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Effects of Language Intervention versus Traditional Interpretation for a Deaf Preschool Child: A Pilot Study

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Abstract

The objective of this study was to determine the impact of combined language intervention approaches (i.e., interaction, modification of the message, and visual scaffolds) on a student's ability to provide correct responses and to appropriately participate in class activities. This study examined the impact of utilizing the collection of language intervention techniques in comparison to traditional interpreting with a four year old deaf child with a language delay who participated in a special education preschool classroom with sign language services. Utilizing a single-subject reversal methodology, the language facilitator providing such services alternated between traditional interpretation and a collection of research-based language intervention strategies. The language intervention incorporated interaction, modification of the message, and visual scaffolds to support language development, which are not typical of traditional sign language interpreting. Results indicate that the language intervention occasioned a higher number of correct responses and instances of appropriate interactions from the student during a daily interactive circle time in comparison to traditional interpreting. A functional relation was established between changes in correct responses and appropriate interactions and the introduction of the language intervention within three different points in time. While traditional interpretation was first implemented, the student was unable to respond or participate on any occasions. By the conclusion of the study, the data showed a steep upward trend, with Jeff nearly doubling his responses and participation from day three to day four of the second intervention period. Despite this, we conclude that the child did not have sufficient expressive language for him to effectively participate in an interpreted classroom. It is likely that even the most intensive language intervention provided by a single individual will not provide the support needed to facilitate full and natural language acquisition. Rather, an environment in which the child has multiple opportunities for age-appropriate interaction, socialization, and language models may be necessary to foster more natural language acquisition.

Keywords: Deaf; Hearing loss; Language delay; Language intervention; Inclusion; Cochlear implant; Interpreting; Educational interpreting; American sign language

Effects of Language Intervention vs. Traditional Interpretation for a Deaf Preschool Child

For most children, language acquisition is typically a natural and effortless process [1-3], as they can hear spoken language in various contexts from the day they are born. Even before children mimic or produce original constructions, the amount and complexity of the language they are able comprehend continuously increases [3,4]. Constant exposure to, and interaction through authentic language in various situations ultimately contributes to children's acquisition of the underlying structures of English [5]. Children born with significant hearing losses, however, encounter barriers to acquiring spoken language through an auditory means, and extreme delays in the development of spoken language are often inevitable [6,7].

The Perpetuation of Language Delays

There are reasons why language delays among children with hearing loss may be perpetuated. While there are various communication and educational philosophies available to deaf children, parents' earliest medical and early intervention consultants often promote an oral/auditory approach. Over 30,000 children to date have received at least one cochlear implant (National Institute of Health [NIH], 2009), a small device that is surgically implanted into the cochlea in attempt to bypass the malfunctioning ear parts and provide sound to children who are profoundly deaf. The actual benefits that deaf children obtain through the use of cochlear implants are significantly varied [8]. Most are assured to obtain sound stimulation, but developing appropriate listening and speaking skills through the implant requires extensive post-operational training, as well as parental and expert professional support [5,9,10].

Professionals often discourage the use of sign language, believing that spoken language and listening must be utilized in order for the cochlear implant user to be successful [10,11]. However, if children experience barriers to accessing spoken English through their cochlear implants and they are simultaneously not exposed to any other communication approach, language development is likely to be significantly delayed [12]. Despite the variety of known and unknown factors that influence the language development of cochlear implant recipients, parents may assume or believe that their child's spoken language will eventually reach that of their hearing peers [13]. Because deafness is a low incidence disability which is often not fully understood, severe language delays may be left unidentified and unaddressed by parents and the educational team.

The factors that contribute positively or negatively to the language development of children who have cochlear implants include access to post-implant support and services, the effectiveness of aural training, mechanical failure, presence of additional physical issues, cognitive ability, student motivation, the onset of intervention, and other unknown variables [6,14]. Even those children who have made great strides in their spoken language development following cochlear implantation often do not develop age appropriate language skills by the time s/he reaches school age [15,16]. While the extent of these delays varies greatly, there remain cases in which children who receive cochlear implants do not benefit enough to continue utilizing them in any capacity [17]. Despite early intervention approaches for children with cochlear implants, the majority of children with significant hearing loss are still arriving to school with language delays [16,18].

Educational Placement Options for Deaf Children

Providing children with educational accommodations and services in the general education setting is often viewed as the least restrictive environment for children with disabilities [17]. Yet, this can also be the most limiting setting with respect to the unique language development needs of children with hearing loss [18]. While a sign language interpreter is one possible service for a student with hearing loss [17], this may do little for a child lacking an adequate sign language foundation.

Specialized schools are often viewed as the most restrictive educational environment [19]. For signing deaf children however, specialized schools provide unlimited opportunities to experience direct communication with teachers, staff, and peers. Nearly all instruction, activities, and conversation take place through a visually accessible mode, which is especially advantageous for those who have difficulty hearing language [7,16,20,21]. There are different educational placements available to deaf children, but the decision is ultimately that of the student's IEP team.

