



Guest Editorial

## Intervention research to improve language-learning opportunities and address the inequities of the word gap



## ARTICLE INFO

*Keywords:*

Infants  
Children  
Poverty  
Language intervention  
Research  
Prevention  
Word gap

## ABSTRACT

In this Special Issue we focus on highlighting intervention research addressing inequities in early language-learning experience that may place some children at a disadvantage later in school. Research over the last three decades has documented evidence for the differential amount and quality of children's early language exposure, referred to as the "word gap." This gap has been associated with family socioeconomic factors and has important consequences for children's later vocabulary, literacy and school performance. Given the profound social, academic, and economic costs that may result when young children do not have ample language-learning opportunities, it is of primary importance to prevent inequities in language experience. With renewed interest in finding solutions to the word gap, this Special Issue is organized around a series of literature syntheses analyzing the state of language intervention research. Reviews of intervention studies conducted with parents, early educators and healthcare providers, and with culturally and linguistically diverse participants, as well as reviews of training and implementation practices, and methodological factors that inform intervention are described. Ten featured empirical studies document the efficacy of communication and language interventions and illustrate promising practices designed to improve outcomes for infants and young children from disadvantaged backgrounds. Based on the findings described in this compilation of articles, we provide some summary highlights and future directions for research addressing the word gap. First, we review the evidence for the word gap and discuss the literature to date in this area.

© 2019 Elsevier Inc. All rights reserved.

### 1. Research identifying the word gap

It has been over two decades since Hart and Risley first described their longitudinal study measuring the home language experiences of infants and young children (Hart & Risley, 1992). In their longitudinal study chronicling differences in the amount and quality of language interaction infants and young children had with adults, they found that on average, children from economically disadvantaged backgrounds had far fewer positive language-learning experiences. By the time children in their sample were entering preschool, they estimated that children from socioeconomically advantaged homes were exposed to approximately 45 million words while children from the poorest homes were exposed to closer to 10 million (Hart & Risley, 1995). From these figures, the 30 million "word gap" in children's language-related experience was derived (Hart & Risley, 2003). Variability in children's earliest language-learning experience predicted language, reading and achievement in kindergarten through early elementary school as reported in a subsequent follow-up study of children from the original sample (Walker, Greenwood, Hart, & Carta, 1994).

There continues to be an ongoing intensive discussion about the importance of children's early learning environments to later development. Interest in the word gap has led to recent research

emphasizing the development and scaling up of interventions and measurement tools designed to prevent the word gap. In addition to intervention studies designed to decrease or prevent language delay (as shown by the syntheses and intervention studies presented in this Special Issue), community- and population-based campaigns aimed at preventing the word gap have been developed (e.g., Providence TALKS – <http://www.providencetalks.org/>, Reach out and Read – Klass, Dreyer, & Mendelsohn, 2009; Zuckerman, 2009, Too Small to Fail – <https://talkingteaching.org/resources>, Talk With Me Baby – <http://www.talkwithmebaby.org/>, the Thirty Million Words Project – Suskind, Suskind, & Lewinter-Suskind, 2015). The word gap has also been addressed by several federal funding initiatives (e.g., Health Resources and Services Administration and Health and Human Services – Carta, Greenwood, & Walker, 2014).

### 2. Critiques of early research

The original Hart and Risley study also raised methodological concerns related to sample size and the conflation of SES and race (e.g., Adair, Colegrove, & McManus, 2017; Baugh, 2017; Sperry, Sperry, & Miller, 2018). As was the case when Hart and Risley recruited their sample, there continues to be a disproportionate

representation of racial, cultural and ethnic minorities in economically disadvantaged groups in the United States ([Children's Defense Fund, 2019](#)). The association between SES and quantity and quality of adult language input (regardless of race), has however been replicated many times in the decades since the original study ([Golinkoff, Hoff, Rowe, Tamis-LeMonda, & Hirsh-Pasek, 2018](#); [Hoff, 2003](#); [Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010](#); [Pace, Luo, Hirsh-Pasek, & Golinkoff, 2017](#); [Rowe, 2008](#)).

