in *Gives Commands (Do as I tell you…)* scoring 1.6. Overall, C3 is using mostly words rather than longer sentences and gestures to communicate. Their performance on the LUI Part 2

(*Words*), and Part 3 (*Longer sentences*) is consistent with their performance on the Pragmatics Checklist with *Use of 1-3 words/signs* and *Use of 4+ word sentences*.

Table 10.
C3's Performance on the Pragmatics Checklist

Pragmatics Checklist Categories	C3 Mean Complexity Score Possible Scores (1-4)
States Needs (I want…)	3.8
Gives Commands (Do as I tell you…)	1.6
Personal (Expresses Feelings…)	1.9
Interactional (Me and you…)	2.5
Wants Explanations (Tell me why…)	2.6
Shares Knowledge and Imaginations (I've got something to tell you…)	2.1

Table 10 C3's Performance on the Pragmatics Checklist

Possible scores range from 1-4 with 1 (Not present), 2 (Gestures only [no words/signs]), 3 Uses 1-3 Words/Signs, Uses 4+ Word Sentences.

Discussion

Parent Perception of Pragmatic Assessments

Pragmatic development is an important aspect of communication development and tends to be a relative challenge in children who are DHH due to a potential lack of overhearing social language interactions in their environments, as overhearing accounts for up to 90% of daily language learning (Wischmann et al., 2022). It is important for clinicians to provide the best possible assessments in any area of language for children of all modalities and hearing statuses. Due to the complicated nature of pragmatic language, many aspects of pragmatic deficits are not ordinarily evident from performance on standardized language tests (Toe et al., 2020). The first objective of this study aimed to offer clinicians information regarding which assessment method (Pragmatics Checklist vs. LUI) is most appropriate to provide to families of children who are DHH to examine pragmatics based on variables that caregivers might find important, or

necessary to consider. These variables included: the time it took caregivers to complete the assessments, the clarity and ease of understanding of the instructions and results, usefulness of the results to set goals for their children, and their willingness to complete the assessments again.

The results of clarity and ease of understating of both assessments overall found that while parents reported the *instructions* of both assessments to be clear and easy to understand, parents found the *results* of the LUI to be easier to understand than the Pragmatics Checklist.

The examination of the variables of time it took caregivers to complete each assessment and the usefulness of the assessment results to set goals for their children found that, while the Pragmatics Checklist took less time for parents to complete, more parents reported that the results of the LUI would be useful in setting goals for their child. In fact, more parents (n=2) reported higher levels of willingness to complete the LUI than the Pragmatics Checklist.

The findings of the Parent Perception Survey indicate that providers may want to utilize the Pragmatics Checklist as a potential screener for pragmatic abilities and utilize the LUI as a more in-depth assessment used to set goals or as a comparison to a normative group. These findings are like the recommendation made by Toe et al., 2020 in which the authors recommend complementing the Pragmatics Checklist with a well-established coding protocol containing natural interactions between a child who is DHH and a familiar communication partner such as a parent or teacher, the *Pragmatics Protocol* (Prutting and Kirchner, 1987).

Language Use Inventory and Pragmatics Checklist

The second objective of this study was to assess all participants' current pragmatic language abilities using both the LUI and the Pragmatics Checklist for trends within and across participants. All participants demonstrated pragmatic delays on both assessments. All children demonstrated more gestures in their communication than words/signs, and longer utterances.

Regarding gestures, analyzed data indicates the LUI provided a more comprehensive view of all three participants' gesture use in Part 1 (*Gestures*), comprised of Subscales A *How your child uses gestures to ask for something* and Subscale B: *How your child uses gestures to get you to notice something*, however the Pragmatics Checklist provided more options for specific skill levels for each question ranging from *Not Present* to *Uses 4+ Word sentences*. A lack of language complexity within pragmatic language abilities was observed across participants on both the LUI and the Pragmatics Checklist.

Areas of greatest language complexity for the children in this study, (meaning the use of words and longer sentences) included requesting wants and needs and the use of polite language. This corresponds with a trend that can be observed in intervention to target MORE or PLEASE to request. Requesting is a simple pragmatic function that is expected in development as early as 12 months of age. It is important for providers and families to build complexity in this area by adding these polite terms, rather than only modeling different pragmatic intentions.