Interpreter Services in the School Setting

When a signing deaf child is placed in the general education setting, a qualified and/or certified sign language interpreter may be determined essential for access to communication and instruction. Nationally certified interpreters are expected to follow a set of ethical guidelines - the Code of Professional Conduct (CPC) - established by the Registry of Interpreters for the Deaf (RID) in conjunction with the National Association of the Deaf (NAD). These guidelines are designed to protect adult consumers' privacy and guarantee that professional services are rendered. Because of their unique psychology and educational needs, some of these guidelines may not be in the best interest of developing children. It has been proposed that a type of language intervention, rather than impartial interpretation may be more appropriate [21]. Every opportunity for early language development is critical for young children with significant hearing losses. Therefore, it is crucial that a language intervention be initiated as soon as possible [7,22].

In attempt to address some of the unique circumstances that surface in educational settings, Schick (2007) established a set of professional guidelines specifically designed for educational interpreters, and a correlating assessment utilized to determine the qualifications of educational interpreters. This is known as the Educational Interpreters Performance Assessment [21]. In turn, the guidelines established are referred to as the EIPA Guidelines. These Guidelines more specifically respond to the unique situations encountered by interpreters in the educational setting.

There are a number of differences between the CPC and the EIPA Guidelines. The CPC states that interpreters should maintain confidentiality of all communication, refrain from counsel, advice, or personal opinion [23], while the EIPA Guidelines recognize that interpreters can "provide valuable contributions about how the student is functioning with an interpreter and can answer questions and address concerns related to a student's communication needs" [21]. The CPC states that interpreters should render the message in its entirety, conveying the spirit and meaning of the speaker and approach all consumers with professional demeanor at all times, while the EIPA Guidelines suggest adapting interactions to the maturity and developmental level of the student. The CPC advises against interpreters performing dual roles, while the EIPA Guidelines recognize that the interpreter may be the best person to provide supplemental instruction. The EIPA Guidelines take into account the unique psychology of a child in the educational interpreting process.

Interpreting for Children with Language Delays

According to the EIPA Guidelines, using an interpreter under any circumstances requires a "certain cognitive sophistication" [21]. Students who are too young in age or development may not be able to comprehend the concept of an interpreter, nor how to appropriately take responsibility for learning. In this situation, a person who can interact and communicate directly with the student may be more beneficial [16,21,22,24]. Yet, there is very little research to determine which situations warrant an interpreter, and which require an alternate type of language intervention, or exactly what such language intervention should entail [21,25]. Because of the varied situations children with hearing loss experience prior to arriving at school, the specific language and communication issues of each child are unique. Regardless, accessible and meaningful communication, including interaction in the child's natural language modality, must occur in order to allow for language development [12,25].

Language Intervention Approaches

When natural language acquisition cannot or does not occur, there are a variety of language intervention strategies that may be implemented within the home or school environment. Due to the limited amount of research available regarding specific language intervention strategies for language delayed deaf students, the strategies utilized within this language intervention are based largely on strategies that have proven successful for hearing students, and can be categorized as interaction with the student, modification of the message, and the use of visual scaffolds.

Interaction with the Student

Natural language acquisition can occur when there is scaffolded communication between linguistically mature language models and a child. Whereas traditional interpreters refrain from initiating interaction with the client or interjecting their own thoughts and statements during an assignment [4,26,27], children who are language delayed may show significant linguistic benefit if the signing adult takes on a more involved role [21]. For example, modeling and role-play have both proven to be very effective approaches with deaf children [6] whereby the adult first demonstrates the expected response to a given situation or question.

Providing positive feedback to the language attempts of children who have language delays is also essential to reinforce and encourage continued use of the language [28-30]. While it is typically the responsibility of the teacher to provide praise, criticism, and/or rewards to all students, positive reinforcement is most successful when it is immediate [31,32]. This presents an issue when considering that a traditional interpreter always remains at least several seconds behind when signing the spoken feedback of the teacher.

Lastly, when children have errors in language beyond the age in which they are developmentally appropriate, suggested interaction guidelines include using expansion, expatiation, and revision techniques [30]. Expansion describes elaboration of the child's attempted message by the language model. Expatiation involves adding details to a child's utterance for clarity. Revision refers to the correction of an erroneous utterance by the language model [30].

The primary expectation of traditional interpretation is to unobtrusively interpret from spoken English into sign language and vice-versa. Typically, encouraging language use of the client is not part of the interpreter's role, and correcting language is not appropriate. For deaf students, however, the signing adult may be the only person qualified to provide the direct language feedback necessary.

