

Advances in Early Communication and Language Intervention

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Abstract

Learning to communicate using speech and language is a primary developmental task for young children. Delays in the acquisition of language are one of the earliest indicators of developmental deficits that may affect academic and social outcomes for individuals across the lifespan. In the period since the passage of P. L. 99-457, significant progress in research related to language intervention has been made in five areas: (a) the social, symbolic and prelinguistic foundations to spoken language; (b) parent-implemented language interventions; (c) the language foundations for literacy; (d) the relationship between language and social behavior; and (e) the use of augmented and alternative modes for communication. Although there are indications of important advances in the knowledge base of early identification as well as comprehensive and continuous intervention, preparing professionals to provide effective interventions in natural environments continues to be a challenge for the field.

Advances in Early Communication and Language Intervention

Learning to communicate using speech and language is a primary developmental task for young children. Delays in the acquisition of language are one of the earliest indicators of developmental deficits that may affect academic and social outcomes for individuals across the lifespan. Estimates of the incidence of language impairments range from 2 to 17% of the population, depending on the criteria for language impairment and the ages of children sampled (Nelson, Nygren, Walker, & Panoscha, 2006). Approximately 89% of children served under Part B receive speech and language services (Hebbler et al., 2007), while more than 50% of young children served in Part C receive speech and language intervention (Carlson et al., 2006). Young children with language impairments have diverse profiles and needs for intervention. Further, the complexity of the language system and the relation of language and communication to other domains of development make effective early intervention uniquely challenging.

The Context of Early Language Intervention

The passage of P.L. 99-457 (Education of the Handicapped Act Amendments, 1986) changed the provision of early language intervention in several important ways. First, when the population of children with disabilities receiving language intervention expanded to include infants and toddlers, communication intervention began to focus more on prelinguistic forms of communication. Second, the legislation provided an important impetus for developing strategies to teach functional communication to young children at home and in childcare settings. Family-centered service provisions required addressing the needs of family members, as well as children, in everyday interactions. Third, with the mandate for serving children from birth came an emphasis on continuity of intervention across disciplines and over time. Early interventionists, as well as speech-language pathologists, began to address communication and language because

these skills are closely integrated with motor, social, cognitive and adaptive behaviors. Fourth, the changes in early intervention services shifted language intervention services for preschoolers toward increasing parent involvement in interventions, further embedding language intervention into natural environments, and addressing the social and prelinguistic precursors to spoken language in older, significantly delayed children.

Advances in Research

Perhaps more than any other area of early intervention, language intervention has been informed by advances in descriptive and intervention research in several disciplines. Four decades of research on language intervention have provided a substantive empirical foundation for treatment. Changes in the demographic characteristics of children with disabilities, increasing numbers of children diagnosed with autism spectrum disorders, greater public awareness of early literacy issues, and advances in technology provided additional incentives for new research on language intervention. Significant progress in research related to language intervention is evident in five areas: (a) the social, symbolic and prelinguistic foundations to spoken language; (b) parent-implemented language interventions; (c) the language foundations for literacy; (d) the relationship between language and social behavior; and (e) the use of augmented and alternative modes for communication. In the following sections, findings in each of these areas are discussed briefly and directions for future intervention and research are noted.

Social attention and prelinguistic communicative behaviors are fundamental to language learning and use. These may be important targets for early communication intervention.

Descriptive studies of joint attention and prelinguistic communication in typical children, children with autism spectrum disorders, and children with developmental disabilities have

provided new perspectives on language development, approaches for assessment, and goals for intervention. Several related findings in developmental research have influenced early language intervention: (a) dyadic interaction, particularly the process of joint engagement between children and their partners, is foundational to emerging communication (Adamson, Bakeman, Deckner, & Ronski, 2009); (b) coordinated joint attention is an important early indicator of social communication abilities and predicts the onset of spoken language in typical children and children with disabilities (Yoder & Warren, 2004); (c) the use of symbols (gestures, words) within the context of joint attention marks the transition from prelinguistic to linguistic communication (Adamson et al., 2009); (d) the development of symbolic play follows a sequence that parallels communication development, suggesting common underlying bases in cognitive development related to the use of symbols (Siller & Sigman, 2008).