While the two assessments provide comparable information, the information that is obtained from each assessment is not always consistent. When examining the performance of participants individually, their outcomes on comparable questions or sections of the LUI and Pragmatics Checklist did not always align. One example of this is, C2 within Subscale J: (*Teasing and your child's sense of humor),* on the LUI in which this participant scored in the 55th percentile with a raw score of two out of five on this section. On the Pragmatics Checklist question *Expresses humor/sarcasm*, C2's parent reported they are demonstrated this skill by using 1 to 3 words/signs. This is likely due in part to the differing structure and format of both assessments. The LUI is comprised of three parts (*Gestures, Words, and Longer Sentences*). As these parts increase in complexity, the specific questions within these sections address more

complex aspects of language such as a child's teasing and sense of humor (Subscale J). In contrast, the Pragmatics Checklist lists six sets of pragmatic skills, and for each of the skills listed, the Pragmatics Checklist offers parents the opportunity to select the length of utterance that corresponds with that skill.

The differences in results of the LUI and the Pragmatics Checklist across and within participants raises questions as to whether these differences are due to the assessments' characteristics or the children's individual abilities. These delays in language use abilities may be reflective of incidental language and the ability to overhear social language situations. On the LUI, all children scored in percentiles below their expected age ranges. While the LUI is not normed for children who are DHH, it is important to note that the skills demonstrated are well-below age-matched hearing peers.

The Pragmatics Checklist is a criterion referenced assessment and does not provide an age-matched comparison group. Due to this lack of comparative data, the results of the Pragmatics Checklist may be misinterpreted in terms of the child's pragmatic abilities. For example, C3's parent marked 1-3 word/signs and 4+ word sentences to describe C3's performance on 26 out of 45 of the pragmatic skills listed on the Pragmatics Checklist, with 19 out of 45 of the pragmatic skills being marked as not present. To a clinician, this may appear as if the child is using complex language (longer expressive utterances) over half of the time (57.7%) to complete pragmatic language tasks. However, on the LUI, this child scored well below normal limits with a total LUI score in the 5th percentile and most higher skill levels were reported in Part 1 (Gestures). Therefore, the Pragmatics Checklist may not be providing a full picture of the pragmatic language abilities of a child who is DHH. The Pragmatics Checklist does however provide a potential snapshot of a child's current levels of language use complexity.

Clinical Implications

Pragmatics must be included as part of language assessments, with checklists currently named best practice as an assessment tool for children who are DHH (Szarkowski et al., 2020; Toe et al., 2019; Toe et al., 2020); The LUI is not normed for children who are DHH, however it may be a valuable tool to provide important insight into the pragmatic abilities of children who are DHH. It is important for clinicians to have access and knowledge of the most appropriate assessments to identify pragmatic strengths and potential areas of intervention for their clients. Both the LUI and the Pragmatics Checklist provide valuable information into a child's current pragmatic abilities and levels of language complexity. However, due to the comprehensive view offered by the LUI, and the quick administration of the Pragmatics Checklist, providers may want to utilize the Pragmatics Checklist as a potential screener for pragmatic abilities and utilize the LUI as a more in-depth assessment used to set goals or as a comparison to a normative group.

Limitations & Future Directions

Limitations for this study include the small sample size of only three parents and their all-male children. Another factor to consider is that all parents included in the study were mothers. This may not be reflective of how all parents (or fathers) of children who are DHH would report their child's performance. There are a variety of factors that contribute to the unique ways infants and toddlers who are DHH develop pragmatic skills, such as attending to interactions with others (specifically caregivers), supporting the development of theory of mind (through describing thoughts and beliefs), and providing an adequate number of accessible opportunities for social communication interactions (Mood et al., 2020). Not all the children in this study utilized a hearing technology. Therefore, the children did not all have equal access to spoken social language communication interactions in their environments. This may have impacted their

pragmatic language performance on both the LUI and the Pragmatics Checklist. Both assessments provided (LUI and Pragmatics Checklist) are not normed for children who are DHH. However, the Pragmatics Checklist has been researched for use with children who are DHH. A future direction for this study is that more research is needed into the effective use of the LUI for children who are DHH.