Modification of the Message

Children make sense of new information by connecting it with information they already know [6,14]. An elementary teacher adjusts her language to the level whereby most concepts are readily understood by the class. Yet, the classroom discourse may still be at a linguistically more mature level than a deaf student with a language delay can access [16]. For such a child, impartial interpretation may create problems for further language development. The child may not know the meaning of signs used by the interpreter. In fact, s/he may not even recognize iconic signs (i.e., signs that are produced to physically resemble objects) as one would assume [33]. Input plus one is a language technique whereby the adult communicates at a level just beyond where the student is currently functioning [34], making the language more accessible and providing opportunity for further development. In cases of extreme delay, the signer may use more transparent language such as gesture, facial expressions, and classifiers to support understanding while slowly integrating new signs [35].

Rhetorical questions in English, in which a question is asked to make a point with no expectation of an actual response [36], may be another reason to modify the message, for these questions can be difficult for children to understand [37]. In a classroom where rhetorical questions are being used, one approach is to rephrase a speaker's rhetorical question into a direct statement.

The Use of Visual Scaffolds

Research has indicated that incorporating visual prompts and pictorial cues is successful for both hearing and deaf individuals with language delays [38-42]. A signer who incorporates greater use of visual scaffolds when communicating with a language delayed child can further promote development. When certain signs and words are beyond a student's ability to make sense of within an interpreted message, pictures and props may be able to accurately express the desired concept. Additionally, spatial relations are typically conveyed in ASL from the perspective of the signer, which requires the viewer to mentally rotate these constructions to perceive accurately. Children learning American Sign Language (ASL), however, develop the ability

for mental rotation later than the ability to understand constructions that do not require this reversal [43]. A signer who uses visual scaffolds in conjunction with the signed information can avoid the use of mental rotation with a linguistically immature student.

For deaf children who are unable to communicate orally and have limited sign language skills, a general education classroom can be even more restrictive to development due to the difficulty of creating an environment conducive to language acquisition [20]. A child may struggle to develop language through the use of a traditional interpreter. Unfortunately, little research is available to guide the accommodations of deaf children who are language delayed and educated within the general education classroom. The components utilized in this specific intervention by the language facilitator can be categorized as interaction, modification of the message, and visual scaffolds. This study investigated the use of language intervention strategies in comparison to traditional interpretation for a Deaf child within a preschool classroom. The research question for the current study is as follows: What is the impact of combined language intervention approaches (i.e., interaction, modification of the message, and visual scaffolds) on the student's ability to provide correct responses and to appropriately participate in class activities?

Method

Participant and setting

The student participant in this study was a four year old, profoundly deaf, Caucasian male. The student, referred to as Jeff, had received a single cochlear implant three years before the implementation of this study and prior to two years of age. Because hearing loss could not be ruled out as the contributor to such a severe language delay, standardized assessment results were not available at this time. Despite monthly therapy sessions provided by a local children's speech center, Jeff had yet to show any type of observed response to sound (e.g., does not turn head or startle to loud noises), intelligible voiced utterances or spontaneously signed utterances at the start of the study. His classroom and itinerant deaf education teachers reported that he did not have any spontaneous or imitated spoken language skills, and therefore could not communicate even the most basic of ideas. As is the case with other deaf children who have failed to develop spoken communication and listening skills, Jeff exhibited a severe language delay and was not participating meaningfully in the majority of classroom activities. Because of this delay, it was the recommendation of the deaf education teacher that Jeff be exposed to sign language through inclusion deaf education services for 45 minutes daily.

Jeff was placed in a self-contained special education preschool classroom. This classroom served approximately twelve children under the age of six with diagnosed or suspected disabilities. A certified preschool teacher led the class each day, utilizing a variety of methods and materials that targeted the Tennessee State Standards. Three full-time teaching assistants also facilitated small group learning and helped with the overall implementation of daily procedures. Jeff's parents desired that he be educated by his home school district in a preschool classroom for children of various disabilities, with support services from an itinerant deaf education teacher. Because most students' disabilities were physical or mild cognitive or developmental delay, the classroom was conducted similarly to the general education preschool classroom. The classroom was part of a reverse mainstreaming program, meaning that two students from a general

education preschool class joined the program daily so that students had opportunities to interact with typical peers.

During morning circle time, the students (approximately eight to twelve, depending on student attendance) each sat on one pre-designated square on the large classroom rug. This morning circle time (large group lesson) served as the setting for the study, during which a daily procedures were followed routinely. Each day, either the teacher or one of two teacher's assistants sat facing the students in a small chair and led the circle time lesson. To the leader's left was an easel that displayed a calendar including the month, and printed number cards indicating the date for each day that had already passed. Occasionally, additional materials were placed on the chalk rest, such as a book the class was reading at that time. To the leader's right was a radio used to play the morning music.

