The Role of Speech-Language Pathologists in Providing Early Childhood Special Education

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Services and Supports

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Speech-language pathologists (SLPs), as one of the members of an early childhood special education team (ECSE), play an important role in helping shape a child's future. Depending on the child's immediate needs and the concerns of the family and other professionals, the SLP participates in a variety of roles that may range from being the primary service provider to providing consultation to the family or other professionals who have a larger role with the child, or joining in classroom instruction. SLPs often play a key role in working with children who have needs in the areas of communication, language, speech, feeding and swallowing, cognition, hearing, emergent literacy, social-emotional behavior, and autism spectrum disorder (ASD). SLPs also play a critical role in the assessment and provision of assistive technologies, including the use of augmentative and alternation communication (AAC).

The services and supports provided by SLPs in early childhood special education settings mirror those of other team members with the exception that the SLP's focused expertise is in communication, language, and speech. Background information on communication and language, the factors affecting development, the prevalence of communication and language disorders, and some key disorders that SLPs address are provided. The chapter then discusses common roles and the kinds of interventions that are provided by SLPs in ECSE settings.

Language and Communication as a Foundation for Learning and Social Interaction

Language and communication skills play a major role in children's overall learning. The term *language* will be used in this chapter to represent any conventionalized *symbol system* (e.g., words, signs, picture symbols) the child may use to interact that is consistently recognized by others. Alternately, the term *communication* refers to any *means* that the child uses to interact with others (e.g., eye gaze, gesture, body movements, facial expression, vocalizations, words) or any combination of two or more means. Therefore, language is only one form of communication, and communication can occur without language.

The early means of communication often are thought of as developing during the prelinguistic (before the use of symbols) and early linguistic

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stages and can also be used later along with language to augment a message (e.g., pointing while saying "Look"). These prelinguistic behaviors are fundamental for the child in many ways. Importantly, they can signal the child's intentional communication and often serve as a stimulus for others around the child to communicate to the child (e.g., "Oh, you want your bottle" when the child reaches for a bottle). Therefore, as children become more proficient in communicating and caregivers react responsively, the input the child receive increases, demonstrating the important transactional nature of communication between the child and those surrounding the child (Sameroff & Fiese, 2000). For example, as children (both with and without disabilities) begin to babble, caregivers take this as a sign that the child is ready for more sophisticated language and they respond by increasing the complexity of their language (Warlaumont, Richards, Gilkerson, & Oller, 2014). Gestures are one of the most consistent early indicators of intentional communication use and thus can provide a window into the child's developing communication skills; the amount and type of gesture use can help in early identification and is predictive of later language (Crais, Watson, & Baranek, 2009; Wetherby, Goldstein, Cleary, Allen, & Kublin, 2003). Children indicate their interest in objects by reaching to request a cup or a book or in people when they wave bye-bye.

The acquisition of language and communication also has a strong transactional relationship with other developmental domains (e.g., social-emotional, motor, cognitive, adaptive). Therefore, it is important to remember that language and communication are not only critical skills to acquire, but they also influence and are influenced by learning that occurs in other domains. Take for example play skills which have long been linked with the development of language and communication (Bates, Bretherton, Snyder, Shore, & Volterra, 1980; Thal, 1991). For ECSE providers, it is useful to know that the level of symbolic play exhibited by young children can be predictive of later language skills (Lyytinen, Laakso, Poikkeus, & Rita, 1999; Lyytinen, Poikkeus, Laakso, Eklund, & Lyytinen, 2001). For example, Lyytinen et al. (1999) documented that symbolic play skills at 14 months of age were predictive of receptive and expressive language at both 24 and 42 months. Although specific play skills are not viewed as prerequisites for particular language skills, they can help mark a readiness for development in some stages of language. For example, single action play schemes (e.g., child puts empty cup to mouth to drink) may signal a readiness for learning consistent communicative gestures and/or single words or symbols.

A child's play skills or interest in objects can also influence the kind of interactions the child receives from others and the learning opportunities that can occur. For children with ASD who exhibit fewer actions on objects and play with fewer objects (Pierce & Courchesne, 2001; Wetherby et al., 2003), there may be fewer things for the child to communicate about to others. In addition, the adults (and other children) surrounding the child may be less likely to interact and communicate with the child because there are few objects and actions that interest the child, resulting in less communicative input to the child. Therefore, a focus in ECSE on helping children develop their play skills and expand their interests can provide more objects and actions on objects for caregivers and children to engage in, as well as a context for providing more things for the child and caregiver to talk about to enhance the child's communication skills (Yoder & McDuffie, 2006).

In parallel, advancing communication and language skills can also enhance a child's play, especially in activities like symbolic play where the use of gestures and/or words can signal the child's intent (e.g., pouring motion or use of the word "juice" to indicate pouring juice). Thus, the child's play becomes more comprehensible to parents or other children, allowing the play partner to then follow the child's lead and respond by reciprocating in play (e.g., holding out an empty cup to be "filled" by the child). Therefore, a focus in ECSE on enhancing children's gestural and language skills can help enhance their play skills and, perhaps even more importantly, their ability and opportunities to interact and play with others.

Early language skills are also linked with later language and literacy skills (Catts, Fey, Tomblin, & Zhang, 2002; National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network, 2005; Skibbe et al., 2008). Thus, examining and enhancing a child's early communication and language skills are important both for the child's current level of skills and also as a predictor of and potential bridge to later skills.

