Appendix 5–C. *continued*

Probable next targets:

As some of our first set of targets move from evoking and early stabilization, more targets can be added:

1. "e" as in bed
2. /l/ once /j/ is stable
3. Step three consonants:
   a. /g/ phonetic level by analogy from /b/ and /d/
   b. /r/ by contrast acoustically to /l/ and /j/
   c. ch
   d. Stop /k/ in contrast to unvoiced stops p and t

Wait on stressed "ir" and unstressed "er" until /r/ is appropriately developed.

CHAPTER 6

Language Assessment of Children With Hearing Loss

Hannah Eskridge and Kathryn Wilson

KEY POINTS

- The types of formal and informal measures used will vary depending on a child's age, stage of development, purpose of assessment, and presence or absence of additional learning challenges.
- Detailed working knowledge of typical language development, components of language assessment, and a variety of approaches are necessary to effectively assess children with hearing loss, interpret results, and develop intervention plans.
- Selection and utilization of appropriate strategies and techniques for children with hearing loss is an important factor in conducting effective language assessment.

INTRODUCTION

Assessment of language and vocabulary is one of the most basic and essential services provided to children with hearing loss and their families. The impact of hearing loss on language development and acquisition among children with hearing loss is well documented (ASHA, 2014a; Nott et al., 2009; Prezbindowski & Lederberg, 2003; Tur-Kaspa & Dromi, 1999). Because it is the child's level of oral language and vocabulary that serves to determine early literacy and later success in school (Beck, McKeown, & Kucan, 2002; Robertson, 2009; Sarant et al., 2009; Trelease, 2006; Waterman, 1994), it is vital that professionals understand and implement preferred practices for assessment of all facets of language and vocabulary.

What, then, are the various purposes of language and vocabulary assessment? Why is assessment essential? What are the reasons practitioners must conduct language and vocabulary assessment? There are at least four primary purposes:

1. Eligibility Determination

In order to receive early intervention or public school services, a child must meet eligibility criteria. In accordance with the Individuals with Disabilities Act (IDEA,

2004), following a referral, an initial evaluation takes place. The evaluation includes individual assessments and observations. IDEA defines evaluation and assessment differently. Evaluation is the process of determining eligibility while assessment refers to the specific tools practitioners use to gather relevant information about a child (IDEA, 2004).

2. Identification of Strengths And Weaknesses

Appropriate selection, administration, and interpretation of language assessments allows practitioners to determine a child's present level of performance in receptive and expressive language and vocabulary. This process serves to inform the practitioner about a given child's areas of strength and weakness, and forms the foundation for the development of appropriate intervention and educational plans and programs.

3. Develop Long- and Short-Term Plans

Practitioners rely on assessment results to construct plans such as the Individual Family Service Plan (IFSP) or Individual Education Program (IEP). These plans incorporate specific goals and objectives focused on a child's needs in language and vocabulary development. A typical long-term plan includes annual goals and objectives; while a short-term plan usually includes targets to be addressed in a 3 to 6 month timeframe. An IEP (long-term) must be reviewed periodically—at least annually—and be revised as appropriate (IDEA, 2004). An IFSP (short-term) must also be formally reviewed on an annual basis with the family at least every six months (IDEA, 2004).

In addition to an IEP, there is another type of long-term plan that relies on comprehensive assessment. For children who are delayed more than a year in language and vocabulary acquisition, a multiyear plan is needed to guide parents and professionals in closing the gap between a child's language/vocabulary age and chronological age (Walker & Wilson, 2011). This type of plan, like others described in this section, is based on appropriate and thorough assessment of language and vocabulary.

4. Monitor Progress

Monitoring language and vocabulary growth on a regular and frequent basis is necessary to determine if a child with hearing loss is making adequate progress. Progress monitoring is accomplished through the use of both standardized tests and various tracking tools and informal measures.

This chapter provides a brief overview of normal language development, followed by a discussion related to assessment approaches and the components of appropriate language assessment for children with hearing loss. Strategies specific for assessing children with hearing loss are examined. A case study approach is used to analyze assessment practices and protocols for the young child, the school-age child, and children with hearing loss who have additional challenges. Finally, existing resources to assist practitioners in the planning, execution, and interpretation of language and vocabulary assessment measures are provided.

NORMAL DEVELOPMENT

If children with hearing loss are expected to develop in close parallel to their hearing peers, it is critical to use information from typical development to guide our assessment and intervention practices. Without knowledge of typical language development, professionals cannot determine if the child with hearing loss is making adequate progress or if he or she is closing the gap between his or her language and the language of their typically hearing peers. This information allows us to determine the need for services, to ascertain when changes to those services are needed, as well as to provide the information parents need to best advocate for their child.

While formal study of normal language development began in the 19th century (Brisbane, 2005), theories regarding the acquisition of language have continued to evolve among linguists, speech-language scientists, and practitioners. Currently, several theories exist for the purpose of explaining and understanding how typically developing children acquire spoken language. These theories include the behaviorist, psycholinguistic, and the interactionist theories (Bui, 2003). The seemingly effortless language-learning process develops as a result of frequent, meaningful interactions among children, their caregivers, and others in the home and community. Regardless of the theory or combination of theories that best fits one's beliefs about how young children acquire language and vocabulary, there is consensus regarding several key factors (Brisbane, 2005):

- Children grow and develop at different rates. What is "normal" for one child looks different from that of another child.
- Children pass through the same developmental milestones, acquiring skills that build on each other, during predictable time periods (Eliot, 1999). For example, a child must babble single syllables at about 4 to 6 months before babbling multiple syllables at 7 to 9 months, before speaking 2-word sentences at 18 to 24 months of age.
- Developmental domains are interrelated. For example, as a child becomes more mobile, he or she will begin to learn more about the world which will in turn impact language development.
- Development is influenced by family, socioeconomic status, ethnicity, culture and history.
- While significant developmental changes take place in childhood, we continue to expand our language and vocabulary throughout our lifespan.

