

## CHAPTER 20

# Communication Disorders in Infants and Toddlers

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Communication is a complex cognitive and social behavior that develops over an extended time. However, by the age of 3 years, many children have mastered the basic vocabulary (semantics), grammar (morphology and syntax), and sound system (phonology) of language and can communicate in a variety of social contexts (pragmatics). For young children at risk for communication disorders and for children with persistent communication disorders, there may be substantial negative academic and social outcomes. Communication disorders in childhood cover a range of conditions, including disorders of fluency and voice production. Language disorders, including phonological disorders, are the most prevalent type of communication disorder. We present in this chapter first an overview of typical language development, then outline the prevalence, comorbidity, and potential risk factors of language disorders. This is followed by an overview of language disorders as they present in early communication, with reference to pragmatics, early vocabulary, and grammar. We also discuss assessment and intervention strategies and efficacy.

### Communication and Language Development

Language development starts well before children begin to use conventional words and sen-

tences. Children's emerging language is linked closely to their prelinguistic behavior and to their social environments. Infants are aware of their environment as early as the first month or two of life. For example, at about 2 months of age, following an initial biobehavioral shift, a young child will follow an adult's eye gaze to a referent of interest. By around 4 months of age, infants have a propensity to fuss at times just prior to scheduled feedings, and begin to anticipate aspects of familiar routines such as clean-up time after mealtimes. These infant behaviors provide salient opportunities for adults to begin to respond consistently to the infant. Adults often do respond, and tend to interpret infants' behaviors as intentional communication (Brooks & Meltzoff, 2013). Over time, consistent and predictable responses by adults likely result in infants moving toward early intentional communicative overtures, including vocalizations by about 9 months of age (Crais, Douglas, & Campbell, 2004). Prizant and Wetherby (2003) described a number of features of early infant-adult exchanges that have been used collectively to infer that a young child's behavior is intentional communication. These include continuing to produce communicative behavior and changing the form of the behavior until the goal is met, alternating eye gaze between the goal and a listener, waiting for a listener to respond, ceasing the behavior when

the goal is met or displaying dissatisfaction if it is not met, and ritualizing or conventionalizing the behavior. The greater the number of these features observed, the stronger the case that the behavior was produced intentionally.

These types of social interaction and awareness during infancy predict later language skills (Kuhl, Tsao, & Liu, 2003). Neural commitment has been proposed as the underlying mechanism motivating the rapid speed with which infants' native-language speech perception increases in the first year of life. This early neural coding and statistical learning promotes the learning of the infant's native language but, as early as 10 months, also inhibits the learning of new patterns such as those in a non-native language (Kuhl, 2004).

Once children are communicating intentionally, both the early functions intended and the means used to produce them can be described. Early intentional communication is often characterized as serving three general functions that emerge before intelligible spoken words (Prizant & Wetherby, 2003). These include behavior regulation, joint attention, and social interaction. Common examples of behavior regulation include protests and requests for objects or activities. Examples of joint attention acts include providing information and commenting. Social interaction acts include intentions, such as greetings.

Joint attention initiations and responses have been of particular interest, and may be served by different functional brain systems (Mundy, Card, & Fox, 2000). Responses to joint attention occur when a child reacts to an adult glancing or pointing to an object or event after the adult first attracts the child's attention. Responses to adult-initiated joint attention bids in the form of following an adult's gaze shift occur within the first several months (Senju & Csibra, 2008). Children's ability to follow an adult-initiated pointing gesture emerges between ages 9 months and 2 years, depending on the location of the referent and communicative partner. Children's initiation of joint attention bids, in which the child directs a listener's attention to a referent through eye gaze, gestures, and vocalizations, begins to emerge about or slightly before 12 months of age. Joint attention may be related to the motor milestone of crawling because locomotion potentially facilitates broader psychological development (Campos et al., 2000).

Early intentional communication has two major means: gestures (e.g., pointing, reaching) and vocalizations (babbling and nonspeech

sounds). While there is variability in speech and other motor movements across development (Saletta, 2015), gestural and vocal development are temporally correlated and linked in many ways. For instance, rhythmic limb movements, such as shaking, swinging, and banging, occur at about 7 months of age, the same time as the occurrence of regularly timed reduplicated babbling such as "bababa" (Ejiri & Masataka, 2001). Oral motor development also has been linked to expressive vocabulary growth and grammatical complexity (Alcock & Krawczyk, 2010; Nip, Green, & Marx, 2011).