Factors Affecting Communication and Language Development

In viewing communication and language development as transactional processes, it is important to look closely at key factors that may influence both the input the child receives and the child's output. The work of Sameroff and MacKenzie (2003) points to the multifaceted ecological factors such as the child and family's culture, home environment, and the characteristics of both the child and family that help shape the child. Commonly known factors such as the education and income of the parents have positive influences on children's language skills, as well as other areas of development (Duncan & Brooks-Gunn, 2000; Hart & Risley, 1995; Rowe, Pan, & Ayoub, 2005). For example, mothers whose income and educational levels are higher use more diverse and complex language and also have children who exhibit superior language skills than do mothers whose education and income are lower (Rowe et al., 2005). The work of Vernon-Feagans et al. (2008) with mothers from rural areas with low incomes has indicated that additional factors influencing the diversity of maternal input were the mother's knowledge of child development, maternal responsivity, as well as the child's temperament.

Parental style of talking has been another key factor in maternal input and child output. For example, mothers who have a more facilitative style (e.g., less directive, more responsive to the child's focus) typically have children who have larger vocabularies and higher reading skills (Fewell & Deutscher, 2004; Masur, Flynn, & Eichorst, 2005). Another factor is children's age, with mothers (including those with low income) increasing the amount of their talking and the diversity of their vocabulary as their children age between the first and third year of life (Rowe et al., 2005). In addition, the child's communicative output further influences the input provided by the parent. Abraham, Crais, Vernon-Feagans, & the Family Life Project Phase 1 Key Investigators (2013) observed this kind of effect on verbal productivity of mothers from low-income and rural environments during book reading with their 15-month-old children. The mothers whose children were most communicative (e.g., sounds, gestures, words) produced more words and diversity of words in response to their children, thus again demonstrating the transactional process. Finally, these researchers documented large variability in the amount of talk provided by mothers from low-income and rural environments; thus, care needs to be taken in attributing amount of maternal talk or type of style to groups of parents depending on their educational or income level. More important is the effort to observe each child with a disability and her/his caregivers to identify ways the caregivers can encourage communication with the child.

Additionally, other factors such as genetic or congenital issues (e.g., Down syndrome, Fragile X), sensory issues (e.g., hearing loss, vision), familial history (e.g., learning disabilities, stuttering), birth history (e.g., anoxia, low birth weight), and environmental factors (e.g., parental substance abuse, toxins) may also impact a child's communication and language skills (ASHA, 2008a, 2008b). Further, as the work of Sameroff and Fiese (2000) indicated, children can have one or more risk factors, and no one risk factor is necessarily linked to a particular outcome. Indeed, there can be a range of developmental outcomes resulting from any one factor. It is important to examine cumulative risk and the effect multiple risk factors may have on the child's level of development.

Prevalence of Communication Delays and Disabilities

The CDC's most recent figures (Boyle et al., 2011) place the overall prevalence of developmental disabilities at 13.8 %, and similarly the

Department of Education indicates that 13 % of children 3–22 years are served by an Individual Education Program (ED Data Express, 2014). In contrast, only 2.77 % of the population of children birth to three were served under Part C and only 4.9 % of children three to five were served in Part B in 2013 (Early Childhood Technical Assistance Center, 2014). Thus, service systems have much progress to make in identifying earlier children with disabilities so they can receive the services and supports they need. A major factor in young children being referred for special services is often due to language or communication deficits. Indeed, many of the children seen for special education services have some type of communication or language deficit either as their primary or secondary disability (ED Data Express, 2014). In many children with ASD, hearing loss, Down syndrome, or intellectual disability, communication deficits are of major concern. For these children, SLPs may play a larger role, whereas for other groups of children, those with attention deficit disorder or other health impairments, their role may be more limited or specialized (e.g., articulation or feeding disorders).

SLPs Contributions to Screening and Diagnosis/Assessment

SLPs can contribute to the screening process for children with special education needs due to their knowledge of communication, language, and social skills. In addition, they are familiar with evidence-based early predictors of later communication and language skills and therefore can help guide decision making about the need for referral for special education services. Some general guidelines can be utilized such as early communication and language skills are a strong predictor of later skills (Chiat & Roy, 2008; Watt, Wetherby, & Shumway, 2006) and receptive language is a key predictor of both future receptive and expressive language skills (see Paul & Roth, 2011 for a review of predictors). In addition, skills such as the repertoire of gestures the child uses are important for later receptive skills, whereas joint attention and consonant inventory are predictive of later expressive skills (Watt et al., 2006). Therefore, a child with deficits in all of these areas would be a good candidate for early intervention services, whereas a child with only a mild delay in expressive language (with age level skills in all other areas) may be more likely to "catch up" to peers without intervention.

In the diagnosis/assessment process, SLPs can use their knowledge of profiling a child's skills across areas within communication and language to help in decision making (Crais, 2011). For example, for a child with a communication and/or language delay, it is important to develop a profile of the child's strengths and challenges across multiple areas *within communication* to help in diagnostic and assessment decisions as well as in intervention planning. Areas to examine include the phonological or sound system the child uses (e.g., number of consonants, omitting sounds); the child's vocabulary, both receptive and expressive; the level of the child's syntax or sentence structure (using single words versus multiple words in a sentence); the morphemes (e.g., "s" for plural, "ed" for past tense); and the child's use of pragmatic skills (e.g., the social rules for interacting such as how to start a conversation with a peer). As noted, a number of these skills are highly predictive of later language skills (Watt et al., 2006) and thus can be valuable in assessment and intervention planning. The child's strengths and challenges can then be used to identify gaps in the child's skills and address these gaps by using the child's strengths from which to build an intervention plan. For a detailed overview of assessment practices for SLPs, see Crais (2011).

As noted previously, it is also helpful for children in the assessment process to have their skills profiled across *all areas* of development (fine and gross motor, cognition, communication, and social-emotional), so as to gain a complete profile of a child's skills before planning intervention. SLPs and other team members, including the parents can contribute to this kind of profiling through standardized, observational, and parent-report measures. The collaborative process between the family and the SLP and other team member's is integral to the assessment and intervention planning process. Experiences with and

expectations for communication are grounded in the sociocultural ecology of the family. Learning from the caregivers about communication in their everyday settings and their preferences about their child's communication provides the context for the child's profile (Crais, 2011; Woods, Wilcox, Friedman, & Murch, 2011).