### 3. The adverse impact of poverty on child language learning

The association between SES linked disadvantage, adult-child language interaction, and later language/literacy/school outcomes has been widely documented (e.g., [Aikens & Barbarin, 2008](#); [Dickinson & Porche, 2011](#); [Gilkerson et al., 2018](#); [Rodriguez & Tamis-LeMonda, 2011](#); [Rowe, Raudenbush, & Goldin-Meadow, 2012](#)). The negative effects of poverty are evident on neurocognitive language systems ([Hackman & Farah, 2009](#)), neural connectivity (e.g., [Kuhl, 2010](#); [Romeo et al., 2018](#)), and in the developing language of children as young as 9 months ([Fernald, Marchman, & Weisleder, 2013](#)). When development is compromised by the stress of poverty, children may be placed at further risk for later delays, reading problems, and school failure, which come at substantial personal and economic cost to society ([Heckman, 2006](#); [Shonkoff & Phillips, 2000](#); [Warren & Walker, 2005](#)). The persistence of SES-related disadvantage in early language development may perpetuate inequality – making action to close the word gap an ethical and moral imperative.

### 4. Need for intervention research addressing the word gap

There is therefore, a compelling need to translate communication and language intervention research into evidence-based practice that can build the capacity of parents and early educators to prevent achievement gaps as children enter school ([Carta, Greenwood, Baggett, Buzhardt, & Walker, 2012](#); [Council on Early Childhood, 2014](#); [Hirsh-Pasek et al., 2015](#)). While there are interventions and practices found to be effective for improving child language outcomes, few have been adopted or maintained by parents or practitioners in home- or community-based settings ([Justice, Logan, & Damschroder, 2015](#); [Phillips & Adams, 2001](#); [Schwartz, Carta, & Grant, 1996](#); [Smith, Warren, Yoder, & Feuer, 2004](#); [Walker, Bigelow, & Harjusola-Webb, 2008](#)). Language interventions have yet to be scaled to community-wide or population level studies ([Darcy Mahoney, McConnell, Larson, Becklenberg, & Stapel-Wax, 2020](#); [Greenwood et al., 2017](#)).

This Special Issue provides a unique opportunity to feature a series of topical systematic reviews and conceptual analyses of language intervention research and to highlight corresponding intervention studies. Improving knowledge of effective interventions and practices is necessary to inform future prevention efforts and to identify interventions to meet the needs of diverse children and families experiencing economic disadvantage and poverty.

### 5. Overview of studies addressing communication and language interventions

Research syntheses completed by interdisciplinary topical work groups convened through the HRSA-Bridging the Word Gap Research Network ([Carta et al., 2014](#)) were solicited for inclusion in this Special Issue. The six featured syntheses address research topic areas covering (1) parents, (2) early educators, (3) health-care providers, (4) culturally and linguistically diverse participants, (5) training and implementation practices, and (6) methodological factors that inform intervention. Each synthesis highlights the

strengths and weakness of studies in the intervention literature. Ten empirical studies describing innovative interventions documenting the effects of communication and language interventions provide promising results and direction for future studies addressing the language-learning environment for infants and young children experiencing economic disadvantage. These studies are featured below according to the key topics aligned with each of the research syntheses.

#### 5.1. Parent-implemented communication and language intervention

In the years since identifying the disparity of the language-learning experiences of children from different socioeconomic backgrounds, interventions to improve children's language outcomes by intervening with parents and guardians have been developed and evaluated ([Heidlage et al., 2020](#)). In their meta-analysis of parent-implemented language interventions, [Heidlage et al. \(2020\)](#) report that the randomized control trials they analyzed identified modest improvements in children's expressive language following intervention. They note however, that few studies addressing parent-implemented communication and language interventions have included infants and young children from low-SES backgrounds.

Two randomized control trials (RCT) featured in this Special Issue evaluate the delivery of intervention models with parents of infants and toddlers. [Leung, Hernandez, and Suskind \(2020\)](#) report the effects of their parent-implemented home-visiting curriculum to enrich the language environment for infants and toddlers. [Feil et al. \(2020\)](#) present findings from an internet-based intervention designed to facilitate the use of the intervention by parents and children from economically disadvantaged households.

Studies examining innovations in the implementation of shared book reading interventions to promote parent-child language interaction for children from economically disadvantaged backgrounds ([Canfield et al., 2020](#); [Knauer, Jakiela, Ozier, Aboud, & Fernald, 2020](#); [Seven & Goldstein, 2019](#); [Troseth, Strouse, Flores, Stuckelman, & Johnson, 2020](#)) are included in this Special Issue. These studies build upon the literature associating oral language experience and later vocabulary ([Burchinal et al., 2000](#); [Dickinson, Golinkoff, & Hirsh-Pasek, 2010](#); [Walker et al., 1994](#)), reading proficiency and print awareness ([Justice, Chen, Tambyraja, & Logan, 2018](#); [Mendelsohn et al., 2011](#); [Neuman, 2008](#); [Whitehurst & Lonigan, 1998](#)). [Troseth et al. \(2020\)](#) for example, report the use of an electronic enhancement to promote parents' use of dialogic reading strategies during a shared reading intervention implemented with parent-child dyads.