Canonical babbling, the point at which children demonstrate well-formed consonant-vowel syllable shapes, emerges at about the same time as intentional communication. The presence and frequency of canonical babbling predicts later development (Oller, Eilers, Neal, & Cobo-Lewis, 1998). However, gestures tend to be the primary communicative form until about 14–16 months of age. Parallel to the production of first words, infants may produce their first gestures indicating recognition, such as picking up the receiver of a toy telephone and placing it briefly to the ear. This indicates that the ability to connect word meanings to objects is emerging (Iverson, 2010).

Gestures decrease during the second year of life, along with an increase in combinations of gestures and vocalizations or early words and an increase in words used alone. By a child's second birthday, vocalizations alone account for approximately 40% of a child's communication, and gesture-vocalization combinations account for about 50% (Iverson & Thal, 1998). By 30 months of age, speech alone is the primary form of communication for children acquiring a spoken language (Carpenter, Mastergeorge, & Coggins, 1983). There are strong links between prelinguistic communication and language production and comprehension, although there may be different patterns of association for children with and without developmental disabilities. These links have been shown for a range of early communicative behaviors, including joint attention, gesture, and consonant production (Bruinsma, Koegel, & Koegel, 2004; Camaioni, Aureli, Bellagamba, & Fogel, 2003; Yoder & Warren, 2004).

Children's first spoken word productions tend to emerge around 1 year of age, and many children comprehend a much larger number of words than they produce. There is wide variability in toddlers' produced and comprehended vocabulary. Sixteen-month-old English-speak-

ing children comprehend a median number of 50 words. However, children at the 10th percentile produce very few words, and children at the 90th percentile use over 150 words. By age 2 years, the median number of words produced is about 300. This ranges from fewer than 60 words at the 10th percentile to over 500 words at the 90th percentile (Fenson et al., 1994). Although spoken language is the most familiar communicative means, sign languages, such as American Sign Language, may be a child's native language. Individuals with severe hearing impairment may also use sign systems that represent language. Hearing infants taught by caregivers to use symbolic gestures for concepts such as *more* and *all gone* appear to use the gestures slightly earlier than they use spoken words for the same concepts, possibly because gestures are more visible than words (Goodwyn & Acredolo, 1993).

Across languages, the emergence of toddlers' word combinations and grammatical affixes correlates robustly with their vocabulary development (Devescovi et al., 2005). Acquisition of a critical mass of different words may be necessary for grammatical skill to emerge. It is common for children to show overregularization errors (e.g., *runned*, *throwed*). The order in which grammatical inflections, such as plural and possessive markers, emerge is predictable within a language but reflects the typology of the native language(s) being learned (Luk & Shirai, 2009). The grammatical errors of children with language disorders also vary according to the specific language(s) they are learning (Leonard, Wong, Deevy, Stokes, & Fletcher, 2006). Between ages 2 and 4, children's sentence length, measured either in words or in ways that account more directly for grammatical complexity, is highly correlated with chronological age (Miller, 1981). Children start to combine two words in the first half of their second year and three words toward the end of the second year. Children begin to use English grammatical markers such as the present progressive *-ing* and plural *-s* consistently when they have two- to three-word sentences (e.g., "Me going now," "Those dogs"). Verb forms such as *is*, *am*, *are*, *has*, and *does* appear later.

For children learning more than one language, there are individual differences in language development related to the age of second-language exposure and the social and affective contexts of language learning. For young children learning two languages sequentially, there likely is a shift in proficiency across the languages over

time. However, there is no strong evidence that children who are learning two languages simultaneously or sequentially are at greater risk for language disorders (Kohnert, 2010). Children's phonological development often is characterized in terms of consistent processes, such as consonant cluster reduction, syllable reduction, and final consonant omission. Typical 1- to 2-year-olds may reduce clusters (e.g., pronouncing *tair* for *stair*), omit unstressed syllables (e.g., *nana* for *banana*), and omit final consonants (e.g., *da* for *dad*). These developmental phonological processes may be present even in children with hearing and speech motor difficulties, as in Down syndrome (Martin, Klusek, Estigarribia, & Roberts, 2009). Glide (*y* and *w*) and liquid consonants (*l* and *r*), in which the articulators are in close approximation, may present particular difficulty (Preisser, Hodson, & Paden, 1988). A general guideline that has been proposed is that 2-year-olds with typical speech development are intelligible to strangers in about 50% of their conversation, and 4-year-olds are completely intelligible (Coplan & Gleason, 1988).