Disorders with Particular Deficits in Communication and Language

The following section highlights the SLP's role for children with disorders that have specific communication intervention needs. Although a number of professionals will work together to provide the services and supports, it is quite common for an SLP to play a prominent role with these children and families.

SLPs' Role with Children who are Deaf or Hard of Hearing (D/HH). Due to the varying impacts that hearing loss can have on a child's speech and language development, children suspected of developmental delays should receive comprehensive audiologic assessment and monitoring for signs of hearing loss (ASHA, 2004). The implementation of universal newborn hearing screening across the USA has resulted in many children who are D/HH being identified as infants (Joint Committee on Infant Hearing, 2007); however, for children with unilateral hearing loss, late onset or progressive hearing loss, mild losses not detected by newborn screening, or auditory neuropathy/dyssynchrony, identification may be much later. It is important to identify intermittent conductive hearing loss associated with otitis media, and therefore professionals and parents should monitor closely young children who are frequently sick with colds or upper respiratory infections. Early identification of hearing loss and appropriate early intervention have been shown to result in improved developmental outcomes for young children (Moeller, 2000).

In terms of which professionals perform audiologic assessment with *infants and toddlers*, ASHA provides clear guidelines, "Audiological assessment is performed by appropriately credentialed and qualified audiologists who possess a current ASHA Certificate of Clinical Competence where required and/or valid state license where required by law" (ASHA, 2004, p. 4). The joint committee (2007) also recommends screening of developmental milestones for all infants and young children by the family's pediatrician and immediate referral to an SLP for a speech and language evaluation if a child does not pass the global screening. For *older children* who are seen in preschool and school settings, SLPs can screen for hearing loss or middle ear pathology using conventional pure-tone air conduction methods (including otoscopic inspection), otoacoustic emissions screening, and/or screening tympanometry (ASHA, 2007a, 2007b). In addition, SLPs are among the professionals who provide services to children who are D/HH and are uniquely qualified to provide assessment of and intervention services in language, speech, and cognitive communication areas.

With the advent of cochlear implants, children who are D/HH are able to receive auditory stimulation at a very young age, during the key period for the development of speech and language skills (Kirk, Miyamoto, Ying, Perdew, & Zuganelis, 2000). Numerous studies have documented that children who receive implants before 3 years of age can acquire speech and language at a rate similar to that of peers with normal hearing, which can help lessen the gap in language development after implantation (Kirk et al., 2002; Svirsky, Robbins, Kirk, Pisoni, & Miyamato, 2000). Children's cognitive and social-emotional skills can also be commensurate with age with early identification and timely and appropriate interventions (Moeller, 2000; Yoshinaga-Itano, Baca, & Sedey, 2010). In addition, children with cochlear implants show better outcomes in speech and language development and speech perception, when compared to children who are D/HH and use hearing aids (Kirk et al., 2002). It is not clear, however, which factors predict success with cochlear implants (e.g., Geers, 2003). Therefore, assessment of the communication skills of children with cochlear implants is important pre- and post-implant to help in making recommendations regarding intervention planning, and SLPs can play a key role in this process.

Further, most children with hearing loss (without severe additional disabilities) should be able to develop spoken language and listening skills if identified early, provided with early and appropriate EI services, and fitted with amplification (Yoshinaga-Itano et al., 2010). Guidelines for the delivery of EI services to children who are D/HH can be found in Muse et al. (2013).

SLPs' Role in Assistive Technology Services. Children with developmental disabilities often have difficulties in daily routines and in interaction with others. Assistive technology (AT) is a means to address these deficits and can help the family and professionals support the child's development across a range of areas (Mistrett, 2004; Wilcox, Guimond, Campbell, & Weintraub Moore, 2006). AT includes a continuum of supports including devices, environmental modifications, and assessment and intervention strategies. In addition, the level of availability, technical complexity, and cost which children may benefit from AT also vary. Devices or accommodations may include "low-tech" inexpensive items such as pencil/crayon grips, adapted materials, and chairs. AT can also be more specialized to include touch screens, individualized switches, or speech-generating mechanisms (Wilcox et al., 2006). AT services also include the assessment of the child and environment, and gaining, implementing, and evaluating the equipment or modifications. Because of their expertise, SLPs can play a significant role on the team and can make recommendations to the family and other team members regarding AT devices and services. In collaboration with other team members who have expertise in positioning or mobility and fine motor and cognitive skills, the team can plan accordingly.

The use of augmentative alternative communication devices has increased in use for young children to support communication, language, and verbal speech development, especially for children with complex communication needs. Although still small in number, results from studies such as Binger and Light (2007) and Kent-Walsh, Binger, and Buchanan (2015) suggest that providing varying forms of augmented models increases symbol comprehension and/or production for preschool children. Use of AAC can help individuals not only meet their immediate communication needs but also support development of new language and communication skills. Studies of AAC use in young children highlight the essential role of the partner in communication interactions to provide language models and input to the child (Binger, Kent-Walsh, Ewing, & Taylor, 2010). SLPs with the ECSE team must also address partner coaching on how to interact and support the child using the AAC device (Douglas, Light, & McNaughton, 2013) for the child to be able to focus on productive communication.