PRECURSORY SKILLS

Before children start talking, they demonstrate many ways to communicate their wants and needs with their caregivers through a variety of precursory language and communication skills. Precursory skills develop in infants between the chronological ages of birth to 18 months (Heerboth, 2014). During this time, infants acquire cognitive and play skills, gestures, social interaction abilities, and speech sounds for the purpose of communication. "Infants develop the capacities for learning language as they learn to see, hear, and do" (Bloom & Lahey, 1978, p. 73).

Cognition and Play Development

Even the very young infant likes to play. Prior to 3 months of age, children can anticipate during an activity such as nursing and can communicate excitement to their caregivers. They begin to explore the use of objects and enjoy play through tickling, bouncing, and interaction with caregivers prior to 6 months of age. Feeding and early play also constitute the beginning of turn-taking. Turn-taking is a skill essential for the later development of conversational skills. During this time, infants also experiment with cause and effect through activities like shaking a rattle. The 6- to 9-month-old baby shows emerging object permanence by searching for a partially hidden object. Object permanence is generally mastered by 12 months of age.

Gestures

Gestures begin as early as 3 to 6 months when infants start to reach for objects. From 6 to 9 months they give, point and show objects of interest, imitate arm movements, reach to request, and respond with appropriate arm gestures to familiar phrases like "bye bye." Before their first birthday, children can shake their head "no" and push away undesired objects. Gestural communication develops to represent functional words such as "bye-bye," "no," "up," "hi," "so big," "more," and "all gone" in the second 6 months of life (Pollack, Goldberg, & Caleffe-Schenck, 1997).

Social Interaction

Children are naturally social beings and begin to interact with those in their environment from birth. During the first 3 months of life, infants begin to develop a social smile and attend to a speaker's mouth and eyes. By 6 months of age, they can maintain appropriate eye contact and share in joint attention. Between 6 to 9 months of age, children call to gain attention.

Speech and Vocal Expression

Children begin cooing as early as 3 months, and by 3 to 6 months, they are vocalizing to express a variety of feelings. By the time they are a year old, typically developing toddlers are babbling with intonation to scold, state, exclaim, and greet. Through the use of gestures and vocalizations, the infant learns to engage in joint attention and reference. This is critical for the ability to establish a topic and provides the infant with the ability to engage in communication to share information (Owens, 1996, 2005, 2012).

The development of the skills previously described is important because they enable a child to learn language. In early development, the parents' response to these infant behaviors is more important than the behaviors themselves. Social communication through the use of precursory skills in an infant's first 24 months of life provides the semantic structure and pragmatic function needed for language development (Owens, 1996, 2005, 2012).

Regardless of when a child with hearing loss first has access to sound, it is critical that he or she develop these precursory skills. Without the ability to demonstrate skills such as turn-taking, vocal play, and joint attention, children are missing the key first steps to understand and produce meaningful spoken language.

VOCABULARY

Vocabulary is the knowledge and use of words and their meanings (Pikulski & Templeton, 2004). Development begins very early and is significantly impacted by a child's environment. Hart and Risley (1999) studied how many words children hear from birth to 3 years of age. The number of words heard per hour was vastly different depending on the education level and socioeconomic status of the parents. Children of parents who were professionals heard on average 2,100 words per hour. Children in working-class families heard 1,200 words per hour, and those in a welfare family heard on average 600 words hourly. Outcomes indicated "the first 3 years of experience put in place a trajectory of vocabulary growth and the foundations of analytic and symbolic competencies that will make a lasting difference to how children perform in later years" (Hart & Risley, 1999, p. 193).

Children typically acquire between 30 to 60 expressive vocabulary words before forming two-word combinations. They use approximately 900 words by the age of three and will need to acquire a minimum of 2,500 words expressively before formal reading instruction is initiated. The exact number of words a child uses at a given age varies due to the fact that children grow and develop at different rates. What is *"normal"* for one child looks different from another child. In Table 6–1, a general guide for *expressive* vocabulary use is depicted.

LANGUAGE

Language is composed of both receptive and expressive components. Receptive language refers to one's understanding and develops prior to expressive use of language. Children around the world, speaking different languages, follow the same general pattern of development. Children progress from early prelinguistic communication skills to the use of complex sentences by their fifth birthday (Brisbane, 2005; Eliot, 1999; Owens, 1996, 2005, 2012).

Specifically, following acquisition of precursory language skills, expressive use of single words, and comprehension of longer utterances, children begin to combine words. For most children, this occurs around 18 months of age. Eliot's (1999)

Table 6–1. General Guide for Expressive Vocabulary

Age	Vocabulary	Syntax
12 months	1st word emerges	One word
18 months	20–50 words	Maybe 2-word combinations
2 years	200–300 words	Average 2-word phrases
3 years	900–1000 words	Average 3–4 word sentences
4 years	1500–1600 words	Average 4–5 word grammatically correct sentences

Source: Owens, 1996, 2005, 2012.

description of the transition from growth in infancy to the onset of expressive language is beautifully stated:

> [Expressive] language lies quietly in wait during the first twelve to eighteen months of a child's life. Though you can see only the merest hints of it in infancy, it grows like an air bubble submerged deep in the sea, rising and expanding until finally, somewhere in the middle of the second year, it explodes for all to hear. (p. 368)

Early two-word combinations appear to follow predictable patterns and generally follow correct word order. The examples in Table 6–2 represent how young children combine words to express a variety of thoughts and ideas in different semantic categories (Bloom & Lahey, 1978; Pollack, Goldberg, & Caleffe-Schenck, 1997).