Over the last two decades, research has described the developmental sequence of early intentional communication. Instruments have been developed to assess joint attention, prelinguistic intentional communication, play, and early symbolic communication (e.g., Communication and Symbolic Behavior Scales [CSBS], Wetherby & Prizant, 1993). Interventions have been designed to teach prelinguistic and early joint attention behaviors to young children with autism and others with developmental disabilities. These interventions have been evaluated using group and single subject designs (e.g., Landa, Holman, O'Neill, & Stuart, 2011; Shertz & Odom, 2007; Wetherby & Woods, 2006). The methods for teaching joint attention and prelinguistic communication skills (point, show, give, turn taking) have included environmental arrangement, modeling, prompting, and reinforcing child responses in naturalistic and direct teaching paradigms. Most intervention studies have reported increases in the targeted prelinguistic communication skills; however, the effects of teaching prelinguistic skills on

subsequent receptive and expressive language use have been variable. Research has also described the concurrent development of symbolic functions in play and language (Toth, Munson, Meltzoff, & Dawson, 2006) and demonstrated the effects of teaching symbolic play on language development (e.g., Kasari, Paparella, Freeman, & Jahromi, 2008).

Future research should apply the strategies for teaching joint attention and prelinguistic communication, demonstrated with children with autism spectrum disorders, to other populations of children with language impairments and adapt the methods and targets of prelinguistic interventions to the specific patterns of prelinguistic to linguistic communication development evidenced in specific populations of children. For example, children with Down syndrome acquire the social attentional aspects of prelinguistic communication easily, but have difficulty infusing symbols (especially producing words) in joint attention episodes. Studies describing the ways in which children who are taught joint attention strategies use them to “bootstrap” their receptive and expressive language learning are needed. Finally, the effects of early intervention to teach social attention and prelinguistic communication need to be assessed longitudinally to describe the use and integration of these target skills and to confirm that these types of interventions have long term facilitative effects on the functional use of spoken language.

Parents’ linguistic input and interactional strategies affect children’s language development. Parent training to support language development in children with language impairments is an effective early intervention.

Hart and Risley’s (1995) study of the effects of parent linguistic input on the language of children from varied social economic backgrounds was a landmark for early intervention research. Hart and Risley provided evidence of the importance of everyday talk to children at home. Their findings concurred with developmental studies reporting specific aspects of parent

behavior associated with language development in typically developing children and in children with language impairments: (a) amount of parent-child interaction (Alston & St. James-Roberts, 2005); (b) responsiveness to child communication (Yoder, McCathren, Warren, & Watson, 2001); (c) amount and quality of linguistic input (Weizman & Snow, 2001); and (d) use of language learning support strategies (Smith, Landry, & Swank, 2000).

Teaching parents to support language development is an important component of effective communication intervention. In the last two decades, more than 100 studies have investigated the effects of teaching parents of children with language impairments strategies for improving child language. Among these studies are demonstrations of the effectiveness of: (a) Enhanced Milieu Teaching (Kaiser, Hancock, & Nietfeld, 2000); (b) Family Guided Routines Based Intervention (Woods, Kashinath, & Goldstein, 2004); (c) modified incidental teaching (Charlop-Christy & Carpenter, 2000); (d) reciprocal imitation training (Ingersoll & Gergans, 2007); and (e) functional communication training (Moes & Frea, 2002). A range of language support strategies have been taught to parents. Generally, the strategies have been derived from (a) descriptions of the normative parent-child interactions (e.g., Weizman & Snow, 2001); (b) behavioral learning principles (Schreibman & Koegel, 2005); or (c) a hybrid of these (Kaiser, 1993).

Roberts and Kaiser (2011) examined the effects of 18 group design studies of parent-implemented language interventions. In this meta-analysis, parent-implemented language interventions compared to nontreatment control conditions resulted in strong positive effects on the receptive and expressive language skills of children with language impairments, including children with intellectual disabilities. Descriptions of the parent training procedures were limited in most studies, and this information is essential for translating research into practice. Research is

needed to specify how parent training is best accomplished within a family-centered approach, and which specific language teaching strategies or key intervention components are most effective in improving language for children with significant language impairments. Research that examines functional outcomes over time for both parents and children is needed to advance understanding of the effects of communication interventions in natural environments.

Children's language skills and language experiences contribute to learning to read.

Early language intervention may improve both language and reading outcomes.