Romski et al. (2010) compared three parent coaching language interventions, including two with AAC to increase the spoken words of 30 toddlers with a wide range of developmental disorders and significant communication delays (i.e., fewer than ten spoken words). They found a positive communication effect for each approach; however, children in both augmented interventions produced more target, spoken words than those in the speech only intervention. They concluded that augmented communication does not hinder, and actually aids, speech production abilities in young children with developmental delays. Not only were parents able to support their children's communication intervention with fidelity at the clinic and at home using AAC, their perceptions of success became more positive. Using a self-administered measure, parent's perceptions of the severity of the child's language difficulties decreased for the augmented intervention groups but increased for the spoken intervention (Romski et al., 2011).

SLPs' Role for Children with Down Syndrome. SLP's supports for families of children with Down syndrome (DS) illustrate the importance of intervention for prevention of communication disorders secondary to the diagnosis of intellectual disabilities (ID). Down syndrome is the most common genetic cause of intellectual disabilities with a wide range of associated developmental delays (Abbeduto, Warren, & Conners, 2007) including communication, speech, and language. While often social and interested in interactions with others, young children with DS begin to show delays in communication and language

development early. Of importance for the EI/ECSE team is that expressive language, a critical skill for functioning in everyday situations, is one of the areas of greatest delay (Roberts, Price, & Malkin, 2007). First words are likely to occur around 18 months. The language gap between children with and without DS widens throughout the preschool years. For example, most children are reported to have 50 single words by 24 months, whereas only 54 % of children with DS use 50 words by 48 months. The transition from single words to multi-word utterances is also prolonged (Iverson, Longobardi, & Caselli, 2003).

For children with DS, expressive use of language lags behind what would be expected for children based on language comprehension skills and should be taken into account as the team and family consider use of assistive technology or AAC. Several factors contribute to the disproportionate delay in expressive communication experienced by young children with DS and are important considerations for early intervention professionals. One factor is limited intelligibility. While the onset of babbling generally occurs on time, there may be a reduction in the variety of vowels and consonants early, and speech patterns begin to diverge in the second year (Kent & Vorperian, 2013; Oller, 2000). A review of studies of articulatory and phonological development in children with DS illustrates that phonological development is both delayed and disordered. Speech sounds develop slowly and error patterns can be related to anatomical differences (Bunton & Leddy, 2011). There is a lack of articulatory precision, pausing and phrasing, as well as a reduction of consonant clusters and final consonants overall (Kent & Vorperian, 2013). Intelligibility is reduced in connected speech (Stoel-Gammon, 2001).

Two-thirds of children with DS experience sensorineural or conductive hearing loss that is often a result of frequent ear infections with effusion (Abbeduto et al., 2007). Because of structural differences in the ear, children with DS are more susceptible than children who are TD to frequent ear infections and the collection of fluid in their ears (Abbeduto et al., 2007). Combined with deficits in short-term auditory memory or phonological working memory, this may pose additional barriers to the language development of children with DS, including the ability to learn through imitation (Chapman, Seung, Schwartz, & Bird, 1998). Thus,

SLPs typically have an important role in working with children with DS due to their speech and language deficits.

Studies of naturalistic language intervention have shown modest positive outcomes for children with DS (Yoder & Warren, 2002; Yoder, Woynaroski, Fey, & Warren, 2014). Often, outcomes for children with DS have been less strong than those for children with other intellectual disabilities and highly variable. For example, children with DS with functional object play increased vocabulary in response to a higher dosage intervention than did others without play skills (Yoder et al., 2014). The use of AAC, specifically sign language or speech-generating devices, is gaining support (Romski et al., 2010; Wright, Kaiser, Reikowsky, & Roberts, 2013) as a bridge to verbal language production. Modeling manual and spoken words to support learning and use of new language also appears to be a promising mode for children with DS, but additional adaptations to address the specific skills and needs of children with DS may be needed to make naturalistic interventions more effective (Wright et al., 2013).

SLP's Role with Children with ASD. Children with ASD are characterized by deficits in social communication and interaction and repetitive behaviors and interests (APA, 2013). In addition, to be diagnosed, a child must have deficits in social-emotional reciprocity, nonverbal communicative behaviors used for social engagement, and developing and maintaining relationships. Because these characteristics typically fall within a strong area of expertise for SLPs, they are often a key member of the team working with children with ASD. As a number of sources have documented, social communicative behaviors indicative of ASD can be observed in some children as early as the first year of life and in many by the second year (Bryson et al., 2007; Colgan et al., 2006; Landa, Holman, & Garrett-Mayer, 2007;

Ozonoff et al., 2010; Sansosti, Lavik, & Sansosti, 2012; Van Naarden Braun et al., 2007; Watson, Crais, Baranek, Dykstra, & Wilson, 2013; Wetherby, Brosnan-Maddox, Peace, & Newton, 2008; Wiggins, Baio, & Rice, 2006). Characteristics seen at 12 months of age in some children later diagnosed with ASD include reduced eye contact, social smiling, response to name, requesting, and joint attention, as well as atypical speech vocalizations and poor imitation skills, a smaller than typical inventory of gestures, and some atypical play skills (Mitchell et al., 2006; Ozonoff et al., 2010; Paul & Roth, 2011; Rozga et al., 2011; Watson et al., 2013; Zwaigenbaum et al., 2005). In addition, many of these deficits are similarly seen in older preschool children as they may not have acquired these skills at younger ages (or may have lost some of them through a regressive pattern). These behaviors can signal the child's limited interest in engaging with others, and therefore, early detection and diagnosis are critical, as well as the initiation of early intervention. SLPs can help parents and other caregivers (e.g., early care and education providers, preschool teachers) focus on enhancing the child's engagement and interest in playing and interacting with others and also increasing the child's interactive opportunities. SLPs may work closely with all team members to ensure there are many opportunities throughout the day for the child to want and need to communicate with others and to be encouraged in these interactions.