Conclusion

Research has shown that during preschool years of age (36-48 months of age) there is an expansion of pragmatic language use (Toe et al., 2020). Therefore, it is important for providers and families of children who are DHH to begin targeting potential pragmatic deficits early on during these crucial years. To effectively support development pragmatic abilities of children who are DHH, providers need to have tools to specifically assess a child's pragmatic strengths and needs to coach families and make referrals for any support as needed (Mood et al., 2020). The results of this study serve as an important first step to proving clinicians the appropriate family centered assessments of pragmatics to facilitate the discussion of potential pragmatic intervention at an early age.

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Appendix A

Prior to Starting

For all questions, check the ONE option that is most typical of the child's language skills.

Assigned Code Number (sent to you via email)

○ Code Number

Relationship to Child

○ Relationship To Child

INSTRUMENTAL-States Needs (I want...)

INSTRUMENTAL-States Needs (I want...)

Makes polite requests

○ Not Present
○ Gestures Only (No Signs/Words)
○ Uses 1-3 Words/Sings
○ Uses 4+ word sentences

Makes Choices

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Sings
- ○ Uses 4+ word sentences

Gives description of an object wanted

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Sings
- ○ Uses 4+ word sentences

Expresses a specific personal need

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Sings
- ○ Uses 4+ word sentences

Requests Help

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Sings
- ○ Uses 4+ word sentences

REGULATORY- Gives Commands (Do as I tell you...)

REGULATORY-Gives Commands (Do as I tell you...)

Gives directions to play a game

- Not Present
- Gestures Only (No Signs/Words)
- Uses 1-3 Words/Signs
- Uses 4+ word sentences

Gives directions to make something

- Not Present
- Gestures Only (No Signs/Words)
- Uses 1-3 Words/Signs
- Uses 4+ word sentences

Changes the style of commands or requests depending on who the child is speaking to and what the child wants.

- Not Present
- Uses 1-3 Words/Signs
- Uses 4+ word sentences

PERSONAL- Expresses Feelings

PERSONAL- Expresses Feelings

Identifies feelings (I'm happy.)

- Not Present
- Gestures Only (Not Signs/Words)
- Uses 1 to 3 Words/Signs
- Uses 4+ Word Sentences

Explains feelings (I'm happy because it's my birthday.)

- ○ Not Present
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Provides excuses or reasons

- ○ Not Present
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Offers an opinion with support

- ○ Not Present
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Complains

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Blames others

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Provides pertinent information on request (2 or more of the following: name, address, phone number, birthdate)

- ○ Not Present
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

INTERACTIONAL-Me and You...

INTERACTIONAL-Me and You...

Interacts with others in a polite manner

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Uses appropriate social rules such as greetings, farewells, thank you, getting attention

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Attends to the speaker

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Revises/Repairs an incomplete message

- ○ Not Present
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Introduces new topics in conversations appropriately (does not just start talking in the middle of a topic)

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Maintains a conversation (able to keep it going)

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Ends a conversation (doesn't just walk away)

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Interjects appropriately into an already established conversation with others

- ○ Not Present

- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Makes apologies or gives explanations of behavior

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Requests clarification

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

States a problem

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Criticizes others

- ○ Not Present
- ○ Uses 1-3 Words/Signs
- ○ Uses 4+ Word Sentences

Disagrees with others

- Not Present
- Gestures Only (No Signs/Words)
- Uses 1-3 Words/Signs
- Uses 4+ Word Sentences

Compliments others

- Not Present
- Gestures Only (No Signs/Words)
- Uses 1-3 Words/Signs
- Uses 4+ Word Sentences

Makes promises

- Not Present
- Uses 1-3 Words/Signs
- Uses 4+ Word Sentences

Wants Explanations (Tell me why...)

WANTS EXPLANATIONS (Tell me why...)

Asks questions to get more information

- Not Present
- Gestures Only (No Signs/Words)
- Uses 1 to 3 Words/Signs
- Uses 4+ Word Sentences

Asks questions to systematically gather information (as in "Twenty Questions")

- Not Present
- Uses 1 to 3 Words/Signs
- Uses 4+ Word Sentences

Asks questions because of curiosity

- Not Present
- Gestures Only (No Signs/Words)
- Uses 1 to 3 Words/Signs
- Uses 4+ Word Sentences

Asks questions to problem solve (What should I do...? How do I know...?)