Reading is built on children's knowledge of the form, structure and content components of the language system and on specific skills for decoding written text (Hoover & Gough, 1990). Phonological awareness, mastery of the production of phonological features, and understanding of rules for combining sounds and modifying words derive from skill in spoken language. Semantics, the understanding of meaning of words individually and in relation to other words, is a second key linkage between spoken language and the development of reading (Snowling, 2005). In sum, children's language skills may be the ubiquitous underpinning of reading even when decoding and phonological awareness appear to be more directly influencing early reading outcomes (Dickinson, Golinkoff, & Hirsh-Pasek, 2010).

When children have limited vocabulary, difficulty with comprehension of word and sentence meanings, or challenges learning the phonological system of language, they are at increased risk for difficulties in learning to read and becoming fluent readers. Persistent language impairment across the preschool and early elementary years increases children's risk for reading failure (Beitchman, Wilson, Brownlie, Walters, & Lance, 1996). Oral language production and language comprehension during the later preschool years are key factors that predict long-term reading problems (Catts, Fey, & Proctor-Williams, 2000).

Early reading skills are affected by the same set of environmental experiences that promote language development as well as by specific contextual support for reading (Landry, Smith, & Swank, 2002). In the follow up to the Hart and Risley (1995) study of individual differences in parents' language to their children, children whose parents talked more to them at age 2 had stronger reading outcomes at fourth grade (Walker, Greenwood, Hart, & Carta, 1994). Similar findings from the NICHD Early Child Care Research Network (2005) link age 3 language experiences in child care to third grade reading. Recently, analyses of data from more than 1,800 children enrolled in Early Head Start showed systematic positive effects of mother-child interaction and participation in literacy activities at home on children's vocabulary and early literacy skills at age 5 (Rodriguez & Tamis-LeMonda, 2011).

The last decade has been marked by the development and testing of a wide range of preschool interventions designed to promote the language foundations for literacy, primarily in typical children and children at-risk due to poverty (National Early Literacy Panel, 2008). In general, curriculum level interventions have met with good success in increasing phonological skills but limited success in increasing oral language skills, especially vocabulary. Targeted interventions that teach specific vocabulary appear to be effective, especially when outcomes are proximal measures of the vocabulary words taught in the intervention (Dunst, Meter, & Hamby, 2007). Interactive book reading strategies that address both vocabulary and literacy concepts have been shown to be effective in teaching vocabulary to typical children and children at-risk (Trivette, Dunst, & Gorman, 2010). In the NELP analysis, children who participated in interactive book reading with their parents gained more than .5 SD in vocabulary and made smaller gains in overall oral language. In contrast, broad literacy-based preschool programs had no significant effects on oral language or vocabulary. None of the NELP analyses described

outcomes for children with disabilities separately and the extent to which this pattern of findings applies to children with significant language impairment is unknown.

While any language intervention that increases children's phonological skills, vocabulary or semantic knowledge might potentially improve reading, language intervention studies that enrolled children with language impairments have not included follow up assessments that demonstrate the effects of early language intervention on reading. Thus, while the linkage between early language experience and early interventions to support vocabulary skills is established in typical children and children at-risk, the evidence for children with disabilities is limited. Systematic research on preventing or reducing later reading deficits through early language intervention for young children with significant language impairments is needed.

Children with language impairments are at increased risk for behavior problems. Functional communication intervention and, possibly, early language interventions can increase positive behavior.

Many children referred for speech and language problems are subsequently identified as having behavior problems (Carson, Klee, Lee, Williams, & Perry, 1998). Parents of young children with language impairments are four times more likely to report externalizing behaviors than parents of children with typical language (Horowitz et al., 2003). Children with language impairments have more negative and fewer positive interactions with their preschool classroom peers (Qi & Kaiser, 2004). Children with language impairments exhibit a profile of peer-directed behavior that is different from their typical age peers: less directive overall, less responsive to peers, and more difficulties gaining appropriate responses from peers (Guralnick, Hammond, Connor, & Neville, 2006).

For children with language impairments who develop behavior problems, the risk for reading problems and other academic difficulties is greatly increased. Carter, Briggs-Gowan, Jones, and Little (2003) reported that children at 24 months who were rated as having problems in both language and behavior had significantly poorer reading at second grade. The Family and Child Experiences Survey (FACES; U.S. Department of Health and Human Services, Administration for Children and Families, 2004) indicated that behavior problems at age 4 predicted low reading scores at second and third grade (Zill & Sorongon, 2004).