An additional area where SLPs may make strong contributions is in ISFP and IEP programming for children with ASD. In recognizing the importance of early developing communicative skills (e.g., gestures, eye gaze, sound making, reciprocity, babbling, imitation, intentionality) and their interconnections and hierarchical development, SLPs can help identify weaker areas and those of strength for the child. Helping build communicative skills in both horizontal ways (adding breadth to the child's communication system) and vertical ones (gaining higher and more sophisticated ways to communicate) is equally important for children with ASD because they may have uneven skills. For example, some children with ASD who use words, may not use those words in a functional way (beyond naming things) to request things or protest things not wanted. Thus, words alone may not be functional for the child unless the child understands how to use the words to communicate with others. In addition, because of the unevenness in skills, a child may have difficulty communicating if there is a communication breakdown and the child does not have an alternate way to indicate a need/want. For example, if a child uses a word to request something and the adult does not understand the word or the request, the child could point to the object, pick it up to show it to the adult, or simply use eye gaze looking back and forth between the object and adult to "show" it to the adult. However, if the child does not have these alternatives means (what some would call "lower level" skills) in their repertoire, their communicative efforts will be thwarted and they may turn away in frustration. In this case, the SLP could work with the child and her/his caregivers to help the child learn some of the underlying and alternative behaviors to communicate when a breakdown occurs. This type of detailed communication analysis is a strength for SLPs and their contributions may be to help highlight the communicative skills the child is lacking and plan strategies to help the child learn the needed skills. In a parallel fashion, SLPs have skill in identifying a child's language strengths and need areas and helping target the next "just right steps" in intervention for a child with ASD.

The final area that SLPs have expertise is in analyzing the play behaviors of the child and helping parents and other providers recognize the kinds of play skills the child exhibits and those that could benefit the child. As noted previously, play and language can be supportive of each other's development and both should be areas of focus for preschool children with ASD.

In terms of evidence-based interventions to guide decision making, the *Guidelines for Speech-Language Pathologists in Diagnosis, Assessment, and Treatment of Autism Spectrum Disorders Across the Life Span* (ASHA, 2006) identified several major research conclusions. First, there is clear empirical support demonstrat-

ing that a variety of approaches are effective in enhancing the communication skills of children with ASD covering a range of interventions from behavioral to developmental (National Research Council, 2001). In addition, recent studies with infants and toddlers provide growing evidence that early behavioral interventions are effective for some children with observable ASD symptoms (Carter et al., 2011; Dawson et al., 2010; Kasari, Gulsrud, Wong, Kwon, & Locke, 2010; Landa, Holman, O'Neill, & Stuart, 2011; Schertz, Odom, Baggett, & Sideris, 2013). Unfortunately, there are few studies that compare interventions with each other; therefore, relative effectiveness is less known as is determining which intervention is effective for which children. It is clear that no intervention is effective for all children with ASD or to the same degree (ASHA, 2006); thus, stronger research studies are needed to determine which interventions are effective for which children (Wallace & Rogers, 2010). Indeed the *Guidelines* (ASHA, 2006) recommend that professionals who want to determine whether a child is making progress with an intervention use systematic methods such as single-subject research design.

The NRC (2001) also identified essential active components of effective interventions for children with ASD that have continued to play a prominent role in many current interventions. They include that children who are enrolled in EI by 3 years of age have better outcomes than those who begin after 5. That at a minimum, active engagement in intensive intervention for 5 h per day for 5 days per week is necessary to achieve optimal outcomes. The makeup of these hours could be spread across direct services from an SLP and other professionals and high-quality preschool programs, plus engagement with the child's primary communication partners (e.g., caregivers, siblings). Additionally, the learning opportunities need to be brief, developmentally appropriate, and sequenced over time with an attentive adult. A further essential element is a strong role for caregivers and some component of caregiver training so that caregivers can generalize what they've learned to new situations and contexts. In a review by Levy, Kim, and Olive (2006) of parent-implemented interventions with children with ASD, the results indicated that parent involvement resulted in favorable outcomes in speech, language, and play skills. From an instructional context, the ratio of teacher to children must be low; in fact a 2:1 ratio is recommended, although may depend on the children's functioning level. Ongoing progress monitoring is recommended with adaptations made as necessary. Further, the NRC (2001) recommended six types of instruction: (a) functional, spontaneous communication; (b) social instruction in varied settings during the day; (c) targeted play especially focused on peer interactions; (d) acquisition of new skills along with generalization and maintenance to naturalistic settings; (e) the use of functional assessment with positive behavioral supports focused on challenging behaviors; and (f) targeting functional academic skills when developmentally appropriate.

SLPs' Role for Children with Childhood Apraxia of Speech

Children with childhood apraxia of speech (CAS) may have many speech symptoms or characteristics that vary depending on their age and the severity of their speech problems making both a clear description of the disorder or a definitive diagnosis a challenge for the early childhood team and the SLP. CAS is viewed as an impairment of speech motor control or praxis (Murray, McCabe, Heard, & Ballard, 2015). CAS can be associated with delayed onset of first words, a limited number of spoken words, or the ability to form only a few consonant or vowel sounds. These symptoms usually may be noticed between ages 18 months and 2 years and may indicate suspected CAS. As children produce more speech, usually between ages 2 and 4, characteristics that likely indicate CAS include vowel and consonant distortions; separation of syllables in or between words; and voicing errors, such as "pie" sounding like "bye." Specific indicators that help to identify CAS include the child making obvious movement of the jaw, lips, or tongue trying to make the sounds; difficulty moving smoothly from one sound, syl-

lable, or word to another; and vowel distortions (ASHA, 2007a, 2007b). With CAS, the child is attempting to say the sounds and words correctly but isn't able. Usually, the child with CAS does not have difficulty with nonspeech movements such as chewing, licking, or swallowing. Children with CAS may also have problems with other fine motor skills such as cutting, coloring, and writing, or even gross motor difficulties such as limb apraxia (ASHA, n.d.). Many children with CAS also have language problems, such as difficulty comprehending speech, reduced vocabulary, or difficulty with word order. The difficulty with speech and later language development may even result in problems with reading and spelling as the child gets older.