- Not Present
- Uses 1 to 3 Words/Signs
- Uses 4+ Word Sentences

Asks questions to make predictions (What will happen if...)

- Not Present
- Uses 1 to 3 Words/Signs
- Uses 4+ Word Sentences

Shares Knowledge and Imaginations (I've got something to tell you...)

SHARES KNOWLEDGE AND IMAGINATIONS (I've got something to tell you...)

Role plays as/with different characters

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Role plays with props (e.g., banana as a phone)

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Provides a description of a situation which describes the main events

- ○ Not Present
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Correctly re-tells a story which has been told to him/her

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Relates the content of a 4-6 frame picture story using correct events, and an end frame

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Creates an original story with a beginning, several logical events, and an end

- ○ Not Present
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Explains the relationship between two objects, actions or situations

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Compares and contrasts qualities of two objects, actions, or situations

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Tells a lie

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs
- ○ Uses 4+ Word Sentences

Expresses humor/sarcasm

- ○ Not Present
- ○ Gestures Only (No Signs/Words)
- ○ Uses 1 to 3 Words/Signs

○ Uses 4+ Word Sentences

Appendix B

Sample Copy -- not to be administered, reproduced, or distributed without permission LUI™ Version 1.0

Language Use Inventory™

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) _____

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Knowledge in Development™

***Contact Information:** Dr. Daniela O'Neill, Dept. of Psychology, University of Waterloo, Waterloo, ON Canada N2L 3G1 519.888.4567 ext. 32545

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.

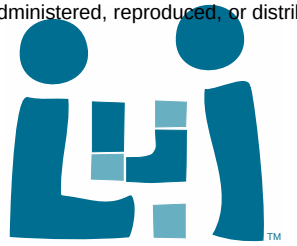
1. Please use a mark such as ⊗ or ✓ when filling out this questionnaire.

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 using 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 daddy 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 event that occurred 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**?	❍	❍

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?	❍	❍

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?	❍	❍

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 chlid 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.	_____	_____

Appendix C

Survey Beginning

What is your assigned code number? (sent to you via email)

Which test did you most recently complete?

- ○ Language Use Inventory (LUI)

- ○ 

Pragmatics Checklist

Approximately how much time did it take you to complete this test?

- ○ Less than 5 minutes
- ○ 6-10 minutes
- ○ 11-15 minutes
- ○ 16-20 minutes
- ○ 21-25 minutes
- ○ More than 25 minutes

Please rate the following statements

	Strongly agree	Agree	Disagree	Strongly disagree
The instructions were clear and easy to understand.	○	○	○	○
The results were easy to understand.	○	○	○	○
I will be able to use the results to set goals for my child.	○	○	○	○

Overall, rank your willingness to use this assessment again.

Not willing ○ ○ Somewhat willing ○ ○ Extremely willing

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Appendix D

Research Intake Form

Child's Date of Birth:

Child's Gender:

Parent's Email:

At what age was your child identified with hearing loss?

Does your child use a hearing technology? If yes, at what age was your child fit with hearing technology?

What is your child's degree of hearing loss? If unsure, answer: I am unsure.

What is your child's primary communication modality? (Ex. spoken language or signed language).

Appendix E

Idaho Collaborative Assessment Project
Principal Investigator: Dr. Kristina Blaiser PARENTAL PERMISSION AND PARTICIPANT INFORMED CONSENT FORM

Key Personnel:

Name	Role	Department	Phone Number	E-mail
Kristina Blaiser	Principal Investigator	Communication Sciences and Disorders	208- 373-1814	Kristina.Blaiser@ isu.edu
Gabriel Bargen	Project CO-PI	Communication Sciences and Disorders	208- 373-1722	Barggabr@ isu.edu
Daphne Darling	Research Assistant	Communication Sciences and Disorders	208-373-1814	DaphneDarling@isu.edu

Your participation in this research study is voluntary. *Please think about the information below carefully. Feel free to ask questions before making your decision whether or not to participate. If you decide to participate, you will be asked to sign this form and will receive a copy of the form.*

Purpose and Background:
The purpose of this project is to examine outcomes and support of families and children who are deaf and hard-of-hearing children from 6 months to 5 years of age and to determine factors that are associated with successful language outcomes. If you agree to participate in this project, you will be asked to complete evaluations at 6- to 12-month intervals until your child exits his/her current early intervention program. This will result in a total of one to eight assessments depending on the age of your child when you begin this project and your child's age when he leaves early intervention. You may decide to participate in some or all of these assessments. Participation in this study is entirely your choice. We will be assessing the outcomes of approximately 200 children every six months.