In tandem with the development of language structure, children develop conversational and social uses of language. Although there is not uniform agreement about the taxonomies of children's early conversational functions, commonly accepted categories include conversational initiation, maintenance, and termination. Conversational functions to maintain social interactions, including the ability to repair communicative exchanges that break down, have the greatest depth of empirical scrutiny. Children attempt to repair as much as 88% of their original communicative acts, such as by repetition of pointing or increased vocalization (Liszkowski, Albrecht, Carpenter, & Tomasello, 2008), by about 1 year of age. During the first several years, children increasingly increase the range of repair strategies that they use. By the time children are producing two-word sentences, a sizable proportion of their communicative repairs are modifications of the original message, through increasing loudness and adding gestures, adding different words, and reducing the original message for emphasis (Wetherby, Alexander, & Prizant, 1998).

### Primary and Secondary Language Disorders

Language disorders may present as a primary language impairment or as secondary to other

conditions, such as hearing loss, neurological insult, developmental delays, and environmental deprivation. Different subtypes of language disorders have been proposed, including expressive (production) language disorder, mixed receptive (comprehension) and expressive language disorder, and phonological disorder. As in research on dyslexia, a primary language disorder has been traditionally diagnosed by exclusion, that is, impairments occurring with adequate environmental stimulation and without neurological damage or other deficits (Leonard, 2014). However, there has been a more recent move to emphasize inclusionary rather than exclusionary diagnostic criteria (Reilly et al., 2014).

Language disorders are a common feature associated with a range of neurodevelopmental conditions. When language disorders are secondary to other conditions, the communication skills often, but not always, reflect the broader cognitive profile of the primary condition (Rice & Warren, 2004). Language disorders are present in many clinical populations with a known genetic basis, such as people with Down syndrome (Chapman & Hesketh, 2000). Disorders also are present in populations with focal brain injuries and hearing impairment (Kennedy et al., 2006, Vicari et al., 2000). Language skills may dissociate from other cognitive skills in some instances, such as Williams syndrome. Different clinical groups do show differences on close examination of profiles across language domains (Rice, Warren, & Betz, 2005). However, there are some broad similarities across primary and secondary language disorders. For instance, although rates of development across language domains may be different, grammar is a particular weakness for several clinical groups (Bates, 2004).

### **Prevalence**

By any measure, language disorders are common childhood conditions across countries (Law, Boyle, Harris, Harkness, & Nye, 2000a; McLeod, McAlister, McCormack, & Harrison, 2014). For example, the U.S. Department of Education (2015) reported that 2.8% of children between ages 3 and 21 years received services for primary language or speech disorders. Estimates of the prevalence of primary language and/or speech disorders range from about 5–7% for 2- to 3-year-olds. A large-scale epidemiological study reported an estimated overall prevalence rate of 7.4% of language disorders in kin-

dergarteners (Tomblin et al., 1997). Estimates of receptive-only and expressive-only language disorders (without concomitant speech disorders) are comparable to each other, with about 2–4% of young children affected in each case. More males than females are affected, although it is not clear whether this reflects biological or reporting differences (Law et al., 2000a).

### **Course**

Although there is marked heterogeneity, primary disorders tend to be persistent across the elementary school years and may persist into adulthood (Bishop, 2006; Tomblin, Zhang, Buckwalter, & O'Brien, 2003). Children with reading and other language difficulties are at risk for negative outcomes as adults, including poor emotional and behavioral health (Law, Rush, Schoon, & Parsons, 2009; Snowling, Bishop, Stothard, & Kaplan, 2006). Although there are few studies of speech-only disorders, these disorders appear to be less persistent than language disorders. Most prevalence estimates of primary speech disorders are for children beyond early childhood, with one estimate of 3.8% for 6-year-old children, with boys affected more often than girls (Shriberg, Tomblin, & McSweeney, 1999).