Because of the intelligibility issues experienced by children with CAS, most interventions focus on increasing communication and language skills. Speech production is a major emphasis, expanding the child's repertoire of sounds and sound combinations; however, when limited oral production is possible, the focus may also include the use of AAC such as gestures, manual signs, communication boards, or voice output systems (ASHA, n.d.; Yorkston, Beukelman, Strand, & Hakel, 2010). For most children with CAS, intensive, individualized intervention is needed; however, naturalistic contexts are preferred where caregivers can play a major role. The array of interventions include a focus on motor planning approaches using motor learning theory (Maas, Gildersleeve-Neumann, Jakielski, & Stoeckel, 2014; McCauley & Strand, 1999), linguistic (Velleman, 2003), sensory cuing (Hall, 2000), tactile cuing (Hayden, Eigen, Walker, & Olsen, 2010), integral stimulation (Strand & Skinder, 1999), integral phonological awareness (McNeill, Gillon, & Dodd, 2009; Moriarty & Gillon, 2006), and rhythmic approaches (Helfrich-Miller, 1994), or some combination.

Due to the limited literature examining approaches to CAS interventions, only preliminary effectiveness data are available. Two motor interventions (integral stimulation and tactile cuing) and a single linguistic approach (integrated phonological awareness) have been shown to be effective in both direct outcome measures and generalization effects (ASHA, n.d.; Murray et al., 2015). In terms of the amount of intervention, several studies have indicated that three to five individual sessions per week is recommended; however, for younger children, shorter and more frequent sessions may be needed (Hall, Jordan, & Robin, 1993; Skinder-Meredith, 2001; Strand & Skinder, 1999).

Service Delivery Options Used by the SLP on the ECSE Team

SLPs who provide services in ECSE settings may play a variety of roles such as team member, direct service provider, service coordinator, consultant, coach, resource locator, insurance liaison, advocate, administrator, and policy maker (ASHA, 2008a, 2008b). Thus, SLPs may have a range of responsibilities in relation to children with disabilities in ECSE settings, the child's caregivers, and other professionals working with the child and/or caregiver similar to other team members.

From a historical perspective, SLPs ("speech teachers" or "speech doctors" in the early years) initially provided services one to one in unidisciplinary settings and focused primarily on elocution and stuttering (Balboa, 2008; Duchan, 2002). With advances in education, medicine, audiology, and the advent of World War II, the field broadened to include a focus on aphasia, traumatic brain injury, and hearing loss. In addition, teams of professionals began to develop to enhance services in a broader array of settings (e.g., schools, hospitals, veteran's hospitals). In current times, SLPs work in a range of job settings and across differing types of teams. In addition, some SLPs continue to practice in unidisciplinary settings including private practice, university clinics, hospitals, etc. In this situation, the SLP will assist caregivers in creating a plan with potential collaborations with those who share in caring for and/or providing services to the child and family (ASHA, 2008a, 2008b, Guidelines). In settings where SLPs are part of an interdisciplinary team, their contributions may vary depending on the knowledge and skills they possess and those represented by other professionals on the team. For example, an SLP who

has expertise in feeding/swallowing may be hired on an EI team where the OT on the team also has feeding/swallowing expertise and may already be providing these types of services. Therefore, the team would collectively decide what types of children the SLP would serve and how to handle the overlap in expertise held by the OT and SLP. The end result may be that the SLP would provide feeding/swallowing services to additional children the team serves or may work exclusively with children who have primary speech and language issues that match the SLP's other areas of expertise.

Another issue in service delivery is the location of the intervention, ranging from home, clinic, school, or community, to integrated classrooms, segregated classrooms, and pullout settings (Schooling, Venediktov, & Leech, 2010). Reviews of service locations have resulted in mixed findings, but were also limited by the settings examined (i.e., classroom versus pullout, segregated versus integrated). A review by McGinty and Justice (2006) looked at the evidence for the effectiveness of intervention delivered in classrooms versus pullout services for children with language impairments. Whereas one study resulted in no differences on expressive language scores and positive results on receptive language for pullout services (Valdez & Montgomery, 1996), two other studies indicated better outcomes for classroom-based services (Throneburg, Calvert, Sturm, Paramboukas, & Paul, 2000; Wilcox, Kouri, & Caswell, 1991). Similarly, a study by Buysse and Bailey (1993) revealed no significant differences on developmental outcomes between segregated and integrated classroom services; however, there were more gains in social and behavioral outcomes in integrated settings. Rafferty, Piscitelli, and Boettcher (2003) also found greater gains in language skills in integrated programs, however, only for the children with severe disabilities.

Regardless of setting or service delivery option, early intervention/early childhood services and supports are based on the same core principles (ASHA, 2008a, 2008b; NECTAC, 2008 Guidelines). The first principle—services and supports are family centered and culturally responsive—emphasizes the unique role of the family and their beliefs, values, priorities, and preferences in the development and implementation of an individualized plan for the child. Families are active participants and decision makers throughout the process, integrating their cultural and linguistic values and practices. Developmentally supportive services that promote children's participation in their natural environments is the second principle based on theoretical and empirical models of child development that acquisition and use of communication occurs within a social and cultural framework. Services and supports offer realistic and authentic learning experiences and promote meaningful and functional communication with family members, peers, caregivers, and team members. The third principle—services are comprehensive, coordinated, and team-based—speaks to the essence of this chapter. SLPs may be one of several professionals working with the child and family. Communication and collaboration to ensure the child and family priorities are addressed efficiently and effectively is the responsibility of every team member regardless of the method of service delivery. Finally, services and supports are based on the highest quality internal and external evidence that is available. The integration of the highest quality and most recent empirical research, informed professional judgment and expertise, and family preferences and values guides the service delivery model identified for the child and the manner in which the roles of the SLP are enacted.