In a conceptual analysis, [Adamson, Kaiser, Tamis-LeMonda, Owen and Dimitrova \(2020\)](#) propose a set of premises to guide parent-implemented language intervention research with infants and toddlers. They posit that to have an impact on children's language outcomes, intervention should start before children begin using words, and include the role of transactional and developmental processes. Each of the papers addressing parent-implemented interventions in this Special Issue emphasize the important role of interaction for improving child outcomes and provides unique perspectives as to how to support parents in using practices that enrich the home language-learning environment.

#### 5.2. Language interventions in child care and early learning programs

Surveying language intervention studies conducted in early education and child care settings, [Walker et al. \(2020\)](#) characterize the features of studies focused on increasing the communication

and language of infants and young children. Walker and colleagues concluded that more studies are needed in which interventions are implemented in early learning settings serving infants and young children from low-SES backgrounds, culturally and linguistically diverse children and children with disabilities.

Illustrating intervention studies implemented in child care and early learning settings, [Lorio and Woods \(2020\)](#) utilized single-subject case methodology to analyze an interactive shared book reading intervention with teachers in Early Head Start classrooms to increase children's vocabulary. In their small-scale RCT study, [Wasik and Hindman \(2020\)](#) analyzed the effects of their intervention to increase the vocabulary of preschool-aged children from a high-poverty, urban school district. [Levine et al. \(2020\)](#) report on their analysis of a new measure of vocabulary and syntax and language processes for preschoolers. In a single-case design study investigating the effects of a naturalistic prelinguistic communication intervention implemented in an Early Head Start program, [Romano and Windsor \(2020\)](#) describe their efforts to increase toddlers' use of deictic communication gestures. Each of these studies contributes to our knowledge about effective interventions and practices that can be implemented by early educators in child care and early learning settings that have the potential to address the word gap.

[Biel et al. \(2020\)](#) report on the features of intervention training and delivery in their systematic analysis of intervention studies with caregivers in homes and in classrooms. Biel and colleagues reveal a need for more thorough descriptions of the training provided when implementing evidence-based practices in home and child care/early education settings to maximize the potential for changing adult behavior that can lead to improved child outcomes (see also [Gottfredson et al., 2015](#); [Greenwood, Schnitz, Carta, Wallich, & Irvin, 2019](#)).

### 5.3. Children from culturally and linguistically diverse backgrounds

Given the increasing population of young children from culturally and linguistically diverse backgrounds, [Larson et al. \(2020\)](#) focus their systematic review on describing and analyzing the features of intervention studies to promote language development implemented with young children who are learning their home language(s) as well as standardized American English. In this research synthesis, Larson and her colleagues expand upon existing literature related to cultural and linguistic diversity (CLD). They examine the methodological features and report on the efficacy of studies in which CLD populations were included.

In an RCT designed to enhance the language acquisition and early literacy of young children from economically disadvantaged homes in rural Kenya, [Knauer et al. \(2020\)](#) tested variations of a dialogic reading intervention with primarily illiterate maternal caregivers. In addition to testing the intensity of the training formats to improve the quantity and/or quality of caregiver-child book-sharing and to address hypotheses around intervention engagement, they also assessed the extent to which the intervention improved child vocabulary. In another study, analyzing the effects of a book-sharing intervention using single-subject design with Turkish fathers and their preschool-aged children, [Seven and Goldstein \(2020\)](#) reported that Turkish fathers successfully increased their use of more complex, decontextualized language interactions during a book-sharing intervention with their young children. These studies provide promising examples of ways in which interventions that are culturally and linguistically responsive can improve the language-learning environments and outcomes for young children from diverse backgrounds.

### 5.4. Pediatric and population-level interventions

In their examination of pediatric and population-level interventions in this Special Issue, [Darcy Mahoney et al. \(2020\)](#) found few studies of population-based public health interventions, but those that met their inclusionary criteria showed promising results for improving parent behavior in particular, and for child language and literacy outcomes. In a representative study linking low-income families with literacy resources, [Canfield et al. \(2020\)](#) examine the contributions of a pediatric healthcare implemented intervention and library access on parents' home literacy activities with their children. Particularly promising is the potential for the scalability of pediatric-based interventions focused on improving parent-child interactions (see also [Radesky, Carta, & Bair-Merritt, 2016](#); [Weisleder et al., 2016](#)).