### **Comorbidity**

There is limited information about the comorbidity of primary language and speech disorders with other conditions in very early development. However, different clinical groups often are comorbid or show overlapping language, social, and/or subclinical nonlinguistic performance at later points in development (Tomblin & Mueller, 2012). There is, for example, substantial overlap between primary language/learning disorders and attention deficit and disruptive behavior disorders during the preschool and school years. “Developmental coordination disorder,” a neurological disorder characterized by movement difficulties such as postural control and timing deficits, may also be comorbid with language impairment (American Psychiatric Association, 2013).

### **Etiology and Risk Factors**

Nonshared environmental factors and genetic factors influence variation in language development. Environmental factors may play a larger role for young children’s vocabulary develop-

ment (Bishop, Price, Dale, & Plomin, 2003). There is increasing documentation of a familial and heritable component to primary language disorder (Bishop, 2006). While this raises the issue that there may be particular genes involved in language disorders, there is not yet a clear understanding of the genetic basis of language difficulties or the multiple genes assumed to underlie variation in language performance. Language disorders generally cluster in families (Tomblin et al., 1997). Twin studies indicate high heritability, and dizygotic twins demonstrate less concordance than do monozygotic twins (Deriziotis & Fisher, 2013). Later literacy difficulties also have a strong genetic contribution (Barry, Yasin, & Bishop, 2007). Primary language disorders also may be associated with structural neuroanatomical differences (Verhoeven et al., 2012). A variety of psychological constructs, including deficits in phonological working memory, processing speed, rapid auditory processing, and attention, have been invoked to describe primary and secondary language disorders (Leonard, 2014).

Although biological factors clearly are important, children's language also reflects their life experiences, social interaction opportunities, and frequency of exposure to different language forms, as well as integrity of the underlying cognitive system. For example, children from lower socioeconomic status groups are more likely to be identified with a primary language disorder or learning disability (Tomblin et al., 1997). Overall, the frequency and responsiveness of child–adult social interaction appears to be a central framework for language development. In a seminal study, the now classic study by Hart and Risley (1995) of the 30,000,000-word gap found that parents who produced the greatest cumulative number of spoken utterances to their children in the first 3 years of life had children with the most extensive vocabulary skills. The degree of children's exposure to lexical richness and syntactic complexity also influences their lexical development (Hoff & Naigles, 2002). Parents of children with superior language skills were far more responsive than other parents to their child's communicative initiations. Other style aspects may differ between caregivers of children with and without disabilities, such as degree of directiveness and variation in intonation. However, these style differences seem to be adaptations to the child's communication, and not a major cause of language difficulties (Leonard, 2014).

## *Phenomenology*

For primary and secondary language disorders, the communication difficulty likely will include deficits in vocabulary and grammar, pragmatics, and speech sound production, with varying severity across these domains. Like other developmental phenomena, language may break down in different ways because there is not a single pathway to the same developmental outcome (Shonkoff & Phillips, 2000). However, there are identifiable patterns of language breakdown, with the overall trajectory in early development appearing to be delayed onset rather than deviance. Early pragmatic, vocabulary, and grammatical delays are described below.

### *Prelinguistic and Early Pragmatic Delays*

In early development, deficits in joint attention and the ability to generalize and use language productively have been of particular interest across different clinical groups. Some children with developmental disabilities, notably children with autism, show marked deficits compared to typical populations in joint attention initiations and responses. Children with developmental delays may initiate communication less frequently, produce a smaller range of communicative functions, and attempt fewer and less sophisticated communicative repairs than typical peers. Children with disabilities may need clearer and a greater number of teaching opportunities than typical children to generalize across communicative means (Reichle & McComas, 2004). Several child and environmental factors have significant correlations with later expressive language skills and may predict language outcomes. These include prelinguistic vocalizations (babbling, using consonant–vowel syllables, vocalization rate), vocabulary comprehension, representational play, and gesture production (Brady, Marquis, Fleming, & McLean, 2004). Parent–child interactions, such as parental sensitivity, the degree of responsiveness, and the ability to moderate interaction styles, may also lead to changes in later language outcomes (Calandrella & Wilcox, 2000; Saxon, Colombo, Robinson, & Frick, 2000).