The signer who provided the language intervention was functioning as a language facilitator for this particular child, in accordance with his academic and functional goals. She was at the time, a deaf education graduate student and teacher intern. She had completed the majority of her coursework, had obtained an interim teaching license, and was participating in a year-long internship program under the direct supervision of a certified deaf education mentor teacher. She had prior experience in educational interpreting, including a bachelor's degree in American Sign Language with concentrations in both deaf culture and sign language interpreting. She had been working with deaf children in varying capacities for approximately six years prior to implementing the intervention.

For the purposes of this study, the interventionist who provided sign language/deaf education services is referred to as the language facilitator. While interpreting the classroom discourse was certainly a component of the intervention, the additional goals of facilitating language development through significant modification was clearly beyond the scope of what an interpreter would typically be expected and qualified to do. Each day, the language facilitator was positioned seated on the floor to the left of the group leader (teacher or teaching assistant), but not completely on the other side of the easel. Most students were not consistently seated, but Jeff always sat to his right of all other students, directly in front of the language facilitator.

Materials

The language facilitator utilized a set of materials specifically created and collected for the purpose of facilitating language development and understanding from Jeff. These materials included a number chart showing numbers 1-20, a "year-at-a-glance" chart with small calendars of each month in the year, a collection of different foam shapes, colored pictures indicating concepts and phrases: "good morning," "joy," "stand-up," "snack," "peanut butter," "head," "shirt," "pants," "socks," "shoes," and "underwear." Also used was a set of laminated alphabet cards, each showing the printed letter and depicting the appropriate hand production of the fingerspelled sign. A turkey Beanie Baby was used during the signing of a Thanksgiving story. Large paintings indicating the four different seasons were used each morning. These materials were created by the language facilitator specifically for use with the deaf child who participated in the study. While it is quite possible that these materials were visibly accessed and utilized by students other than the participant in the study, no data was collected regarding this possibility.

Variables

The independent variable in this study was the language facilitator's use of a specific set of language intervention techniques, including interaction, modification, and/or visual scaffolds, (Table 1) while working with a deaf child placed within a classroom of hearing children, in comparison to traditional classroom interpretation. The dependent variable was the amount of instances of appropriate interaction that the single deaf student, Jeff, demonstrated during a morning circle time routine.

Instructional Components	Instructional Procedures
Interaction	communication directly with the language facilitator (no indication of original speakers)
	modeling of correct response/appropriate participation
	immediate feedback and reinforcement for correct language usage and participation
	correction techniques – expansion, expiation, and revision
	supporting student language attempts
Modification of the Message	simplification of the signed vocabulary, including gesture
	deletion of extraneous information
	modification of content presented
	rephrasing of (English) rhetorical questions into simple statements
Utilization of Non-Manual Visual Supports	Using pre-made pictorial cues to clarify the message or prompt
	Utilizing classroom supports to avoid mental sign language rotation, which is problematic for learners with emerging sign language skills [43]

Table 1: Components of the intervention.

For the purpose of the outcome variables being measured in this study, appropriate interaction encompassed instances of the student's meaningful responses and appropriate participation. A response indicated any instance in which Jeff answered a question in a way that demonstrated understanding of the content and question being asked. Participation was counted as any instance in which Jeff appropriately followed directions, completed a task, participated in a routine, or offered an echo response that was identical to the teacher's prompt, such as when the teacher modeled each letter of the alphabet to facilitate the students' responses.

Data Collection

All data for this intervention were collected during circle time each morning, which primarily consisted of the same daily activities. "Circle time" began between 8:15 – 8:30 each morning and lasted an average of 26 minutes. Event recording was used to track meaningful responses and appropriate participation. A meaningful response was defined as the student responding correctly to a question (either directed to him only, or towards the group for a collective response). Examples of meaningful responses include the student signing "December" in response to the teacher asking the whole class what the current month of the year is, or the student signing "square" in response to being

shown a square and asked "What's this?" As a variable, participation was measured when it indicated language comprehension. Examples of appropriate participation include: reaching out for a handshake, standing up, clapping or dancing along, or any other behavior that demonstrated he understood the expectations.

Design

A single-subject withdrawal/reversal (ABAB) design [44] was utilized in order to document effects of the intervention and establish a functional relation between variables. During baseline, the language facilitator (functioning as an interpreter) presented information to Jeff in a traditional interpreting manner. She only signed what was communicated verbally in the classroom and did not incorporate any additional language intervention strategies. A minimum of three school days of data were collected or until the data were stable. After the data were considered stabled during baseline, the language facilitator introduced the intervention and signed what was communicated verbally in the classroom, along with additional language intervention strategies. The intervention phase continued for a minimum of three days or until Jeff reached criteria. Criteria were defined as an ascending trend (therapeutic direction) above baseline levels in Jeff's total occurrence of correct responses and appropriate participation was observed. After reaching criteria, the language facilitator no longer incorporated the additional language intervention strategies; she only signed what was communicated verbally in the classroom. The withdrawal phase continued for a minimum of three school days or until Jeff's performance reversed and approached near baseline level. Afterwards, the language facilitator re-introduced the supplemental language intervention strategies when signing.