Few large scale interventions have targeted both language and problem behaviors in preschool children, although single subject interventions targeting both domains report positive results (e.g., Hancock, Kaiser, & Delaney, 2002). Social skills interventions often target peer-directed initiations and responses (Vaughn et al., 2003). While some social interventions include verbal role plays and practicing specific social pragmatic skills (Goldstein, English, Schafer, & Kaczmarek, 1997), most do not include a language teaching component. Few studies report participants' language abilities or analyze language skill level as a moderating variable in response to social skills interventions.

In contrast, there is a substantive literature demonstrating the positive effects of functional communication training (FCT) for children with severe behavior problems and limited communication, including preschoolers under the age of 6 (Kurtz, Boelter, Jarmolowicz, Chin, & Hagopian, 2011). FCT is an individualized, behavior analysis-based teaching procedure in which the functions of a problem behavior (i.e., the reinforcers that maintain the behavior) are systematically identified and then a replacement, a socially appropriate communication behavior, is taught (Carr & Durand, 1985). FCT does not typically result in general changes in children's language skills because it does not teach a broad set of social communication skills.

Studies are needed to examine how limited language and communication skills impact children's behavior with peers and during learning opportunities in school settings. Research on the effects of early communication intervention on behavior and research on strategies for teaching communication with peers as an adjunct to primary communication interventions are needed. While research on FCT offers principles for increasing positive behavior through communication intervention, it is not clear if the same principles can be applied to children with more complex communication; research is needed to investigate this possibility.

Alternative and augmented modes of communication (AAC) can improve young children's immediate functional communication and support the development of spoken communication.

More than 60 studies indicate that young children can learn to communicate using different types of AAC (Drager, Light, & McNaughton, 2010). Children who are nonspeaking, as well as children who have difficulty producing intelligible speech, may benefit from using an AAC. This includes children who have motor impairments, such as cerebral palsy, cognitive impairments, or autism, for whom social use of spoken language is challenging. AAC systems include aided (speech output devices, pictures, or other technology to support basic to complex communication) and unaided (signs, natural gestures) systems. Use of an AAC system allows young children to communicate sooner and more effectively, and supports children in learning the symbolic and functional aspects of language. Use of an AAC mode may be an intermediate step in for children who will later be speakers (e.g., use of signs for initial communication by children with Down syndrome). Use of an AAC mode does not inhibit the development of spontaneous speech and may actually facilitate use of spoken words (Dunst, Meter, & Hamby, 2011). Partners' use of an AAC mode with spoken words may enhance the salience of the

spoken language and promote language comprehension. Teaching toddlers to use speech generating devices during interactions with their parents also resulted in more use of both AAC communication and spoken words (Ronski et al., 2010). The use of the Picture Exchange Communication system (PECS; Bondy & Frost, 1998) is effective for increasing child social exchanges with partners using pictures, particularly with children who have autism (Preston & Carter, 2009).

Systematic research on instruction in the use of alternative modes is essential in developing AAC as an effective early communication intervention. PECS is unique among AAC approaches because it integrates use of an alternative mode (pictures), specific instructional strategies to teach communicative functions, and systematic partner responses to child communication attempts. Instruction using other modes might be improved by focusing on teaching form, function and partner responsiveness simultaneously. Applications of AAC with toddlers pose challenges related to selection of mode, assessment of prerequisite motor and cognitive skills. However, use of AAC with young children is one of the most exciting areas of communication intervention because it potentially provides young children with significant communication impairments access to a means for social and symbolic communication earlier and more easily than has ever been possible.

Principles and Practices in Early Language Intervention

Based on development and intervention research spanning the last 25 years, we propose the following principles to guide early language intervention.

1. All children are communicators. Regardless of age or ability level, all children behave in ways that signal their state, interests, attention and needs.

2. Early language impairments place children at risk for problems in social development and reading. A proactive prevention approach is needed. Comprehensive assessment, progress monitoring in these areas, and systematic intervention to ensure positive social and academic outcomes for children with language impairments are needed to ameliorate these risks.
3. All children with language impairments can benefit from intervention in natural environments regardless of their developmental limitations or severity of impairments of form, content or use.
4. Most children with language impairments require intervention and support to increase the rate, diversity and complexity of their communication at every stage of development.
5. Most children with language impairments will need systematic teaching to learn, generalize and maintain new language and communication skills across the toddler and preschool years.
6. Children's progress in using communication functionally in everyday activities, not their diagnoses, should determine the methods, dosage, contexts, and duration of intervention.
7. Early communication intervention: (a) begins with supporting social foundations of communication (joint attention, engagement, play); (b) teaches prelinguistic communication skills as needed; (c) provides a mode for expressive communication; (d) builds comprehension as well as production; and (e) continues through the transition to spoken language.