### *Early Vocabulary Delays*

The high variability in vocabulary size for typical children can make it difficult to identify early delays. A central clinical question has

been whether children with slow expressive vocabulary development (often defined as below the 10th percentile) who otherwise show typical development, so-called “late talkers,” catch up to age peers with continued development. It is not clear what characteristics predispose some children to resolve early language delays, presenting a challenge for appropriate intervention services. Several risk factors have been suggested for persistent delays, especially the presence of a receptive language delay in addition to the expressive delay, more restricted consonant and syllable inventories, and lower nonverbal cognitive abilities (Oliver, Dale, & Plomin, 2004; Thal, Reilly, Seibert, Jeffries, & Fenson, 2004). Toddlers’ “fast mapping” (the ability to comprehend and produce new words after few exposures) has received particular attention as a predictor of vocabulary learning. For example, an older sibling may talk about a new toy in the context of playing with a group of toys. The younger sibling can then learn that new word and match it with the new toy by realizing that he or she already understands the names associated with the other toys. Fast mapping and other aspects of word learning are less developed in children with language difficulties, with this ability mediated by chronological age, receptive language skills, and word-learning task (Kan & Windsor, 2010).

As a group, late talkers resolve some of their language delay, but the clinical significance of the change is open to debate. Dale and colleagues (2003) showed that 40% of children who were below the 10th percentile in vocabulary size at age 2 years performed below the 15th percentile at age 4 years. There are findings that many toddlers with small expressive vocabularies perform at or near age expectations on standardized language tests by 5 years of age. However, these children continue to show noticeable weaknesses in higher-level language use and reading (Rescorla, 2005). Caregiver education and monitoring but no intervention for early vocabulary delays has been suggested; others have advocated for early intervention. Not every toddler who demonstrates delayed language production experiences a later language disorder. “Late bloomers” demonstrate late language emergence but appear to improve their language skills in preschool (Rescorla, 2009). However, some research indicates that this improvement is an illusory recovery, manifest at certain points of development, and that the underlying language weakness may still be

apparent in later childhood (MacRoy-Higgins & Dalton, 2015; Rescorla & Turner, 2015).

Many children with significant language delays also exhibit social difficulties. Separating late talkers from young children at risk for autism spectrum disorders presents a particular diagnostic difficulty. As language skills become more established in the preschool and school ages, the cognitive–linguistic profile of children with a primary language disorder is separable from that of children with autism spectrum disorders. Although there may be overlapping profiles at certain points in development (Tager-Flusberg, 2004), there are core distinctions in nonverbal intelligence and quality of language performance. By convention, children with a primary language disorder have nonverbal IQs within the normal range. This is not the case in autism spectrum disorders, in which 50–70% of children with autism obtain scores of less than 70 in nonverbal IQ measures (Matson & Shoemaker, 2009); 28% obtain scores in the average range, and 3% obtain scores in the above average range (Charman et al., 2011). Up to about 35% may have no or severely limited language skills (Lord & Risi, 2000; Lord, Risi, & Pickles, 2004). School-age children with a primary language disorder show more subtle grammatical and conversational difficulties. The frequent “echolalia” (excessive immediate or delayed imitation) and the characteristic stereotyped behaviors found in children with autism spectrum disorders also are absent for children with a primary language disorder.

For infants and toddlers, the distinction between late talkers and children at risk for autism spectrum disorders is less clear. Toddlers with autism spectrum disorders may show differences in social communication, including less frequent imitation and joint attention bids, but may not show the stereotyped behaviors of older children (Crais, Watson, Baranek, & Reznick, 2006). Toddlers identified as late talkers may show low social competence, especially related to shyness and internalizing behaviors (Irwin, Carter, & Briggs-Cowan, 2002). However, in this as in several other studies, it is difficult to separate the two groups because screening measures for autism were not administered to the assumed late talkers (Fitzgerald, 2003).