Following the two-word phase, preschoolers between the ages of 3 and 5 enter the syntactic stage of language acquisition. This stage is often referred to as the telegraphic stage, because many function words (or, to, the, am, do,) are omitted in short sentences that convey meaning. Children begin to sort out the rules of language and often over generalize. They begin to use plurals, verb tenses, prepositions, and conjunctions (Pollack, Goldberg, & Caleffe-Schenck, 1997). They are able to follow two- and three-step commands, use sentences with increasing complexity, and ask questions to learn more about their environment. By age five, 90% of the grammar used to produce language has been acquired (Owens, 1996, 2005, 2012).

The school-aged child continues to acquire language through vocabulary, refined conversational skills, and figurative language. During the elementary school period, children further expand their language in the following ways (ASHA, 2014c):

- Answer more complex yes/no questions.
- Demonstrate narrative mastery including telling stories with increased detail in a logical order.

Table 6–2. Semantic Categories

Existence:	A ball.
Nonexistence/Denial (negation):	No ball. Not tired.
Questions:	What's that?
Attribution (noun plus modifier):	Big ball.
Recurrence:	More ball. Another car.
Action (verbing):	Throw ball.
Possession:	Mommy ball. My car.
Quantity:	Two ball.
Locative/Locative Action:	Up ball. Sit down. Right there!
Adverbs:	Too late! All wet.
Commands:	Help me. Open door.
Demands:	Want more. Come here.

- Use most grammatical structures correctly by the end of first grade.
- Stay on topic, take turns, and initiate conversations.
- Give directions that increase in the number of steps and accuracy.
- Ask and answer all "wh" questions.
- Use language for a variety of purposes such as to persuade, entertain, clarify, and inform.

By age 12 years, children have mastered many of the language skills of an adult (Owens, 1996, 2005, 2012).

APPROACHES TO LANGUAGE ASSESSMENT

For both initial evaluations and ongoing progress monitoring, clinicians create a plan to identify the measures they will use to obtain information about the child's present level of performance, strengths, and needs. IDEA (2004) requires that multiple types of tools, tests, and procedures are used to determine eligibility for services, rather than reliance on a single test or procedure. The latter is not acceptable under the law. Professionals responsible for language and vocabulary assessment of children with hearing loss will want to be familiar with a variety of assessment approaches and the advantages and limitations of various approaches.

Formal

Formal assessment is comprised of standardized tests, norm-referenced tests, and criterion-referenced measures. Standardized tests rely on specific administration, scoring, and interpretation methods. Norm-referenced instruments allow for comparison of a child's performance to others in a normative sample. Criterion-referenced assessments are those designed to determine if an individual has mastered specific skills or content. With a criterion-referenced assessment, there is no comparison of performance to other individuals or groups.

Some formal assessments address multiple aspects of language and vocabulary. The *Clinical Evaluation of Language Fundamentals, 5th Edition* (Semel, Wiig, & Secord, 2013) is an example of a standardized test designed to assess several different aspects of receptive and expressive language and vocabulary. Other measures —such as the *Expressive Vocabulary Test, 3rd Edition* (Williams, 2007)—only evaluate a particular language feature. The *Rossetti Infant-Toddler Language Scale* (Rossetti, 2006) is a criterion-referenced instrument appropriate for assessing language and other communication skills in children birth to 3 years of age. It is important to note that the majority of measures used with children with hearing loss are not designed specifically for children with hearing loss. Furthermore, it is vital that clinicians consider the potential impact of cultural bias in the selection, administration, and interpretation of assessment instruments since many measures are not normed on racially and linguistically diverse populations (ASHA, 2014b).

Informal

Informal measures are content rather than data-driven (Weaver, n.d.) and allow practitioners to obtain valuable information about a child's language and vocabulary using instruments other than standardized, formal measures. In order

to obtain a complete representation of a child's language and vocabulary functioning, clinicians can opt to use informal assessments such as checklists, parent interviews, observations, and diagnostic teaching. The latter type of assessment—diagnostic teaching—is especially useful in working with children with hearing loss. Caleffe-Schenck (2012) describes diagnostic teaching as a process of individualized interactions. When listening and spoken language specialists employ diagnostic teaching, they engage in functional, authentic assessment. Based on the child's performance, the professional can adjust session targets in real time, as well as use the assessment information to make adjustments in long- and short-term plans.

Structured Language Analysis

Perhaps one of the most valuable approaches is that of language sampling accompanied by a structured analysis. This approach requires a practitioner to engage a child in activities such as conversation, description, narration, explanation, and questioning (Ling, 1989) for the purpose of collecting spontaneous utterances. Once the child's utterances are recorded and transcribed, an analysis is conducted to determine the length and complexity of the child's utterances (**syntax**/grammar), the number of different words and word types (**semantics**), and social (**pragmatic**) aspects. Although the approach is regarded as valuable and informative, it is not frequently used by many clinicians (Heilman, 2010). Reasons cited for infrequent or nonuse include the length of time required to analyze the data and difficulties in learning how to conduct proper language sampling and analysis. Presently, the *Systematic Analysis of Language Transcripts* or SALT (Miller & Iglesias, 2008) is available—as a software program—to streamline the process of data collection, transcription, analysis, and interpretation.

COMPONENTS OF LANGUAGE ASSESSMENT

Language can be assessed according to three primary components: form, content, and use (Bloom & Lahey, 1978). Language form includes syntax, **morphology** and **phonology**; while language content refers to semantics (the meaning underlying what we say). Language use or pragmatics is another component of language. These components are separate and distinct; practitioners must understand the contribution of each dimension individually, while recognizing that these components are overlapping and interrelated. This understanding of the singular and collective contributions of form, content, and use sets the stage for proper and appropriate holistic language assessment.