Procedures

Baseline

During traditional interpretation/baseline, the language facilitator (functioning as an interpreter) sat directly in front of Jeff, facing him and interpreted in a traditional manner. Anything that was stated aloud by the classroom teacher, assistants, students, parents, or anyone who could be heard was interpreted. Sign choice matched the original spoken message to the best of the interpreter's ability, with technical words being fingerspelled if no sign was available. During traditional interpreting/baseline, conversations amongst adults in the classroom or via telephone were interpreted to Jeff as they occurred, even if the information was not instructional in nature or pertaining to the students. During interpretation, she did not prompt Jeff to pay attention or answer questions if it was his turn, except when interpreting prompts of the teacher. No reinforcement was given to Jeff directly from the language facilitator (functioning as an interpreter). When the teacher praised other students or the entire class however, this was interpreted, regardless of Jeff's behavior. Every utterance was signed using the "signer's perspective," regardless of whether or not the idea was abstract. No gesture or simplification of the message was intentionally implemented, other than what the language facilitator designated as appropriate traditional interpretation.

Language intervention

During intervention, the instructional components of the language intervention were categorized into interaction, modification, visual scaffolds, or a combination.

Interaction with the student

When it was determined to the language facilitator that Jeff did not comprehend the directions of a specific task, the language facilitator modeled the appropriate behavior. Jeff always had an opportunity to respond independently first as a way of monitoring his comprehension. An example included taking Jeff's hand for a handshake several times before it was actually his turn to shake the teacher's hand during the opening song. Another example of modeling is when the language facilitator actually stood-up as the student was instructed to do the same. Additionally, the language facilitator walked to Jeff's name card and signed each letter as he was expected to do. Modeling of particular situations subsided as Jeff began to understand the expectations for regularly occurring events.

When the situation allowed, every attempt was made to praise Jeff for correct language usage and appropriate behavior as soon as possible. As Jeff progressed, not every single correct response was praised individually. Reinforcement was provided in the form of a high-five, the signed equivalent for applause, or, for exceptional performance, a small candy.

In a situation where Jeff signed incompletely or erroneously, the language facilitator attempted to utilize correction techniques to provide feedback. Corrections were provided when the language facilitator determined Jeff would comprehend and benefit. For example, expansion was utilized when Jeff already understood the correct subject and object and was missing the verb. As he signed "I, candy," the language facilitator demonstrated "candy I want," which is the appropriate ASL utterance utilizing the topic-comment grammatical structure of American Sign Language. Expatiation, or adding details to an utterance for clarity, was provided when Jeff signed "food" as he glanced at crackers. The language facilitator demonstrated the more specific sign (cracker) as she handed him one. Revision, or correcting an erroneous utterance, was provided each and every time Jeff needed assistance with the physical construction of a sign.

Modification of the message

During the intervention, the language facilitator primarily conveyed the concept currently being discussed. The teacher's discourse was the basis for what was signed. When peer comments were determined relevant to the education and language development of Jeff, they were signed without indication of the speaker. There was no attempt to match the language characteristics of the speakers. For example, a preschool student stuttered and took frequent pauses to tell a story about the snow. The language facilitator instead pointed outside, signed "snow" several times, and gestured to indicate being cold and playing in snow, thus providing direct instruction through pairing vocabulary with its referent.

Based on the language facilitator's observations, signs were chosen based on what would most likely or readily be understood by Jeff, while attempting to convey as much of the original message as possible. Examples include signing "rain" instead of "storm," "happy" instead of "excited," pointing around the room instead of signing "school."

Anything determined by the language facilitator to be irrelevant to Jeff or too linguistically complex was omitted from interpretation. Examples include teacher/staff conversations, one-sided telephone conversations, and praise directed to the class for a behavior in which Jeff did not perform.

The language facilitator also conveyed any rhetorical questions as direct (often simplified) statements that indicated the same intent. An example includes the teacher stating, "Do we need to do a lesson about telling stories?" (in reference to several students' very obvious exaggerations about the type of pets they have at home). Here the language facilitator used, "lie no-no" (gesture finger shake). Another instance was the teacher asking "Is it summertime?" and the language facilitator stated, "outside (pointed out window) cold." Since this rhetorical was used several times by the instructor, the language facilitator was eventually able to advance to signing "now cold winter."

Utilization of visual scaffolds

During each of the three morning songs, specific picture cues were used to prompt Jeff to sign along as well as reinforce the meaning of vocabulary. Examples include a picture of a boy waking up and stretching his arms for the term "good morning", a smiling face for the term "joy", alphabet cards indicating the printed letter with a picture of the corresponding sign, and a set of foam shapes.