#### *Early Grammatical Delays*

Difficulty with grammar is the hallmark of preschoolers with a primary language disorder.

der. English-speaking children with language disorders omit verb markers more often than do typical children who have the same average sentence length. The verb markers include the regular past tense marker *-ed* (*walked, kicked*), third person singular marker *-s* (*she sleeps, he runs*), and verbs *is, are, and am*. A 4-year-old child with a language disorder might say *he play* and *she happy* while typical age-matched peers say, “He plays” and “She is happy.” While grammar appears to be a difficulty across several languages, language-specific features lead to somewhat different grammatical profiles for children with language disorders. For instance, Italian-speaking children may not show as much difficulty as English-speaking children with verb markers, probably because Italian has a richer inflectional system (Leonard, 2000). There are three main explanations of the particular difficulty with verb markers. Children may have difficulty with these inflections because they are unstressed and of relatively short duration, making them difficult to perceive as distinct grammatical forms. Also, children may be very slow in acquiring linguistic tense marking. Finally, children with a language disorder may show particular difficulties with “procedural memory,” the ability to learn and control motor and cognitive procedures, such as the rule-governed combining of grammatical markers (Ullman & Pierpont, 2005). While no single explanation has universal support, the grammatical difficulty may have sufficient sensitivity and specificity to act as a clinical marker of primary language disorder for children beyond early childhood (Rice, 2000).

### Assessment of Language Disorders

Recent language assessments and intervention for young children are framed within family-centered practices that promote families’ ability to provide appropriate care, in addition to a focus on children’s language (Paul & Norbury, 2012). While there are various screening and assessment methods for language disorders, there is no single, broadly accepted screening measure for language disorders in early childhood. The available systematic reviews have concluded that universal language screening is not yet appropriate (Law, Boyle, Harris, Harkness, & Nye, 2000a; Nelson, Nygren, Walker, & Panoscha, 2006). Rather, there has been increasing attention on identifying factors that place

young children at risk for communication and later academic difficulties. This includes, for example, attention to comorbidity and medical factors, such as prematurity, prenatal care, and the presence of recurrent otitis media, as well as familial and socioeconomic factors. Similarly, there has been recent attention to population-based, public health models of assessment and intervention that address social determinants of communication disorders (Law et al., 2000b; Wylie, McAllister, Davidson, Marshall, & Law, 2014).

Behavioral observation, parent or other caregiver report, environmental manipulations to promote use of targeted behaviors, and medical and family history remain core features of assessment for infants and toddlers. General developmental guidelines are available for early language (American Speech–Language–Hearing Association, 2016). Most attention has been paid to whether infants are intentional communicators and to their range of communicative functions and means. Early identification of how young children respond to environmental events is important because it provides the basis for predictable adult responses. Caregiver report and systematic observational measures such as the Early Social Communication Scales (Mundy, Delgado, Hogan, & Doehring, 2003) and the Communication and Symbolic Behavior Scales (Prizant & Wetherby, 2003) have served as valuable ways to identify early communication skills. Vocabulary growth and the emergence of two-word combinations also are conventional markers of language development. Caregiver reports of vocabulary size, such as the MacArthur–Bates Communicative Development Inventories (Fenson et al., 2006) have been used extensively.

Traditionally, little attention was paid to the validity and reliability of norm-referenced assessment measures for children from diverse economic, cultural, and linguistic backgrounds. However, the role that experience plays in language is now emphasized in developing less biased assessments. Even during middle childhood, the second-language performance of typical sequential bilingual children may resemble the language of monolingual children with a primary language disorder (Windsor & Kohnert, 2004). In screening younger children, it remains important not to overidentify language disorders in second-language learners. Similarly, there are challenges in underidentifying language disorders in this population by

assuming that all differences are due solely to the children's bilingual status.

There have been several criterion-referenced approaches proposed to help resolve the issue that speech–language pathologists and other professionals may not be familiar with the dialect or language of young children whose language skills they are assessing. One approach is the use of a “minimal competency core” (Stockman, 2006; Stockman, Guillory, Seibert, & Boulton, 2013), a set of guidelines representing the lowest level of semantic, grammatical, pragmatic, and phonological knowledge expected at a given chronological age. For example, a minimal competency core for a 3-year-old child who uses African American English identifies the types of meanings and proportion of complex sentences minimally expected at age 3 years, consonants expected to be produced correctly, and type of conversational repairs likely to be used. Other screening measures for young children deemphasize language ability and instead rely on minimally linguistic cognitive measures that correlate with higher-level language performance in other speakers of African American English of the same age. This includes measures such as nonword repetition, rapid naming, and digit recall (Graf Estes, Evans, & Else-Quest, 2006; Kohnert, Windsor, & Ebert, 2009). “Dynamic assessment procedures,” designed to identify areas of greatest readiness for immediate language growth through mediated learning opportunities, are also used to identify likely intervention targets (Swanson & Lussier, 2001).