8. A wide range of instructional strategies can improve children's language and communication skills: Contingent responding, turn taking, modeling new forms and functions in context, recasting and expanding child communication acts, providing meaningful feedback in response to children's attempts, and prompting.
9. Teaching and supporting partners (parents, caregivers, teachers, and peers) is essential to successful child communication intervention. Effective early intervention depends on the participation of partners who respond to communication, who teach new forms and functions of communication in context, and who can modify how they respond and what they model as children develop new skills.
10. Full participation in home and classroom learning opportunities is a critical component of early language intervention. Thus, making adaptations to promote participation, and providing support and training to partners to support learning in natural environments is part of early communication intervention.

Future Research

Recommendations for future research derive from the major themes identified in this paper, including intervention that links early social communication to later spoken language; preventing problems in reading through early language intervention; integrating interventions to address communication, social skills and behavior; improving strategies for teaching parents, teachers and peers to be effective communication partners; and developing instructional approaches for AAC use. Comprehensive communication interventions are required to teach the range of communication and language skills needed in the toddler and preschool years. There are almost no comprehensive approaches to early language intervention that address the scope and sequence of communication and language skills in children from birth to 8 years. Prelinguistic,

linguistic and social pragmatic skill content as well as instructional methods to be used in natural environments require specification. Ideally, such an approach would include curriculum-based measures to track progress so that decisions about modifying content or instructional strategies can be made to enhance learner outcomes. Response-to-intervention (RTI) models for language intervention for children with significant language impairments are not yet available. Further, very little research has addressed strategies for increasing language comprehension as part of a comprehensive intervention approach

Standards for effective language intervention are needed. The ultimate standard for effectiveness of early communication interventions is the extent to which children's everyday social functioning is improved. Benchmarks for intervention outcomes (expected levels of acquisition, generalization and growth in language abilities for specific interventions at a given level of dosage and fidelity) should be developed based on empirical data and the effectiveness of interventions should be indexed in relation to these benchmarks.

Finally, communication is a social process that most often occurs in dyads. Studies examining the contributions of partner communicative behavior (e.g., adult responsiveness, provision of opportunities to communicate, linguistic input) on children's use, generalization and maintenance of skills are essential to improving the effectiveness of early language intervention. Interventions that simultaneously address children and their communication partners (e.g., parents, teachers, peers) are needed. While there is evidence of the effectiveness of teaching parents to implement naturalistic communication teaching strategies across routines, there are fewer studies of interventions across the day in classrooms, on playgrounds, and in the community with teachers, peers and friends.

Policy

Early identification, ensuring sufficient intervention to remediate early language delays, and preparing early interventionists, teachers and speech-language pathologists for effective early communication and language intervention are policy issues. Although the largest percentages of children served under Part C and Part B are children with language impairment, longitudinal studies suggest systematic under identification of early language delays (Tomblin et al., 1997). Universal screenings for language delays beginning at 24 months would be an important means of earlier identification that might lead to earlier interventions to moderate the severity of language impairments, reduce problem behavior and prevent problems in reading.

Given the importance of language skills in children's overall development, the typical intervention dosages are often quite limited. In part, this is the result of the personnel who are prepared to provide early language intervention. Few speech-language pathologists have training in working with children in Part C (Paul & Roth, 2011) and few early interventionists or teachers have adequate preparation in language development and intervention. Even fewer professionals are well-trained to teach parents and other adults skills for communication intervention.

Summary

Advances in early language development and intervention over the past 25 years have been substantial. Early communication intervention has a strong theoretical and empirical base. Effective early intervention is essential for ensuring positive social and academic outcomes for children with language impairments. Early identification, comprehensive intervention, and preparing professionals to provide effective interventions in natural environments continue to be challenges for the field.