Any signing that would typically require Jeff to mentally rotate the construction to accurately comprehend the message was signed from Jeff's perspective, and supported by visual scaffolds. This technique was primarily used when describing shapes, numbers, or referents in a story. For example, the number 24 (referring to the date) was signed from the language facilitator's right to left, allowing Jeff's perspective to match the number on the classroom calendar.

Combination of approaches

In several instances, the language facilitator spent extra time focused on one particular concept, and held additional concepts to be worked on at a later time. One example includes Jeff pointing to number magnets behind the language facilitator and attempting to sign "1". Instead of continuing with the concept the class was focused on, the language facilitator opted to use the opportunity to encourage language. She signed, "yes, 1, 2, 3, (referring to the scattered arrangement of the magnets on the door) number, 1, 2, 3," at which point Jeff excitedly signed, "1, 2, 3, number." After praising Jeff, the language facilitator attempted to return to conveying the class-focused concepts as appropriate. This serves as an example of interacting with Jeff, modifying the message, and using visual scaffolds.

Withdrawal of Language Intervention

After Jeff's total occurrence of correct responses and appropriate responses were observed trending above baseline levels, the interpreter returned to traditional interpretation with no additional language intervention strategies, similar to the baseline phase. This phase continued until Jeff's performance approached baseline levels.

Reimplementation of language intervention

During this phase, the interpreter included additional language intervention strategies when signing, similar to the initial intervention phase.

Social Validity

In order to learn the opinions of other professionals who had the opportunity to witness the progress of Jeff during this study, surveys were distributed to his teacher, three teaching assistants, and the deaf education teacher upon completion of the study and the school year. It must be noted that only one of the four people who provided social validity findings was fluent in sign language and able to fully understand the communication of the child. Because they worked closely with this student, they were qualified to provide opinions regarding his engagement and attitude. Opinions regarding his language usage, however, must be considered critically as most of them had little to no knowledge of American Sign Language and its usage. The four professionals completed a six-item survey regarding Jeff's engagement and language use during the intervention. Questions addressed the student's language use, participation, and behavior on the days that the intervention took place in comparison to days that traditional interpretation was provided. Professionals responded to a 5-point Likert scale with 1 defined as strongly disagree, 2 defined as somewhat disagree, 3 defined as neither agree nor disagree, 4 defined as somewhat agree, and 5 defined as strongly agree.

Inter-Observer and Procedural Reliability

The lead researcher recorded each time that Jeff responded correctly or participated appropriately on an observation data form. Data were separated by date, with each form being dated and having two separate areas for tallying occurrences (responses and participation). On 10 of the 13 observation days (77%), a certified teacher of the deaf, fluent in American Sign Language with several years of experience working with deaf children of various ages, also was present to observe the morning activity. She completed the observation form indicating how often she observed Jeff responding correctly or participating appropriately. There was a 93% agreement rate in terms of the total amount of instances each person tallied. While the lead researcher noted which instances were counted as an occurrence, the deaf education teacher did not, thus creating the possibility that different behaviors were actually seen. When the number of recorded instances differed, the researcher used the average of the two in the actual analysis.

For procedural reliability, the certified deaf education teacher observed the interpreter to ensure the intervention was being implemented as described. During baseline and withdrawal phases, the interpreter did not incorporate supplemental language intervention strategies. On days 4, 10, and 11 during the intervention phases, the teacher rated the language facilitator's ability to perform the language intervention approaches. Fourteen questions were rated on a scale from 1-5, 1 indicating at no opportunities and 5 indicating at every opportunity. Questions addressed the language facilitator's correct and consistent implementation of interventions being utilized. The result for all domains was 5, except for information being carefully deleted which was 4.33 on average. The percentage of intervention fidelity was 99.02%.

Results

As indicated in Figure 1, the amount of correct responses and appropriate participation instances were substantially higher during the intervention periods of the project. Prior to intervention, Jeff was not able to correctly respond or participate appropriately even one time. After three days of traditional interpreting/baseline testing, the intervention was utilized and it immediately made a difference in his engagement. During days 4-6 of the study (the first phase of the intervention), 44, 46, and 50 instances were documented, respectively. For example, Jeff was able to identify three shapes and two colors using the correct sign when requested to do so by the teacher. When supported by visual scaffolds, Jeff was able to "sing along" with the class

by correctly using five signs. After day 6, the intervention was withdrawn for three days and the language facilitator returned to traditional interpretation, the same strategy that was utilized during baseline, during which, Jeff's responses returned to 0 correct responses and 0 instances of appropriate participation. After the second three-day session of "traditional interpretation," the intervention was implemented again for four final days. While the amount of his responses and participation initially began at near baseline levels, a substantial increase did again occur. The final four-day session of the intervention solicited 4, 18, 85, and 152 total instances of correct responses and appropriate behavior. Examples include Jeff being able to independently identify the current month on four different occasions, and using correct signs 66 times when singing (signing) along with the class. By the conclusion of the study, the data showed a steep upward trend, with Jeff nearly doubling his responses and participation from day three to day four of the second intervention period.