The following section highlights some of the types of evidence-based interventions that may be provided by SLPS in early childhood special education settings.

Evidence-Based Interventions Focused on Communication and Language

A number of comprehensive interventions and specific teaching strategies for promoting communication and language in young children have empirical support within the literature, such as

environmental arrangement (which may include AT adaptations; Demchak & Downing, 1996), milieu approach (Hancock & Kaiser, 2002), responsive adult interaction patterns (MacDonald & Gillette, 1988; Mahoney, Powell, & Finger, 1986), and parent-implemented interventions (Arthur, Butterfield, & McKinnon, 1998; Hemmeter & Kaiser, 1994). Of these interventions, naturalistic or milieu teaching techniques are the most frequently researched, and while each has specific components, this group of interventions typically includes basic features of following the child's lead, providing natural consequences, embedding techniques throughout the child's daily routines and activities, and providing caregiver support/training in multiple settings and contexts (Wolery & Hemmeter, 2011). Implementation of intervention techniques that are appropriate to the individual family and child as well as the individual(s) who will be responsible for implementing and monitoring the outcomes will be outlined in the IFSP to ensure that the techniques are used consistently, systematically, and accurately.

Research in communication-focused interventions is expanding with the importance of this expansion underscored by the prevalence of communication impairments in children with various etiologies and the predictive relationship between communication skills and later academic and social performance (Johnson, Beitchman, & Brownlie, 2010). Because of the integral role communication has in young children's participation in everyday activities, research is increasing to support the recommended practices for infants and toddlers with communication delays that incorporates intervention within natural activities through collaboration with parents (American Speech-Language-Hearing Association [ASHA], 2008a, 2008b; Early Intervention Program for Infants and Toddlers with Disabilities & 34 C.F.R. pt. 303, 2011; Sandall, Hemmeter, Smith, & McLean, 2005). Although the importance of translational research is widely recognized (Durlak, 2013; Justice, 2008; Other Communication Disorders, 2012), to date, early communication intervention research has been limited in its direct translation to implementation in community settings in which children regularly receive services (e.g., preschools, Head Start programs) rather than home settings where parents are included. For infants and toddlers served in natural environments, child outcomes, while essential, do not address the whole story. Early communication interventions should be examined also in relationship to the process and context used to teach parents (Schertz, Baker, Hurwitz, & Benner, 2011; Trivette, Dunst, & Hamby, 2010; Woods & Brown, 2011).

Parent-Implemented Interventions

Several intervention studies and systematic reviews have shown that parents can effectively use communication strategies and supports with positive effects on their children's communication outcomes (e.g., Boyd, Odom, Humphreys, & Sam, 2010; Girolametto, Weitzman, & Clements-Baartman, 1998; Kaiser & Roberts, 2013; Kashinath, Woods, & Goldstein, 2006; Law, Garrett, & Nye, 2004; Roberts & Kaiser, 2012; Wetherby & Woods, 2006). The interventions examined in these studies were based on the established framework that parents can and do have an instrumental role in their children's language development (Hart & Risley, 1995; Landry, Smith, & Swank, 2006), and teaching parents to use specific communication interactions and support strategies may enhance their children's skills.

To examine the effectiveness of parent-implemented interventions, Roberts and Kaiser (2011) conducted a meta-analysis of 18 parent-implemented communication intervention studies. The children in the studies ranged from 15–77 months and included children with primary language impairments (11 studies) and secondary language impairments (7 studies), including ASD, Down syndrome (DS), and developmental delay (DD). Children receiving parent-implemented interventions had positive, significant effects for expressive language when compared to nontreatment groups, particularly for expressive language form, $g = 0.82$, $p < .01$. When parent-implemented and therapist-

implemented interventions were compared, child language outcomes were similar or slightly higher for children receiving parent-implemented interventions. Intervention strategies common across effective studies included (a) responsiveness to child communication, (b) expanding child communication, (c) enhancing the type of language input, and (d) balancing parent and child communication to establish reciprocal supportive communication exchanges.

In five recent randomized control trials, researchers examined parent-implemented interventions for toddlers and young preschool-age children (Carter et al., 2011; Roberts & Kaiser, 2012; Rogers et al., 2012; Wetherby et al., 2014). Roberts and Kaiser (2012) and compared language outcomes of children between 24 and 42 months with primary language impairments in a combined clinic and home Enhanced Milieu Teaching (EMT) intervention program. Rogers et al. (2012) examined the effects of a clinic-based parent-implemented version of the Early Start Denver Model (P-ESDM) for toddlers at risk for ASD. Carter et al. (2011) studied parent responsivity and child communication of toddlers with red flags for ASD following participation in Hanen's More than Words (HMTW) combined group and individual parent training intervention. The children in the comparison groups received "business as usual" supports; many of the children and families in the P-ESDM and HMTW studies participated in various community-based interventions, whereas 92 % of the children in the EMT study did not receive any language intervention. Interestingly, only the EMT study demonstrated significant main effect differences between intervention and control groups. Without carefully defining or controlling the intervention that the control groups in the P-ESDM and HMTW studies received, the results are difficult to interpret beyond stating that each of the examined interventions was similarly effective as other interventions that children and families may be typically receiving. The role of parent intervention involvement in the control groups was not reported. In addition to location variations (e.g., home or clinic) of the respective parent-implemented intervention, the researchers in each of these three studies used different processes to teach the parents to implement intervention strategies. This highlights the issue that although parent-implemented intervention studies share the common focus of teaching parents to implement specific strategies, the intervention and process in which parents are taught varies substantially (Baranek et al., 2015).