References

- Adamson, L.B., Bakeman, R., Deckner, D.F., & Romski, M.A. (2009). Joint engagement and the emergence of language in children with Autism. *Journal of Autism and Developmental Disorders, 39*(1), 84-96. doi: 10.1007/s10803-008-0601-7
- Alston, E., & St. James-Roberts, I. (2005). Home environments of 10-month-old infants selected by the WILSTAAR screen for pre-language difficulties. *International Journal of Language & Communication Disorders, 40*, 123-136.
- Beitchman, J. H., Wilson, B., Brownlie, E., Walters, H., & Lance, W. (1996). Long-term consistency in speech/language profiles: Developmental and academic outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry, 35*(6), 804-814.
- Bondy, A. S., & Frost, L. A. (1998). The picture exchange communication system. *Seminars in Speech and Language, 19*(4), 373-398.
- Carlson, E., Daley, T., Shimshak, A., Riley, J., Keller, B., Jenkins, B., & Markowitz, J. (2006). Changes in the characteristics, services, and performance of preschoolers with disabilities from 2003-04 to 2004-05: Wave 2 overview report from the pre-elementary education longitudinal study (PEELS). *National Center for Special Education Research*.
- Carr, E.G., & Durand, V.M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18*(2), 111-126. doi: 10.1901/jaba.1985.18-111
- Carson, D. K., Klee, T., Lee, S., Williams, K. C., & Perry, C. K. (1998). Children's language proficiency at ages 2 and 3 as predictors of behavior problems, social and cognitive development at age 3. *Children's Communication Development, 19*(2), 21-30.

- Carter, A. S., Briggs-Gowan, M. J., Jones, S. M., & Little, T. D. (2003). The infant-toddler social and emotional assessment: Factor structure, reliability, and validity. *Journal of Abnormal Child Psychology, 31*(5), 495-514.
- Catts, H. W., Fey, E., & Proctor-Williams, K. (2000). The relationship between language and reading: preliminary results from a longitudinal investigation. *Logopedics, Phoniatrics, Vocology, 25*(1), 3-11.
- Charlop-Christy, M.H., & Carpenter, M.J. (2000). Modified incidental teaching sessions: A procedure for parents to increase spontaneous speech in their children with autism. *Journal of Positive Behavior Interventions, 2*(2), 98-112.
doi:10.1177/109830070000200203
- Dickinson, D.K., Golinkoff, R.M., & Hirsh-Pasek, K. K. (2010). Speaking out for language: Why language is central to reading development. *Educational Researcher, 39*(4), 305-310. doi: 10.3102/0013189X10370204
- Drager, K., Light, J., & McNaughton, D. (2010). Effects of AAC interventions on communication and language for young children with complex communication needs. *Journal of Pediatric Rehabilitation Medicine, 3*(4), 303-310. doi: 10.3233/PRM-2010-0141
- Dunst, C.J., Meter, D., & Hamby, D.W. (2011). Influences of sign and oral language interventions on the speech and oral language production of young children with disabilities. *Center for Early Literacy Learning, 4*(4), 1-20.
- Dunst, C.J., Meter, D., & Hamby, D.W. (2007). Predictors of and interventions associated with later literacy accomplishments. *Center for Early Literacy Learning, 1*(3), 1-15.

- Education of the Handicapped Act Amendments of 1986, Pub. L. 99-457. United States Congress (1986).
- Goldstein, H., English, K., Shafer, K., & Kaczmarek, L. (1997). Interaction among preschoolers with and without disabilities: Effects of across-the-day peer intervention *American Journal of Speech-Language Pathology*, *40*, 33-48
- Guralnick, M. J., Hammond, M. A., Connor, R. T., & Neville, B. (2006). Stability, change, and correlates of the peer relationships of young children with mild developmental delays. *Child Development*, *77*(2), 312–324. doi: 10.1111/j.1467-8624.2006.00872.
- Hancock, T. B., Kaiser, A. P., & Delaney, E. M. (2002). Teaching parents of preschoolers at high-risk: Strategies to support language and positive behavior. *Topics in Early Childhood Special Education*, *22*(4), 191-212. doi: 10.1177/0271112140202200402
- Hart, B. & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore, MD: Paul H. Brookes.
- Hebbler, K., Spiker, D., Bailey, D., Scarborough, A., Malik, S., Simeonsson, R., Singer, M., & Nelson, L. (2007). Early intervention for infants & toddlers with disabilities and their families: Participants, services, and outcomes. *Final Report of the National Early Intervention Longitudinal Study (NEILS)*.
- Hoover, W., & Gough, P. (1990). The simple view of reading. *Reading and Writing*, *2*, 127–160.
- Horowitz, S., Irwin, J., Briggs-Gowan, M., Heenan, J., Mendoza, J., & Carter, A. (2003). Language delay in a community cohort of young children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *42*(2), 932-940. doi: 10.1097/01.CHI.0000046889.27264.5E