Figure 1: Total number of occurrences of correct responses and appropriate participations across phases.

Jeff continued to progress in the instances of correct language usage and appropriate behavior during both phases of intervention. The amount of gains made during the second intervention period far exceeded those in the first intervention, indicating continual improvement over time. At the same time, Jeff was unable to participate in the activities in any meaningful way during phases in which traditional interpretation with no language intervention was utilized.

The results of the social validity survey indicated that teachers and other staff members who worked with this child felt that he did use more correct language and was more engaged in activities on days he experienced the language intervention, even after the specific intervention had been completed for that day. Survey items and results can are listed in Table 2.

Items	Average
The student seemed to be more engaged during "circle time" during the intervention.	5
The student was more engaged in later activities on days of the intervention.	5
The student used more correct language in other activities on days of the intervention.	5
The student seemed to use more appropriate behavior on days that the intervention took place.	5
I would recommend that this child continue receiving this particular language intervention.	5
I would recommend this intervention for other deaf children who have language delays.	5

Table 2: Social Validity Results. Note: Average responses of one deaf education teacher, one preschool teacher, and three teacher assistants on a five-point Likert scale with 1 defined as strongly disagree and 5 defined as strongly agree.

Discussion

The purpose of this study was to evaluate the effects of language intervention that included interaction with the student, modification of the message, and visual scaffolds to facilitate appropriate responses and participation of a deaf preschool student. Jeff, due to a language delay, appeared to be disconnected from the classroom activity at the start of the study. Prior to the intervention, Jeff would sit on the floor and seem to have no understanding of the expectations associated with "circle time." He would often look around the classroom and stare with an empty gaze. Even when an interpreter was provided, the language being conveyed seemed to be meaningless to him. Jeff did not respond to the teacher (through interpreted communication), nor attempt to respond directly to the interpreter as she signed. The interpretation showed no indication of benefit for Jeff.

A functional relation was established between changes in correct responses and appropriate interactions and the introduction of the language intervention within three different points in time [45]. Almost immediately after implementing the sign language intervention, Jeff began to show progress. His demeanor changed, and he began to show interest in the classroom and learning. He began attempting to respond to questions, follow directions, and participate in classroom activities. Jeff's excitement grew as he started to understand communication and yearn for more knowledge. Along with a clear numerical increase in participation and responses during the intervention, Jeff exhibited less frustration in class.

Placing this student with a fluent interpreter may have provided him with visual access to the spoken language of the classroom, but it was likely too far above his current language ability (i.e., his stage of development) for him to extract meaning [6,14]. Although interpreters can help to bridge language gaps by presenting the message at the language level of the child [16,21,23], there are few guidelines for how to handle severe language delays when even a modified interpretation is beyond the student.

Interpreting for children can be complicated because an interpreter who is impartial and effective at interpreting information may not be the most effective at fostering learning [16,21]. Interpreters may feel ethically obligated to interpret all classroom discourse in accordance with their training and the Code of Professional Conduct [46]. While the EIPA Guidelines acknowledge that children who are uniquely language delayed due to lack of exposure may need something more interactive than interpreting, specialized procedures have not yet been developed [21]. In this study, interpretation did not suffice. During intervention, language was modified and provided at a level that was
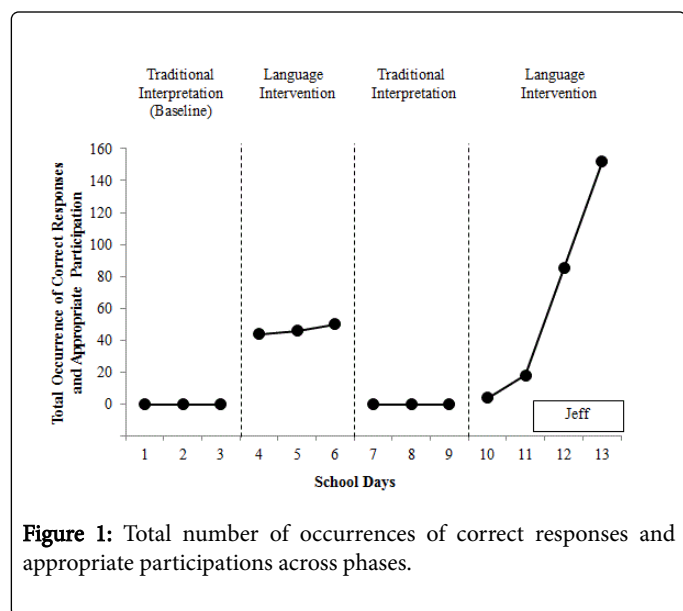
slightly above Jeff's current language level [6,14]. Interaction techniques and visual supports were also used during the intervention in ways that are not possible during interpretation. These techniques led to increased language usage and appropriate participation within the preschool classroom. As authentic interaction and scaffolding have proven critical in language development for hearing children [27-30,38-42], it is likely that these components contributed to the success that Jeff experienced in this situation.