Study Tasks and Procedures:
If you agree to take part in this study, at each assessment you will be asked to complete several questionnaires about your child's development. For example, you will be given a list of words and will check off which ones your child can say and/or sign. In addition, you will be asked to sign a form releasing your child's audiologic information to our research team at Idaho State University - Meridian. You also will complete a demographic questionnaire, possibly with your early interventionist's assistance, regarding your child's intervention program and hearing history.

The questionnaires will be delivered to your home or you will be given links to complete the surveys by your early interventionist, a private speech-language pathologist or audiologist. One assessment, the

Language Use Inventory, will be emailed to you and you will have 48 hours to complete the assessment from the time you start the assessment.

Duration:
Participating should take approximately one hour of your time.

Risks and Discomforts:
The assessments that have been chosen are regularly used with children and families across the United States. Any services you are receive will not be affected in any way regardless of whether or not you choose to participate in this project.

Benefits:
We expect the project to benefit you by providing you with a continuing record of your child's development over time. This information may be helpful as you make intervention and educational decisions for your child. Your participation will help us better understand the strengths and limitations of our early intervention and family support services across the state of Idaho. We will also gain a better idea of specific challenges children who are Deaf/Hard-of-Hearing may face and help us identify factors that lead to better developmental outcomes for children who are Deaf/Hard-ofHearing.

Confidentiality:
Your individual privacy will be maintained in all published and written data resulting from this study. Participant names will not be used in any written report used for this research. The questionnaires you complete will be kept at Idaho State University in a locked storage room. Any data that is transferred to a computer will be on a single, password-protected desktop computer that is housed in a locked office at Idaho State University.

If your child's questionnaires were delivered by your early interventionist, a report of your child's results will be sent to her/him, and she/he will share your child's test results with you. If your child's questionnaires were delivered by personnel from Families for Hands & Voices or private audiologist/ speech-language pathologist, your child's report will be sent directly to you. This information will also be seen by the research team at Idaho State University- Meridian.

Incentives:
For your involvement and completion of the study, you will be entered into a raffle to win a $50 Amazon gift card that will be chosen at random.

Participant Rights:
If you decide to participate in this project, please understand that your participation is voluntary, and you have the right to withdraw your consent or discontinue participation at any time. You have the right to refuse to answer any question(s) for any reason. Your decision regarding participation in this study is not associated in any way with the quantity, quality, or type of intervention/educational services that are available to your child.

Contacts and Questions:
If you have questions, concerns or complaints about this study, you should contact the Principal Investigator at 208-373-1814 or Kristina.Blaiser@isu.edu.

If you have questions about your rights as a research study participant, you can call the Institutional Review Board (IRB). The IRB is independent from the research team. You can contact the IRB if you have concerns or complaints that you do not want to talk to the study team about. The IRB phone number is (208) 282-2179.

Signing the Consent Form

I have read (or someone has read to me) this form. I am aware that I am being asked to be in a research study. I have had a chance to ask all the questions I have at this time. I have had my questions answered in a way that is clear. I voluntarily agree to be in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