### Interventions and Intervention Efficacy

Interventions for young children with language disorders often emphasize the role of adult responsiveness, whether in discrete trial approaches or more developmentally guided, social pragmatic approaches. While discrete trial approaches attempt to isolate the child from distracters, social pragmatic approaches emphasize child-initiated instructional opportunities in the natural environment and provide extensive opportunities for adult responses to children's initiations. A hybrid intervention approach that combines elements of both approaches, (prelinguistic) milieu teaching, has received particular attention as an early intervention, especially for children with language disorders secondary to autism and other developmental delays.

Prelinguistic milieu teaching creates social routines and other play opportunities for children to communicate successfully. In milieu teaching, specific prompts, social consequences, and other teaching techniques are embedded in the child's ongoing activities (Thiemann & Warren, 2010). The vast majority of the research in this area uses single-case experimental designs and other designs beyond randomized controlled studies, with no discernible intervention efficacy for the very small number of randomized controlled studies (U.S. Department of Education, 2012).

However, there is a moderate level of evidence that many direct practitioner-delivered and home-based interventions for language disorders during early childhood are effective across different areas of language. Speech–language pathologists are often the key practitioners who work directly with children and their families. There remain key questions of dosage, cost-effectiveness, and the need to include family perspectives of progress in intervention models (Law, Roulstone, & Lindsay, 2015). Positive child outcomes have been associated with caregiver involvement in intervention techniques (e.g., Woods, Kashinath, & Goldstein, 2004). There are fewer intervention studies focused on young bilingual children, and the predominant philosophy is that both languages should be included in language intervention (Thordardottir, 2010). Early intervention may be crucial in capitalizing on brain plasticity, as, for example, in the early diagnosis and treatment of children with autism (Dawson, 2008).

The risk of later literacy difficulties appears to be greater for children who demonstrate speech and language difficulties at the beginning of their reading development (Bird, Bishop, & Freeman, 1995; Nathan, Stackhouse, Goulandris, & Snowling, 2004). One specific area in which young children can receive benefits from early therapy is prephonological awareness. Metaphonological work is an effective therapy approach for some children with expressive phonological disorders. In this form of therapy, children may work on general phonological awareness tasks or more specific tasks targeting specific phonemes that are produced in error (Hesketh, Adams, Nightingale, & Hall, 2000). Children who participate in early phonological awareness training may demonstrate later improvements in spelling and the decoding of printed text (Gillon, 2002; Rvachew, Nowak, & Cloutier, 2004).

Many children with severe language disorders are not able to effectively produce spoken language. Approximately 12% of children who participate in special education programs work with augmentative and alternative communication systems (Binger & Light, 2006). Gestural symbols (conventional gestures, sign languages, and systems) and graphic symbols (pictures, line drawings, and orthography) housed in a small wallet or notebook can be implemented to supplement vocal/verbal utterances. Graphic symbols displayed via a speech-generating electronic communication aid allow a toddler to retrieve prestored messages with one or more keystrokes that can be produced using synthesized and/or digitized speech. A graphic symbol display can concurrently offer symbol options, lowering the recall demands to retrieve vocabulary. There is increasing research suggesting that augmentative communication systems can have at least a modest positive impact on the emergence of oral–aural communication. Both graphic and gestural symbols may be advantageous in promoting speech production when the child is successful in vocal imitation (Millar, Light, & Schlosser, 2006).

## Conclusions

Communication and language develop in the context of social interaction. However, despite sufficient exposure and experiences, some infants and toddlers do not demonstrate robust language growth. Given the likelihood of cumulative effects of language delays over time, early identification of children at risk for delays is critical. Current language screening measures are viable but need refinement and validation, especially for children from diverse cultural and linguistic backgrounds. Language interventions for older children show a range of effectiveness, and may be hampered by scheduling and other constraints that reduce the amount of time a child typically receives dedicated intervention services. There is a need for professionals, including speech–language pathologists, to develop the expertise both to treat children and families and to collaborate with other professionals in a team-based approach. The frequency and responsivity of interaction in language interventions may be highly influential in language outcomes for young children. Thus, parents and other familiar caregivers who interact daily with young children and who are

taught sustainable, systematic ways to facilitate communication can be key partners with professionals in furthering children’s development.

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