Morphological

Morphology is the study of the internal structure of words (Owens, 1996, 2005, 2012). Words consist of smaller units called morphemes. A morpheme is the smallest unit of a word that contains meaning (Payne, 1997). A morpheme that can stand alone is referred to as a *free* morpheme while those that cannot stand alone are referred to as *bound* morphemes (Gleason, 2001). For example, the word "horses" has two morphemes; *"horse"*—which refers to a large animal that you can ride, and often lives on a farm—is a free morpheme and *"s"*—to indicate there is more than one—is a bound morpheme. The potential influence of hearing loss on morphological development is worth noting here. Historically, some children with hearing loss have experienced difficulty with auditory access of certain morphological features including plurals, possessive -*s*, and regular past tense -*ed*. Limited auditory access has, in turn, resulted in incomplete morphological development for some children. Additionally, it is important to note that given today's technology, even children with profound hearing loss have the auditory potential to access and develop difficult-to-hear morphological features.

One method to assess a child's level of morphological development is a calculation of the mean length of utterance (MLU). The MLU is calculated by obtaining a language sample of 100 utterances and dividing the total number of words and morphemes by 100 (the number of utterances). The work of Brown (1973), summarized in Table 6–3, can function as a tool to analyze a child's morphological development according to MLU and Brown's 14 Grammatical Morphemes.

Semantic

Semantics refers to the underlying meaning of language including complex use of vocabulary and figurative language. Children can demonstrate semantic difficulties when they display limited vocab-

Table 6–3. Morphological Development According to Brown (1973)

Stage	MLU	Approximate Age (Months)	Grammatical Morphemes
I	1.0–2.0	12–26	Pronouns (I, you, me), familiar names, nouns (food, toys), verbs (eat, wash), and adjectives (hot, big, dirty) produced as single words and in combination to utterances such as: daddy eat, doggie bed, mommy throw ball
II	2.0–2.5	27–30	Present progressive (ing), regular Plurals, prepositions (in, on), and possessive pronoun (my)
III	2.5–3.0	31–34	Irregular past tense, uncontractible copula, possessives, prepositions (under, with, of, for, to), and pronouns (he, she, him, her, your)
IV	3.0–3.75	35–40	Regular past tense, modal verbs (can, will), prepositions (around, behind), prepositional phrases, pronouns (they, we, them, us, hers, his)
V	3.75–4.5	41–46	Uncontractible and contractible auxiliary, contractible copula, third person singular (He walks and He does), modals (could, would), prepositions (beside, between), wh questions + inverted auxiliary/copula, possessive pronouns (its, our, ours, their, theirs), and reflexive pronouns (myself, herself, himself, yourself, ourselves, themselves)
V+	4.5+	47+	Morphological development is complete at the end of Stage V or V+

ulary, longer response time in selecting vocabulary, and figurative language problems. Informal assessment of semantics can include (Shipley & McAfee, 2009):

- defining words;
- giving synonyms and antonyms for words;
- determining common theme/category in a group of words (i.e., water, milk, orange juice);
- listing words in a given category (i.e., vegetables);
- explaining the meaning of phrases and figurative language; and
- making comparisons between two words.

Syntactic

Syntax is the study of the rules that govern how words are organized into phrases and sentences. It differs from morphology in that it deals with rules related to putting words together versus the rules of formulating those words. Like morphology, syntax follows a clear pattern of development based on age, as indicated in Table 6–4.

There are many standardized language assessments that look specifically at the development of syntax and that can be used when assessing a child with hearing loss. Comprehensive language assessment measures that examine syntax include the *Oral and Written Language Scales*, 2nd Edition (Carrow-Woolfolk, 2011); *Clinical Evaluation of Language Fundamentals*, 5th Edition (Semel, Wiig & Secord, 2013) and the *Comprehensive Assessment of Spoken Language* (Carrow-Woolfolk, 1999).

Table 6–4. Syntactic Development

Stage	Approximate Age (Months)	Stage Characteristics
One-word/holophrastic stage	12–18	Children use one word to convey a sentence; they often overgeneralize words (doggie is any four-legged animal).
Two-word stage	18–24	Two word phrases to impart various semantic meanings from categories such as recurrence (more water) and action (throw ball).
Telegraphic stage	24–30	Children use just enough to get their meaning across. May include 3 to 4 word utterances and begin to overgeneralize their language use ("mouses" instead of "mice"), utterances contain mostly nouns, verbs and adjectives.
Later multiword stage	30+	Function words begin to appear and clauses are linked ("When will Mommy cook dinner?").

Pragmatic

The knowledge of appropriate use of language is known as pragmatics. Hymes (1972) introduced the term "communicative competence" or the concept that we have to not only know what to say (vocabulary) and how to say it (syntax, morphology) but also when, where, and why to say it.

After the early childhood years and children learn the "rules" of the what and how of language, their language continues to develop through the learning of pragmatic rules. Children demonstrate increased use of conversation, narratives, idioms, figurative language, and jokes. Many aspects of pragmatic development require "overhearing" others in our environment as well as things such as tone to detect sarcasm. Children with hearing loss are at a disadvantage for these things and sometimes may need to be taught certain pragmatic elements that other children pick up on their own. Therefore, it is important to assess them so they can be incorporated into regular therapy and carry over at home.