- Ingersoll, B., & Gergans, S. (2007). The effect of a parent implemented imitation intervention on spontaneous imitation skills in young children with autism. *Research in Developmental Disabilities, 28*, 163–175.
- Kaiser, A. P. (1993). Parent-implemented language intervention: An environmental system perspective. In A. P. Kaiser & D. B. Gray (Eds.), *Enhancing children's communication: Research foundations for intervention* (Vol. 2, pp. 63-84). Baltimore, MD: Paul H. Brookes.
- Kaiser, A. P., Hancock, T. B., & Nietfeld, J. P. (2000). The effects of parent-implemented enhanced milieu teaching on the social communication of children who have autism. *Journal of Early Education and Development [Special Issue], 11*(4), 423-446.
- Kasari, C., Paparella, T., Freeman, S., & Jahromi, L.B. (2008). Language outcome in autism: Randomized comparison of joint attention and play interventions. *Journal of Consulting and Clinical Psychology, 76*(1), 125-137. doi: 10.1037/0022-006X.76.1.125
- Kurtz, P.F., Boelter, B.W., Jarmolowicz, D.P., Chin, M.D., & Hagopian, L.P. (2011). An analysis of functional communication training as an empirically supported treatment for problem behavior displayed by individuals with intellectual disabilities. *Research in Developmental Disabilities. Advance online publication.* doi:10.1016/j.ridd.2011.05.009
- Landa, R.J., Holman, K.C., O'Neill, A.H., & Stuart, E.A. (2011). Intervention targeting development of socially synchronous engagement in toddlers with autism spectrum disorder: A randomized controlled trial. *Journal of Child Psychology and Psychiatry, 52*(1), 13-21. doi:10.1111/j.1469-7610.2010.02288.x

- Landry, S. H., Smith, K. E., & Swank, P. R. (2002). Environmental effects on language development in normal and high-risk child populations. *Seminars in Pediatric Neurology*, 9(3), 192-200. doi: 10.1053/spen.2002.35499
- Moes, D. R., & Frea, W. D. (2002). Contextualized behavioral support in early intervention for children with autism and their families. *Journal of Autism and Developmental Disorders*, 32(6), 519–533. doi: 10.1023/A:1021298729297
- National Early Literacy Panel (2008). *Developing early literacy: Report of the National Early Literacy Panel*. Washington, DC: National Institute for Literacy.
- NICHHD Early Child Care Research Network. (2005). Pathways to reading: The role of oral language in the transition to reading. *Developmental Psychology*, 41(2), 428–442. doi: 10.1037/0012-1649.41.2.428
- Nelson, H.D., Nygren, P., Walker, M., & Panoscha, R. (2006). Screening for speech and language delay in preschool children: Systematic evidence review for the US Preventive Services Task Force. *Pediatrics*, 117 (2), 298-319. doi: 10.1542/peds.2005-1467
- Paul, R., & Roth, F.P. (2011). Characterizing and predicting outcomes of communication delays in infants and toddlers: Implications for clinical practice. *Language, Speech, and Hearing Services in Schools*, 42, 331-640. doi:10.1044/0161-1461(2010/09-0067)
- Preston, D., & Carter, M. (2009). A review of the efficacy of the picture exchange communication system intervention. *Journal of Autism and Developmental Disorders*, 39(10), 1471-1486. doi: 10.1007/s10803-009-0763-y
- Qi, C. H., & Kaiser, A. P. (2004). Problem behaviors of low-income children with language delays: An observation study. *Journal of Speech, Language, and Hearing Research*, 47(3), 595-609.