Educational Implications

The need for intensive language intervention may not be addressed or even realized by the IEP team. IEP team members within the public school may have no knowledge of the student's use and understanding of language, nor any experience with how to acquire that information [47]. Yet, severe language delays must be identified and addressed as quickly as possible since most classroom learning hinges on being able to communicate concepts and ideas through language.

Assessing a deaf child's expressive and receptive language can be complicated, especially considering that most professionals in the public school are unlikely to know sign language [47]. Despite not having educator training or licensure, the educational interpreter can be quite knowledgeable about communication and language issues of the student [21]. In fact, some educational interpreters have been known to informally assess a deaf child's language needs and provide language supports within the classroom [48]. Since interpreters are often viewed as aides or assistants, rather than equally contributing IEP team members [49], they may not feel they are in a position to share such information or even know how to participate [50].

IDEA does recognize the educational interpreter as a valid and participating member of the student's IEP team [19]. As such, an interpreter may be the person who can provide valuable information regarding the student's expressive and receptive language or engage with other team members in problem solving difficulties [21,48]. It may be decided, for example, that a language intervention should be implemented in the classroom. The interpreter may be instrumental in designing the intervention, implementing it, and monitoring progress. By having direct access to the child's language input and output and by being a fluent sign language user, the interpreter is able to participate in the process in ways other members cannot.

The intervention in the current study was critical in providing meaningful access to language when interpretation was clearly pointless. In some cases, however, even the most intensive language intervention may not provide the support needed to facilitate full and natural language acquisition. An environment in which the child has multiple opportunities for age-appropriate interaction, socialization, and language models may be necessary to foster more natural language acquisition [20]. One must consider the potential results of the student in this study had he been provided with multiple signing models and peers, and multiple opportunities for interaction using sign language. It may be necessary for the educational team to discuss other educational placements (e.g., center based program for the deaf, residential school for the deaf) that could be more conducive to language development than an inclusive, interpreted setting.

Unfortunately, the situation described in this study is not an isolated occurrence. Deaf children are often placed in a general education or multi-categorical special education classroom within the local school district in attempt to provide education in the "Least Restrictive Environment" [12]. Additionally, the low-incidence rate of deafness means that specialized programs for the deaf are not readily available in every location. There are certainly challenging variables, but the language delay of a deaf child is likely to persist without specialized remediation. It is vital that the educational team, including the educational interpreter, is able to identify students who are language delayed who could benefit from alternative language interventions or an alternate setting.

Limitations and Future Directions

It was the intent of the researcher to determine the effects of a language intervention on both the responses and instances of participation for one specific child with a severe language delay. While data indicated improvement in both domains, that of participation was significantly higher. The specific situation in which the language intervention and data collection were implemented must be considered. For purposes of consistency, data were collected during circle time daily. The context of this activity largely focused on class participation and group responses, with significantly less instances in which a direct individual response from Jeff was expected. Perhaps data taken at a time in which more conversational opportunities existed would have allowed for more of a balance between participation and response opportunities.

Furthermore, while the procedures implemented during circle time each day were quite routine and consistent, it cannot be ignored that different days likely had different amounts of opportunities for responses and participation. Having had calculated these total opportunities for responses or participation could allow for alternate calculations that would have provided a more sufficient representation of his rate of progress. Additionally, having collected specific levels of academic, cognitive, and language performance prior to and upon completion of the study could have provided additional information regarding the effects of the intervention. As is such, it is difficult to untangle some of the findings in the current study.

Even though the results of this study are revealing, only one student was involved. We cannot speculate that other deaf children with language delays would benefit as much from the language intervention. Future research should investigate a continuum of possible language interventions and/or interpretation modifications to be utilized in the general education or multi-categorical special education classroom with deaf children having varying degrees of delayed language. A comparison of development could also be made by setting, where for example, the student is educated in a signing environment versus a general education classroom with language support.

Conclusion

A deaf student with a language delay was placed in a special education preschool classroom designed for hearing children with developmental delays. He received sign language services for 45 minutes daily, as per his IEP. The language facilitator alternated phases of traditional interpretation and language intervention techniques. Data indicated that Jeff was unable to participate during interpretation, yet had significantly increased participation and responses on the days in which intervention was utilized. A continuum of possible interventions, including alternate placements, must be considered by a knowledgeable IEP team to promote language development for deaf children exhibiting language delays.

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