CONSIDERATIONS AND STRATEGIES

Listening and spoken language specialists must demonstrate knowledge and application of many different strategies. In intervention, strategies are used to promote the auditory learning of targets in speech, language, audition, and cognition. Selection and use of strategies is equally important in the assessment process. The following considerations and strategies will be described within the context of language assessment: technology check, positioning, attention, environment, wait time, visual processing time, and **acoustic highlighting**:

- Technology check: Before any assessment of a child with hearing loss, a technology check must be performed to ensure that the equipment (hearing aids, cochlear implants, FM system) is functioning properly. This should include both checking the device(s) and the child's responses to the Ling Six-Sound Test. (See Chapters 9, 10, and 11 for more discussion.)
- Positioning: A preferred practice in intervention sessions calls for adults to sit *beside* the child to minimize visual clues. During assessment, sitting *across* from the child is beneficial. This approach allows the administrator to more easily manipulate test materials, read test instructions, and record responses on test protocols outside of the child's visual range. Sitting across from the child also provides the added benefit of speechreading, if necessary. When we conduct standardized language and vocabulary testing, our goal is to obtain the most reliable and valid information possible; therefore, we ensure that the child has access to both speechreading and auditory cues.
- Attention: Prior to the presentation of stimuli, the clinician should obtain the child's auditory attention. Many formal measures do not allow the test administrator to repeat items; therefore, it is vital that the child is attending before questions are asked or directions are given. A few ways to obtain auditory attention include saying: "here we go," "ready," or "next one." Waiting for the child to look at the examiner and providing frequent breaks are other ways to gain and maintain optimal attention.
- Environment: Children with hearing loss require a favorable listening environment (Cole & Flexer, 2011).

This means that care needs to be taken to minimize background noise, speak close to the microphone of the child's hearing technology, and use a regular speaking voice (Estabrooks, 2012). If the child has personal FM technology, it should be used during assessment. Using a small, portable table-top sound field system can enhance the listening environment as well (Flexer, 2012).

- Wait time: Tobin (1987) defines wait time as a silent-pause between adult initiation and learner response. To optimize language assessment outcomes, sufficient wait time is necessary for the child to process the meaning of the stimulus and formulate a response. Age, cognition, language level, and task complexity are all variables that influence wait-time (Rhoades, 2013). Carey-Sargeant and Brown (2003) propose that children with hearing loss need longer pause lengths for sufficient processing. Although, it is not possible to state precisely how long one should wait for a response, anecdotal information obtained from listening and spoken language specialists suggest that practitioners employ wait times ranging from 10 to 45 seconds (Rhoades, 2011).
- Visual processing time: It is helpful to provide a brief period of time for children to visually inspect test items before questions or instructions are stated, especially if the child has a tendency to respond impulsively. The examiner can encourage the child to first look at all the pictures or graphics. This can be done by simply stating, "Let's look at all the pictures first" and subsequently touching each item for the child to examine.
- Acoustic Highlighting: Acoustic Highlighting refers to techniques employed to enhance audibility in speech, language, and auditory learning (Daniel, 2012; Simser & Estabrooks, 2001). Examples include repetition, increased rhythm and pitch variation, emphasis on key words (Simser & Estabrooks, 2001), and prolongation of phonemes (Daniel, 2012). In assessment, examiners may find it helpful to use acoustic highlighting to ensure optimal audibility of stimuli. For example, in asking a child to identify an item for plural /s/, the examiner might emphasize plurality in the following way: "Show me cat*ssss* vs cats." Using a slightly slower rate and/or a sing-song voice can facilitate attention in children with hearing loss. Placing emphasis on a keyword, for example, "The dog is *in* the box," serves to ensure that a child has appropriate access to the target test item.

ASSESSING THE YOUNG CHILD

Name: Nick

Age: 20 months

CI Age: 11 months

History:

Nick is a 20-month-old male with a bilateral profound hearing loss. His hearing loss was identified at three months of age and he was subsequently fitted with Phonak Naida VSP bilateral hearing aids. Early intervention services began when Nick was four months of age. He received a right N5 cochlear implant at 9 months of age. Nick's parents chose the auditory-verbal approach. He lives at home with both parents and is seen in his home three to four times monthly for parent participation sessions. Nick's parents are very involved in his care and his development of listening and spoken language.

A comprehensive evaluation was conducted when Nick was initially referred for early intervention services. In keeping with recommendations specified by the Joint Commission on Infant Hearing (2013), Nick was assessed every six months following his initial evaluation. The purpose of the current assessment was to obtain present level of performance in language and vocabulary in order to monitor progress, and revise Nick's treatment plan for the next six months. Nick's mother was present during the assessment sessions which occurred over the course of two home visits.

Assessment Instruments

- The Rossetti Infant-Toddler Language Scale (Rossetti, 2006)
- Preschool Language Scale, 5th Edition (PLS-5; Zimmerman, Steiner, & Pond, 2011)
- The MacArthur-Bates Communicative Development Inventories: Words and Sentences (Fenson et al., 2007)

Findings

The Rossetti Infant-Toddler Language Scale

The Rossetti Infant-Toddler Language Scale (Rossetti, 2006) is an instrument designed to assess both preverbal and verbal areas of communication in children from birth to 36 months of age. The Rossetti (Rossetti, 2006) is composed of six areas. A definition of each area and results are described below:

Interaction-Attachment. This section assesses the relationship and patterns of interaction between the child and caregiver. Nick passed all items through the 15 to 18 months level. There are no test items beyond 15 to 18 months.

Pragmatics: Skills in this area reflect the way a child uses language to communicate with others. Nick demonstrated mastery of skills through 15 to 18 months and all but one skill through the 18 to 21 months level. There are no items beyond 18 to 21 months. Nick received credit for the following:

- Engages in adult-like dialogue.
- Uses vocalizations and words during pretend play.
- Uses words to interact with others.

Nick is not yet taking turns talking during conversation.

Gestures. Children use gestures to express their thoughts and intentions prior to their use of spoken language. This section evaluates the child's use of gestures. Nick passed items through 12 to 15 months. There are no items at 18 to 21 months. He also passed 4/5 items at 21 to 24 months and 3/4 items at 24 to 27 months. The following behaviors were either observed or reported by the parents:

- Gestures to request action (to get others to sit).
- Pretends to pour from a container.
- Flies a toy airplane.