- Roberts, M.Y., & Kaiser, A.P. (2011). The effectiveness of parent-implemented language interventions: A meta-analysis. *American Journal of Speech-Language Pathology*. Advance online publication. doi:10.1044/1058-0360(2011/10-0055)
- Rodriguez, E.T., & Tamis-LeMonda, C.S. (2011). Trajectories of the home learning environment across the first 5 years: Associations with children's vocabulary and literacy skills at prekindergarten. *Child Development*, 82(4), 1058-1075.
- Romski, M., Sevcik, R.A., Adamson, L.B., Cheslock, M., Smith, A., Barker, R.M., & Bakeman, R. (2010). Randomized comparison of augmented and nonaugmented language interventions for toddlers with developmental delays and their parents. *Journal of Speech, Language, and Hearing Research*, 53, 350-364. doi:10.1044/1092-4388(2009/08-0156)
- Schreibman, L., & Koegel, R. L. (2005). Training for parents of children with autism: Pivotal responses, generalization, and individualization of interventions. In E. Hibbs & P. Jensen (Eds.), *Psychosocial treatment for child and adolescent disorders: Empirically based strategies for clinical practice* (2nd ed., pp. 605-631). Washington, D. C.: American Psychological Association.
- Schertz, H. H., & Odom, S. L. (2007). Promoting joint attention in toddlers with autism: A parent-mediated approach. *Journal of Autism and Developmental Disorders*, 37, 1562-1575.
- Siller, M., & Sigman, M. (2008). Modeling longitudinal change in the language abilities of children with autism: Parent behaviors and child characteristics as predictors of change. *Developmental Psychology*, 44(6), 1691-1704. doi: 10.1037/a0013771

Smith, K., Landry, S., & Swank, P. (2000). Does the content of mothers' verbal stimulation explain differences in children's development of verbal and nonverbal cognitive skills?

Journal of School Psychology, 38, 27-49.

Snowling, M. (2005). Literacy outcomes for children with oral language impairments:

Developmental interactions between language skills and learning to read. In H. Catts and A. Kahmi (Eds.), *The Connections Between Language and Reading Disabilities* (pp.48-66). Mahwah, NJ: Lawrence Erlbaum.

Tomblin, J. B., Records, N. L., Buckwalter, P., Zhang, X., Smith, E., & O'Brien, M. (1997).

Prevalence of specific language impairment in kindergarten children. *Journal of Speech and Hearing Research, 40*(6), 1245-1260.

Toth, K., Munson, J., Meltzoff, A., & Dawson, G. (2006). Early predictors of communication

development in young children with autism spectrum disorder: Joint attention, imitation, and toy play. *Journal of Autism and Developmental Disorders, 36*(8), 993-1005. doi:

10.1007/s10803-006-0137-7

Trivette, C. M., Dunst, C. J., & Gorman, E. (2010). Effects of parent-mediated joint book reading

on the early language development of toddlers and preschoolers. *Center for Early Literacy Learning, 3* (2), 1-15.

U.S. Department of Health and Human Services, Administration for Children and Families,

(2004). *Family and child experiences survey (FACES)*. Retrieved September 26, 2005

from http://www.Acf.hhs.gov/programs/core/ongoing_research/faces/faces_instrument.

Vaughn, S., Kim, A., Sloan, C. V., Hughes, M. T., Elbaum, B., & Sridhar, D. (2003). Social

skills interventions for young children with disabilities: A synthesis of group design studies. *Remedial and Special Education, 24*, 2-15.

- Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development, 65*(2), 606–621. doi: 10.1111/j.1467-8624.1994.tb00771.x
- Weizman, Z., & Snow, C. (2001). Lexical input as related to children's vocabulary acquisition: Effects of sophisticated exposure and support for meaning. *Developmental Psychology, 37*, 265-279.
- Wetherby, A.M., & Prizant, B.M. (1993). *Communication and Symbolic Behavior Scales*. Baltimore, MD: Paul H. Brookes Publishing.
- Wetherby, A.M., & Woods, J.J. (2006). Early social interaction project for children with autism spectrum disorders beginning in the second year of life: A preliminary study. *Topics in Early Childhood Special Education, 26*(2), 67-82. doi: 10.1177/02711214060260020201
- Woods, J., Kashinath, S., & Goldstein, H. (2004). Effects of embedding caregiver implemented teaching strategies in daily routines on children's communication outcomes. *Journal of Early Intervention, 26*(3), 175-193. doi: 10.1177/105381510402600302
- Yoder, P., McCathren, R., Warren, S., & Watson, A. (2001). Important distinctions in measuring maternal responses to communication in prelinguistic children with disabilities. *Communication Disorders Quarterly, 22*, 135-147.
- Yoder, P.J., & Warren, S.F. (2004). Early predictors of language in children with and without Down syndrome. *American Journal on Mental Retardation, 109*(4), 285-300.
- Zill, N., & Sorongon, A. (2004), Children's cognitive gains during Head Start and kindergarten, Presentation at the National Head Start Research Conference, Washington, DC.