Limitations of Parent-Implemented Intervention Studies

When examining limitations of parent-implemented intervention studies of toddlers, two additional considerations related to IDEA Part C service delivery can be noted—the parent's role and the service location. IDEA Part C stipulates that early intervention services and supports are designed to build the families' capacity to support their children's development and are to be provided in their natural environments, including both physical locations (i.e., setting) and the family's routines and activities (i.e., context) (IDEA, 2004; NECTAC, 2008). Family capacity building underscores an important distinction among the broad category of parent-implemented interventions. Although the terms training and coaching are often used interchangeably or in a nonspecific manner, there are important differences between the two approaches (Kemp & Turnbull, 2014). Specifically, training parents to implement intervention in *predetermined* intervention contexts (e.g., preschool, clinic setting) is different than collaborating with parents as decision makers in the process of coaching them to embed intervention in their everyday routines. Parent training often entails the interventionist providing information, modeling strategies while the parent watches, and providing specific instructions to the parents on what and how to use strategies within play activities (e.g., Fey et al., 2006; Girolametto et al., 1998). However, family-guided parent coaching includes parents as integral decision makers and collaborators in how, where, and when the intervention is implemented (Kashinath et al., 2006; Wetherby & Woods, 2006; Woods, Kashinath, & Goldstein, 2004). Interventions using a parent coaching

approach focus on the triadic interaction of the interventionist supporting the bidirectional parent–child interactions and communication (Salisbury & Cushing, 2013; Woods et al., 2011). To be determined as effective and efficient, parent-implemented communication interventions for young children overall should address both the needs of the child and of the parent.

Classroom- and Collaboration-Based Approaches

Classroom- and collaboration-based approaches are described as those in which SLPs join the early childhood special education team in the classroom providing intervention to individuals or to small groups of young children in their general and special education classroom settings directly or by supporting other team members to embed a planned intervention within specified activities throughout the day (Hadley, 2014; Kamhi, 2014). SLPs also may team teach with general and special education classroom teachers using lessons and scaffolding strategies that integrate communication intervention with instruction in the regular curriculum.

One area for SLP participation in PreK classrooms is preventative language and literacy development for children at risk for language delays and possibly susceptible for later reading difficulties. A prevention orientation emphasizes the importance of focusing attention toward the design and delivery of interventions that boost children's achievement of pre-reading skills, particularly oral language and vocabulary. The embedded–explicit model of emergent literacy intervention (Justice, Invernizzi, & Meier, 2002) is designed to guide the SLP who works with preschool children through the use of a multitiered intervention for ensuring at-risk children's attainment of critical emergent literacy skills in collaboration with the classroom daily activities. Multiple examples of interactive storybook reading as an instructional practice have had positive effects on young children's vocabulary development (Goldstein, 2011; Justice, Kaderavek, Fan, Sofka, & Hunt, 2009). This practice expands on the context of shared book reading (i.e., adult–child engagement centered on a book) by embedding specific learning opportunities on identified target words or grammatical forms focusing on the interaction between the adult and child during storybook reading as a way to introduce new vocabulary and reinforce language development by engaging the child in dialogue.

Evidence-based reviews or meta-analyses of SLP communication interventions in the preschool classroom are limited and have variable findings. SLPs incorporate a variety of interventions in class-wide, small group, and individual interventions with young children.

Specific procedures such as recasts, focused stimulation, and enhanced milieu teaching have been examined with children of various age groups and disability types. Studies examining specific procedures alone are more variable; however, packaged that incorporate multiple naturalistic strategies as a key ingredient do appear to be effective (Roberts & Kaiser, 2011, 2012).

Hadley (2014) discusses two additional important considerations for the SLP and the team, sufficiency of opportunities, and distribution of practice, as she draws her conclusion that there is a critical level of input for preschoolers to gain language skills including vocabulary and grammatical markers. The evidence suggests that children with language impairments need more opportunities to learn than children with typical language (Proctor-Williams, 2009) and that exposure below a critical dose level will not be effective (Proctor-Williams, Fey, & Loeb, 2001). Gray (2003) found that preschoolers with LI required an average of 27 trials to comprehend a new word and 49 trials to produce a new word compared with a mean of 13 for comprehension and 24 for production by same-aged typically developing children. In this study, approximately twice as many trials as were needed to map a new word with its referent by the children with LI and that they also required more trials to comprehend new words than the typically developing group did to produce them. Studies of children with LI show the same advantage of distributed over massed practice. Evidence for this comes from studies of both vocabulary and grammar. These

findings emphasize the importance of collaboration and coordinated planning between the team and the family to ensure acquisition of skills.

The contents of this chapter are intended to describe the collaborative role of the SLP as a member of the early intervention/early childhood special education team to support the child, family, and other team members to enhance communication, language, and literacy development. In addition, specific interventions for feeding and swallowing, speech and phonology, or in AAC/AT are provided through a variety of service delivery approaches. The diverse roles of the SLP range from the primary service provider to the classroom consultant confirm that there is much to learn about efficacy and effectiveness of communication interventions. While many evidence-based interventions are available, more are needed to support the diversity of important outcomes to be achieved and the roles that SLPs may play. At this point in our evolution, team members should incorporate supports and services matched to the unique and changing needs and priorities of the children and families. Keeping the child and family at the focus of intervention and the source of decision making is the linchpin of quality services. Connecting families with resources in the community, with their health and education programs, and with other families of children with disabilities promotes engagement, participation, and implementation. Evidence supports communication as key to high-quality and productive life.

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