- Pretends to write or type.
- Wipes hands and face.
- Slaps a palm in response to "give me five."

Nick is not yet gesturing to indicate toileting needs (21–24 months) or pretending to talk on the telephone (24–27 months).

Play. As a child grows, many changes in play skills take place. This section evaluates a child's individual play skills as well as play with others. Nick demonstrated mastery of all skills through 27 to 30 months, with the exception of two items (see below*). Nick received credit for the following;

- Puts away toys on request.
- Stacks and assembles toys and objects.
- Shares toys with other children.
- Demonstrates parallel play with other children.
- Performs many related activities during play.

*Nick does not yet demonstrate the following skills:

- Groups objects in play (18–21 months).
- Talks and verbalizes more in play around other children.

Language Comprehension. The language comprehension component assesses a child's understanding of verbal language. Nick passed all items through 21 to 24 months with the exception of "identifies objects by category." He was credited with two items at 24 to 27 months, that is, "recognizes family member names and points to four action words in pictures." He demonstrated the following skills:

- Identifies four body parts and clothing items on self.
- Identifies pictures when named.
- Chooses one object from a group of five upon verbal request.
- Points to four action words in pictures.
- Recognizes family members names (Mama, Daddy, Max).
- Understands new words rapidly.

Skills that have not yet been demonstrated include:

- Identifies objects by category.
- Understands the concept of one.
- Understands size concepts.

Language Expression. This section examines a child's use of both preverbal and verbal skills. Nick passed all items at 12 to 15 months and demonstrated scattered skills through 24 to 27 months. He is able to do the following:

- Uses single words frequently.
- Uses sentence-like intonational patterns.
- Uses two-word phrases occasionally.
- Uses new words regularly.
- Imitates two numbers or unrelated words upon request.
- Uses action words.

Skills that have not yet been demonstrated include:

- Asks, "What's that?"
- Imitates words overheard in conversation.
- Imitates environmental noises.
- Refers to self by name.
- Uses early pronouns occasionally.
- Uses two-word phrases frequently.

Preschool Language Scale, 5th Edition (PLS-5)

The PLS-5 (Zimmerman, Steiner, & Pond, 2011) is a standardized test that provides information about a child's understanding and use of language. There are two subtests, that is, Auditory Comprehension and Expressive Communication. For each subtest, a standard score, percentile rank, and age equivalent are obtained. A Total Language Score is also obtained reflecting combined performance of the two subtests. Standard scores between 85 to 115 are in the average range for a child of Nick's age. Results are as follows:

Auditory Comprehension:

Standard Score: 120
Percentile Rank: 91
Age Equivalent: 2 years, 3 months

Expressive Communication

Standard Score: 116
Percentile Rank: 86
Age Equivalent: 2 years, 3 months

Total Language

Standard Score: 120
Percentile Rank: 91
Age Equivalent: 2 years, 3 months

The MacArthur-Bates Communicative Development Inventories: Words and Sentences (Fenson et al., 2007)

The first portion of this tool, Part A—Vocabulary Checklist, is used to gain an inventory of words children use, regardless of pronunciation. Based on the parents' responses, Nick uses a total of 95 different words. Most of Nick's vocabulary clusters around the following categories (including 9 or more words): sound effects and animal sounds, animals, food and drink, action words, (e.g., hug, help, blow), games and routines (e.g., bath, night night), and descriptive words (e.g., all-gone, high, stuck). Word use was scattered among the other categories (including 1–5 words): vehicles, toys, clothing, body parts, small household items, furniture/rooms, outside things, places, people, time, pronouns, question words, prepositions/locations, and quantifiers/articles. No helping verbs (e.g., am, be) or connecting words (and, but) were noted. Nick's word use falls within the 38th percentile for boys his age, and the 30th percentile for 20-month-old boys and girls combined.

Summary of Nick's Assessment

Both informal and formal measures were used to obtain information regarding Nick's present level of performance. Results of the Rossetti (Rossetti, 2006) indicate that Nick has made significant gains in all areas since previous testing. Skills in the Play domain are a relative strength for him. Since activation of his cochlear implant about one year ago, Nick has not only made a year's progress in a year's time but has demonstrated accelerated (catch-up) growth.

The PLS-5 (Zimmerman, Steiner, & Pond, 2011) was used to obtain information regarding receptive and expressive language. Nick scored in the above average range for the Auditory Comprehension area and slightly above average in the Expressive Communication component for a child his age. Nick was credited with use of 95 different words on the MacArthur-Bates Communicative Development Inventories: Words and Sentences (Fenson et al., 2007). Nick's parents maintain a vocabulary list of words he is heard

to say that are not listed on the MacArthur-Bates (Fenson et al., 2007). Nick has made excellent progress in his understanding and use of new words since receiving his cochlear implant. His present level of vocabulary acquisition is more advanced than his cochlear implant age but not yet at the level of the typical 20-month-old.

Recommendations

- Continue regular audiological management.
- Continue regular sessions of auditory-verbal therapy.
- Provide a favorable listening environment.
- Provide a minimum of 1 hour daily to carry-over goals established in therapy during a structured play session, and a minimum of 4 to 5 hours daily to embellish goals during the course of daily routines.
- Continue reading several books each day to develop language, vocabulary, attention span, and interest in books.
- Continue ongoing monitoring of progress in all areas of development.