Name of Child: _____

Name of parent/guardian (printed) _____

_____ _____

Signature of Parent/Guardian Date

Appendix F

Name of checklist	Checklist authors & year	Age group	Checklist focus Aspects of pragmatics that are measured	Primary informant	Nature of information assessed	Published peer reviewed Papers
			(2) Asking, Giving, & Responding to information (e.g., *The student apologizes/accepts apologies appropriately*). (3) Nonverbal communication skills (e.g., *The student knows how someone is feeling based on nonverbal cues*)			
Socio-Pragmatic Skills Checklist for DHH Students	Cobb County School System: Author: Marietta (1997)	5–13 years	Wide range of broad skills divided into General conversational skills (e.g., *Provides relevant answers to questions*) and Non-verbal pragmatic skills (e.g., *Looks at speaker when conversing*)	Educators	Can provide a score or be used to identify broad areas of delay	Thagard, Hilsmier, and Easterbrooks (2011)
Children's Communication Checklist (CCC-2)	Bishop (1998)	5–17 years	Specific groups of items from the checklist are combined to give a pragmatic composite score. Subgroups are Inappropriate initiation, Coherence (e.g., *Uses terms like "he" or "it" without making it clear what he is talking about*) Stereotyped language (*e.g., Will suddenly change the topic of conversation*) Use of context, and Rapport.	Parents/caregivers and/or educators	Pragmatic composite score and subscores. Used to identify specific pragmatic profiles	Wolters, Knoors, Cillessen, and Verhoeven (2011) and Zaidman-Zait and Dotan (2017)
Group 2: Checklists completed by clinician/researcher or educator based on a videotaped interaction						
Communicative Intentions (CI) Range Checklist	Day (1986)	Preschool	Both educators and child's *Communicative Intentions* are coded and counted in six categories according to the type of turn/ utterance: Conversational device, Description, Performative, Request, Response, Statement	Educator/Clinician /Researcher observes 20 min videotaped interaction	Quantitative output for each communicative intention	Beattie & Kysela (1995) and Duncan (1999)
Pragmatic Protocol	Prutting and Kirchner (1987)	Any age	30 parameters representing a wide range of communication abilities, including Verbal (e.g., Topic initiation) Paralinguistic (e.g., Vocal intensity) and Nonverbal (e.g., body posture). Each parameter is rated as appropriate or inappropriate	Educator/Clinician/ Researcher observes 15 min videotaped interaction	Identifies any of these 30 pragmatic behaviors that are used inappropriately	Curtiss, Prutting, and Lowell (1979), Most et al. (2010), and Rodda, Beattie, Seabrook, and Gough (1997)

Name of checklist	Checklist authors & year	Age group	Checklist focus Aspects of pragmatics that are measured	Primary informant	Nature of information assessed	Published peer reviewed Papers
Group 1: Checklists that are completed by parents/guardians or educators						
The Pragmatic Profile of Everyday Communication Skills	Dewart and Summers (1997)	Level I: 0–4 years; Level II: 5–10 years	Items are organized in four sections: Section A: Communicative Functions (e.g., Greeting on arrival; *If a familiar person comes to your home, how does (child's name) usually react?*) Section B: Response to Communication Section C: Interaction and Conversation Section D: Contextual Variation	Parents/caregivers and/or educators in an interview with clinician	Descriptive /qualitative summary for each section	Lichtig et al. (2011) and Mouvet, Matthijs, Loots, Taverniers, and Van Herreweghe (2013)
Language Proficiency Profile-2	Bebko and Mckinnon (1993/1998)	3–14 years	61 items in checklist in five categories: Content, Form, Use, Cohesion and Reference. Items have a broad pragmatic interpretation (e.g., Cohesion refers to ways the chid moves the interaction forward, e.g., *Does the child volunteer new information about a topic that others have introduced in a conversation?*)	Completed by someone who knows child well	Provides a developmental assessment	Bebko and McKinnon (1993) and Bebko, Bell, Metcalfe-Haggert, and McKinnon (1998)
The Pragmatics Checklist	Developed from Simon (1984), adopted by Goberis et al. (2012)	2–7 years	6 categories of expressive communicative intentions are assessed: (1) States needs, (2) Gives commands, (3) Personal interactional (e.g., *Provides excuses or reasons*), (4) Wants explanations, (5) Shares knowledge, (6) Imagination (e.g., *Role plays with props*)	Parents/caregivers	Identifies specific areas of delay	Goberis et al. (2012) and Yoshinaga-Itano (2015)
Social Conversational Skills Rating Scale	Girolametto (1997)	12–36 months	10 Responsiveness Items (e.g., *In a conversation, my child stays on the same topic for two or more turns*) 15 assertiveness items (e.g., *My child starts conversations with me during familiar routines*) Parents and educators assess each item on a 5 Point Likert scale from never to always	Parents/caregivers and/or educators	Provides a score but individual item analysis can also identify strengths and challenges	Guerzoni et al. (2016) and Rinaldi, Baruffaldi, Burdo, and Caselli (2013)
CELF-4 Pragmatic Profile	CELF-4 (Semel, Wiig, & Secord, 2003; recently updated to CELF-5)	5–21 years	Includes 52 items rated in terms of frequency of occurrence (0–4) in three areas: (1) Rituals & Conversation (e.g., *The student asks appropriate questions during conversations and discussions*).	Parents/caregivers and/or educators	Criterion Score for age	Shoeib, Kaddah, El-Din, and Said (2016)