ASSESSING THE SCHOOL-AGE CHILD

Name: Sarah

Age: 6 years, 6 months

CI Age: 3 years. 8 months

History:

Sarah is a six-year, six-month-old girl with a bilateral sensorineural hearing loss of unknown etiology, identified through newborn hearing screen. She received hearing aids at 3 months of age and began receiving early intervention services at that time. At 3 years of age, she received a cochlear implant in her right ear. She continues to wear a hearing aid in her left ear. She began auditory-verbal therapy at the time of her implant. She currently attends a mainstream first grade classroom with a language facilitator. She also receives services with a teacher of the deaf for 1 hour each day. She was discharged from speech-language therapy at the end of her kindergarten year. She continues to attend private auditory-verbal parent participation sessions bimonthly.

This evaluation was conducted to evaluate current speech, language, and audition skills and to follow-up on the recommendation to remove the language facilitator from her mainstream classroom.

Assessment Instruments

- The Oral and Written Language Scales, 2nd Edition (OWLS-II; Carrow-Woolfolk, 2011)
- Expressive Vocabulary Test, 2nd Edition (EVT 2; Williams, 2007)
- Peabody Picture Vocabulary Test, 4th Edition (PPVT 4; Dunn & Dunn, 2007)

Findings

Oral and Written Language Scales

Oral and Written Language Scales, Second Edition (OWLS-II; Carrow-Woolfolk, 2011) is a norm-referenced assessment to measure receptive and expressive language communication skills in children ages 3 to 21. Standard scores are based on a mean of 100 and a standard deviation of 15. Therefore, standard scores between 85 and 115 are considered within normal limits. Results are as follows.

Areas of strength:

- Understands complex sentences (i.e., The boy she waved to was sitting).
- Understands prepositions.
- Understands irregular present perfect tense (i.e., Show me the girl who has eaten her apple.).

Areas of need:

- Understands inferences related to world knowledge (i.e., Show me the picture in which Dad is thinking, "Too bad she can't be in the race.").
- Understands adverbs (i.e., hurriedly).
- Understands present progressive in a negative sentence (e.g., Which girls have not been raking?).
- Use of passive voice.
- Use of irregular past tense.

Oral Composite

Standard score: 96

Percentile rank: 39

Expressive Vocabulary Test

The Expressive Vocabulary Test, 2nd Edition (EVT-2; Williams, 2007) is a norm-referenced assessment to measure expressive vocabulary and word retrieval for individuals from ages 2.6 to 90+. Standard scores are based on a mean of 100 and a standard deviation of 15. Therefore, standard scores between 85 and 115 are considered within normal limits. Results are as follows:

Standard score: 101

Percentile rank: 53

Oral Expression

Standard score: 101

Percentile rank: 53

Areas of strength:

- Understands complex sentences (i.e., The boy she waved to was sitting).
- Understands prepositions.
- Understands irregular present perfect tense (i.e., Show me the girl who has eaten her apple.).

Areas of need:

- Use of 3rd person plural personal pronoun (theirs).

Peabody Picture Vocabulary Test

Peabody Picture Vocabulary Test, 4th Edition (PPVT-4; Dunn & Dunn, 2007) is a norm-referenced assessment to measure receptive vocabulary comprehension for individuals from ages 2.6 to 90+. Standard scores are based on a mean of 100 and a standard deviation of 15. Therefore, standard scores between 85 and 115 are considered within normal limits. Results are as follows:

Standard score: 94

Percentile rank: 34

Summary of Language Assessment

Sarah is a 6-year-old girl with a bilateral sensorineural hearing loss. The results of these language assessments indicate that

she has continued to demonstrate language progress with her cochlear implant. Her current receptive and expressive language and vocabulary skills are within normal limits for her age when compared to her typically hearing peers. However, her scores do not equal those of her cognitive abilities and therefore do not meet her potential language abilities. She has continued needs within the areas of vocabulary, and receptive and expressive language use to match the language of her typical hearing such as the skills listed in this evaluation.

Recommendations

Based on these needs, Sarah needs to continue receiving the following services:

- Bimonthly auditory-verbal therapy parent sessions with daily carryover at home.
- Individual sessions with the teacher of the deaf to preteach vocabulary and language that will be used in the mainstream classroom as well as age-appropriate language targets she is not comprehending or using.
- It is appropriate at this time to begin to transition her away from the use of a language facilitator in the classroom.
- Parents should continue to read aloud at home for 30 minutes per day.
- Sarah should continue to wear the cochlear implant device all waking hours and pursue aggressive audiological management.
- Parents, therapists, teachers, and other caregivers should continue to provide extensive language stimulation in all settings.

ASSESSING CHILDREN WITH HEARING LOSS AND ADDITIONAL CHALLENGES

Name: Miguel

Age: 4 years, 1 month

History:

Miguel is a 4-year, 1-month-old Hispanic male. He was born prematurely at 28 weeks, weighed 4 pounds and required two weeks in an incubator. His early history is significant for breathing problems, jaundice, excessive crying, feeding difficulties, hearing problems, ear infections, eye/visual problems, colic, and allergies. Miguel was diagnosed with auditory neuropathy in his left ear at 13 months of age.

Miguel currently lives at home with his parents and younger brother. He attends a special needs preschool classroom. Miguel has a current Individualized Education Program (IEP) under developmental delay. Miguel's preschool teacher reports concerns with doing what is asked, responding to simple commands, social skills with peers and adults, lack of interest in toileting, drawing/handwriting, understanding language, social use of language, problem solving, and early literacy skills.

Miguel was referred to a university specialty clinic to gain a better understanding of his language delays and to determine if he meets criteria for an autism spectrum disorder.

Assessment Instruments

- Test of Auditory Comprehension of Language, 3rd Edition (TACL-3; Carrow-Woolfolk, 1998)
- Aided Language Stimulation Activities (Drager, 2009)
- Autism Diagnostic Observation Schedule, Module 1 (ADOS; Lord et al., 2000)
- Parent Interview

Findings

Test of Auditory Comprehension of Language

Administration of the Test of Auditory Comprehension of Language (TACL-3; Carrow-Woolfolk, 1998) was attempted to assess Miguel's understanding of language. Miguel was asked to identify common words by pointing to pictures, which did not require him to use spoken language; however, the TACL-3 (Carrow-Woolfolk, 1998) was discontinued due to difficulty engaging Miguel in the task.

In an effort to gain an estimate of receptive vocabulary, the clinicians tried using tangible objects, such as a book, spoon, cup, duck, and a frog. Objects were presented two at a time, and Miguel was asked "Show me ___?" The clinicians modeled how to reach for the corresponding item. This informal assessment was also discontinued because Miguel appeared to reach indiscriminately or toward a preferred object.

Aided Language Activities

Miguel was further assessed for stimulability using aided language boards with a bubble activity and a balloon activity. This strategy involved using a communication board that contained related vocabulary and picture symbols (or pictures) to communicate during an activity. For example, during the bubble activity, a communication board with symbols for actions (e.g., *open, blow, pop*) and a symbol for *bubbles* was used. Although Miguel attended to the symbols on the board as the examiners modeled its use during the bubble activity (i.e., pointing to pictured vocabulary as they spoke), he only once spontaneously pointed to the board to communicate a request.

During a requesting and choice-making activity, the clinicians took turns modeling holding out their hands to request a cookie. Miguel appeared to observe these interactions and began to request another cookie the same way, and on one occasion used the sign for "more." Miguel's request time decreased as the interaction progressed, which is important because it demonstrates that with a highly motivating item (such as a cookie), modeling and direction, along with wait time, Miguel will initiate expressive communication in an appropriate and meaningful way.

Communication

Autism Diagnostic Observation Schedule, Module 1 (ADOS; Lord et al., 2000). Miguel's communication attempts were limited throughout the assessment. He produced minimal verbalizations, which were rarely directed toward others. Miguel used few gestures during the ADOS (Lord et al., 2000), although he demonstrated an open-handed reach to request and to push undesired items away. These gestures were rarely coordinated with eye gaze. Miguel used his mother's hand as a tool and pulled her hand to other desired objects; for example, he placed her hand on the bubble gun to activate it.

Social Interaction

Miguel's social interaction skills were limited compared to other children his age.

Although he used eye contact to check in with others on his own terms, he did not use it in combination with other behaviors, such as vocalizations or gestures within social interactions. Although he showed shared enjoyment by occasionally smiling toward the examiner and his mother during peek-a-boo and tickling games, it was difficult for both the examiner and his mother to get him to produce a purely reciprocal social smile just by smiling at him. Other than an occasional smile, Miguel demonstrated rather flat affect and did not direct facial expressions toward others. He did not look toward the examiner after his name was called several times, but he did respond to his name being called by his mother on her second attempt. The best examples of requests during the ADOS (Lord et al., 2000) generally included reaching without eye contact or verbalization or pulling an adult's hand to a desired item. Overall, Miguel demonstrated a slightly unusual quality of social interaction because his interactions are mainly limited to his interests or personal demands; however, he did initiate a peek-a-boo game with a clinician.

Summary of Language Assessment

Although the examiners were unable to use formal testing to assess language skills, based on previous evaluation reports and informal observation, it was evident that Miguel presented with delayed receptive and expressive language skills. Based upon the ADOS (Lord et al., 2000) and the parental report, the assessment team concluded that Miguel demonstrates communication, social interaction, and behaviors consistent with the criteria for a diagnosis of autistic disorder. Miguel was stimulable for aided language communication strategies, which provide him visual support for receptive input of language, while providing him with a model of alternative means to communicate with available vocabulary.

Recommendations

- Continue current speech and language services to address overall delays in communication development. The following communicative functions that emerge before words should be targeted: behavior regulation (requesting/protesting objects and actions), social interaction (requesting routines, calling, showing off), and joint attention. The following communicative means are also important for Miguel to develop: contact gestures, distal gestures, and vocalizations.
- Implement an aided language communication approach.
- Sing songs and read books with repetitive lines to encourage Miguel to initiate communication. After singing or reading the same song or book several times, begin to pause at the repeated line and wait expectantly for him to fill in the line by vocalizing or by activating a speech-generating switch on which the repeated line is recorded.
- Encourage engagement with others or joint attention by pointing out objects and events that interest him.
- Due to communication, social, and behavioral challenges, Miguel is likely to benefit from a classroom setting that includes a structured and organized environment, a predictable schedule of activities, visual supports, and a low teacher–student ratio.
- An *Object Exchange Communication System* might also be beneficial for Miguel in teaching him to communicate. Use objects for communication in order to help Miguel understand that the objects are symbolic of a request for another object, for an action, or for an event to take place.

THE ROLE OF PARENTS IN LANGUAGE ASSESSMENT

Parents play a crucial role in the assessment process. They act as historians and informants. Parents must provide an accurate history of their child's hearing, medical, and educational history. They must act as informants regarding the child's current language use, educational, and therapeutic services, and voice any concerns they have regarding their child's progress. Parents must also provide the clinician with information regarding their child's performance (i.e., Is this typical behavior?), the need for breaks, and potentially regulate the child's behavior during testing. They provide any relevant information needed to support the comprehensive assessment of language for the child with hearing loss.

CONCLUSION

Assessing the language and vocabulary of infants, toddlers, and children with hearing loss is necessary to fulfill both legal directives and to provide essential information to determine eligibility, facilitate intervention planning, and monitor progress. Effective and comprehensive assessment requires practitioners to demonstrate knowledge and application of normal language development, as well as a variety of formal and informal approaches designed to measure all facets of language form, content, and use. Selection and use of specific strategies and techniques serves to optimize the assessment process and results. Parents play an important role in planning and conducting language assessment for children with hearing loss.

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