Pragmatic Assessment	Description	Age	Assessor	Advantages	Disadvantages	Reliability Validity Norms	Studies with DHH Children
Coded natural interactions							
The Pragmatic Protocol (Prutting and Kirchner[20])	Videotaped natural spontaneous communication between child and a communication partner. Verbal (eg, turn taking, contingency), paralinguistic (eg, prosody, fluency), and nonverbal (eg, facial expressions, physical contact) pragmatic behaviors (30 in all) are observed and coded as inappropriate or appropriate	Can be used with any age group	Professionals trained to apply the coding protocol	Authentic interaction is objectively observed and rated. Comprehensive with 30 specific pragmatic skills	Professionals need practice and training to apply the protocol. Time consuming. Norms for typically developing children cannot be easily applied	R: yes; V: yes; N: no	Most et al[4]; Rodda et al[26]
Communicative Intentions Range Checklist (Day[27])	During an interaction (live or videotaped) in a preschool setting, teacher's and child's communicative intentions are coded in 6 categories	3–5 y	Professionals trained to apply coding protocol	Codes both interactive partners. Authentic interaction in preschool setting	Aspects of pragmatics are limited to 6 categories. Time consuming	R: no; V: no; N: no	Beattie and Kysella[28]; Duncan[29]
Checklists							
The Pragmatic Profile of Everyday Communication Skills (Dewart and Summers [30])	Parents respond to questions about a range of pragmatic behaviors in these 4 areas: communicative functions, response to communication, interaction and conversation, and contextual variation	2 versions: 0–4 y and 5–10 y	Professional completes the checklist during an interview with a parent	Reflective assessment tool for parents. Interview process provide opportunity for clarification. Inclusive tool for children with or without pragmatic challenges	Time consuming Lack of norms for comparisons. Provides descriptive rather than quantitative assessment	R: no; V: no N: yes.	Lichtig et al[31]; Mouvet et al[32]
The Pragmatics Checklist (adapted from Simon[21]) by Goberis et al[10]	Parents to assess if children exhibit a range of communicative functions, including states needs, gives commands, personal interactional, wants explanations, shares knowledge, and uses imagination	2–7 y	Completed by a parent or caregiver	Focuses on purpose of pragmatic behaviors	Age range is limited. Some pragmatic skills are not included such as turn taking, nonverbal communication, contingency, etc.	R: no; V: yes; N: yes	Goberis et al[10]
Children's Communication Checklist (Bishop [33])	Groups of items from the checklist are combined to give a pragmatic composite score (eg, inappropriate initiation, coherence, stereotyped language, context, and rapport)	5–17 y	Completed by parent, caregiver or teacher	Well-designed checklist with reliability and validity data. Widely used by clinicians	Not solely focused on pragmatics. Screening tool rather than diagnostic. Identifies ASD and LI, may be less useful for DHH children. No version for children <5	R; yes; V: yes; N: yes	Zaidman-Zait and Dotan[34]
Coded structured interactions							
Referential Communication Tasks	Exchange of information between conversational partners separated by a visual barrier. Stimulus tasks such as selecting a shape from an array require the speaker to describe the target and listener to check understanding	3–21 y	Video recorded and analyzed by a professional	Provides insight into clarification strategies. Focuses on referential language	May not represent natural interaction. Assesses limited set of pragmatic skills. Research tool rather than practical clinical or educational assessment task	R: no; V: no; N: no	Ibertsson et al[35]; Jeanes et al[36]

ASD, autism spectrum disorder; LI, language impairment; N, norms; R, reliability; V, validity.

Appendix G

Item Analysis of the Language Use Inventory

Raw Scores	**C1**	**C2**	**C3**	**Percentage of Items Correct**
A: How your child uses gestures to ask for something	11	11	10	97%
B: How your child uses gestures to get you to notice something	1	2	2	83%
C: Types of words your child uses (21)	14	15	21	79%
D: Your child's requests for help (7)	6	7	7	95%
F: How your child uses words to get you to notice something (6)	2	5	5	67%
G: You child's questions and comments about things (9)	1	4	9	52%
H: Your child's questions and comments about themselves or other people (36)	6	17	25	44%
I: Your child's use of words in activities with others (14)	4	9	9	52%
J: Teasing and your child's sense of humor (14)	0	2	0	13%
K: Your child's interest in words and language (12)	3	7	6	44%
M: How your child adapts conversation to other people (15)	1	8	8	38%
N: How your child is building longer sentences and stories (36)	0	5	12	16%

Appendix H

Item Analysis of Pragmatics Checklist

	States Needs (I want…)	C1	C2	C3	Average
Q1	Makes polite requests	3	3	4	3.333333333
Q2	Makes Choices	2	3	4	3
Q3	Gives description of an object wanted	3	3	4	3.333333333
Q4	Expresses a specific personal need	3	4	3	3.333333333
Q5	Requests Help	3	4	4	3.666666667
	Gives Commands (Do as a I tell you…)				
Q6	Gives directions to play a game	1	4	1	2
Q7	Gives directions to make something	1	4	1	2
Q8	Changes the style of commands or requests depending on who the child is speaking to and what the child wants.	1	3	3	2.333333333
	Personal (Expresses Feelings…)				
Q9	Identifies feelings (I'm happy.)	1	3	1	1.666666667
Q10	Explains feelings (I'm happy because it's my birthday.)	1	4	1	2
Q11	Provides excuses or reasons	1	3	1	1
Q12	Offers an opinion with support	1	3	1	1
Q13	Complains	3	3	4	3.333333333
Q14	Blames others	1	3	4	2.666666667
Q15	Provides pertinent information on request (2 or more of the following: name, address, phone number, birthdate)	1	1	1	1
	Interactional (Me and you…)				
Q16	Interacts with others in a polite manner	3	3	3	3
Q17	Uses appropriate social rules such as greetings, farewells, thank you, getting attention	3	3	3	3
Q18	Attends to the speaker	3	3	3	3
Q19	Revises/Repairs an incomplete message	1	3	1	1.666666667
Q20	Introduces new topics in conversations appropriately (does not just start talking in the middle of a topic)	1	1	1	1
Q21	Maintains a conversation (able to keep it going)	1	1	3	1.666666667
Q22	Ends a conversation (doesn't just walk away)	1	1	1	1
Q23	Interjects appropriately into an already established conversation with others	1	1	1	1
Q24	Makes apologies or gives explanations of behavior	1	1	3	1.666666667
Q25	Requests clarification	1	1	3	1.666666667
Q26	States a problem	1	1	4	2
Q27	Criticizes others	1	1	4	2
Q28	Disagrees with others	2	3	4	3

Q29	Compliments others	1	1	3	1.666666667
Q30	Makes promises	1	1	1	1
	Wants Explanations (Tell me why…)				
Q31	Asks questions to get more information	1	3	4	2.666666667
Q32	Asks questions to systematically gather information (as in "Twenty Questions")	1	3	1	1.666666667
Q33	Asks questions because of curiosity	1	3	4	2.666666667
Q34	Asks questions to problem solve (What should I do...? How do I know...?)	1	1	3	1.666666667
Q35	Asks questions to make predictions (What will happen if...)	1	1	1	1
	Shares Knowledge and Imaginations (I've got something to tell you…)				
Q36	Role plays as/with different characters	3	4	3	3.333333333
Q37	Role plays with props (e.g., banana as a phone)	1	4	4	3
Q38	Provides a description of a situation which describes the main events	1	4	1	2
Q39	Correctly re-tells a story which has been told to him/her	1	4	3	2.5
Q40	Relates the content of a 4-6 frame picture story using correct events, and an end frame	1	1	3	1.666666667
Q41	Creates an original story with a beginning, several logical events, and an end	1	3	1	1.666666667
Q42	Explains the relationship between two objects, actions, or situations	1	3	1	1.666666667
Q43	Compares and contrasts qualities of two objects, actions, or situations	1	1	1	1
Q44	Tells a lie	1	3	1	1.666666667
Q45	Expresses humor/sarcasm	1	3	3	2.333333333