### 5.5. Methodological features of communication and language intervention research

In their analysis of the methodological quality of peer-reviewed language intervention research studies focused on children from low-socioeconomic backgrounds, [Greenwood et al. \(2020\)](#) addressed questions related to ecological validity, rigor or trustworthiness and readiness for scaling up to prevent the word gap. These authors reported that although most of the intervention studies employed generally high standards of methodological rigor, most interventions were not implemented by parents/caregivers; and few of the studies met the criteria for scaling up to address community-wide prevention.

The intervention studies featured in this Special Issue begin to address some of the gaps and methodological shortcomings in the literature highlighted by [Greenwood et al. \(2020\)](#) for example; (a) including participants from low-SES and/or poverty backgrounds, (b) demonstrating that parents and early educators can implement interventions with fidelity, and (c) using rigorous research design. For instance, a number of the intervention studies included in this Special Issue employed single-subject experimental research designs (see [Lorio & Woods, 2019](#); [Romano & Windsor, 2019](#); [Seven & Goldstein, 2019](#)) that meet the What Works Clearinghouse standards for single-case designs ([Kratochwill et al., 2013](#)). Various small- and large-scale RCT designs are also employed (see [Fiel et al., 2019](#); [Knauer et al., 2020](#); [Leung et al., 2020](#); [Wasik & Hindman, 2019](#)).

## 6. Next directions for guiding communication and language intervention research

The premise underlying the research addressing the word gap in this Special Issue is that the period of development between birth to 3 years represents a unique time during which transactional effects can have a substantial positive or negative impact on child outcomes ([Gilkerson et al., 2018](#); [Hart & Risley, 1995](#); [Hoff, 2003](#); [Pan, Rowe, Singer, & Snow, 2005](#); [Walker et al., 1994](#)). Research addressing the word gap has been informed by a developmental transactional framework wherein early social communication and language development is facilitated by bidirectional, reciprocal and cumulative interactions between a child and his/her environment ([Adamson et al., 2020](#); [Bronfenbrenner, 1994](#); [Sameroff, 2000](#); [Warren & Walker, 2005](#)). In the final paper of this Special Issue, [Ford et al. \(2020\)](#) propose an eco-behavioral model of language development aligned with an analysis of social determinants of child development. Their framework expands upon transactional models of development to inform the planning of future interventions to support children's optimal development.

The 18 studies included in this Special Issue contribute to our knowledge of communication and language interventions that may be effective in addressing disparities in language-learning opportunities associated with SES. The series of research syntheses provide an overview of the strengths and weaknesses of the empirical research addressing communication and language intervention for infants and young children. While interventions effective for addressing communication and language delays or improving child language outcomes have been developed, infants and young children from low-SES or poverty backgrounds have only rarely been included as participants. Too often, published articles describing these studies have not provided sufficient information to address questions around fidelity of intervention implementation or adequately described the factors contributing to intervention success or failure, making replication impossible. The featured intervention studies address many of these deficiencies and provide innovative approaches that contribute to a growing literature base of studies designed to address the word gap and meet the needs of diverse children and families experiencing poverty and/or related risks. It is our expectation that this Special Issue will contribute to moving the field forward in efforts to take interventions to scale to prevent persistent SES-related inequities in language experience by reducing or eliminating the word gap, and, ultimately, to improve the opportunities for children from diverse family backgrounds to reach their potential in school and beyond.

## Dedication

We dedicate this Special Issue to the memory of Drs. Betty Hart and Todd Risley. Their pioneering research documented the importance of early language-learning experiences for children's development and for their future.

## Acknowledgments

We thank the authors who contributed their work to this Special Issue. We sincerely appreciate the many scientists who donated their time and effort toward providing scholarly critiques of the manuscripts submitted for publication in this Issue. Preparation of this editorial and Special Issue was supported in part by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant UA6MC 27762, Bridging the Word Gap Research Network (BWGRN) to the University of Kansas. This information or content and conclusions are those of the authors and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS, or the U.S. Government. Additional support for this work was received from the Kansas Intellectual and Developmental Disabilities Research Center, NIH U54HD090216 held by the University of Kansas.

## References

- Adair, J. K., Colegrove, K. S., & McManus, M. E. (2017). *How the word gap argument negatively impacts young children of Latinx immigrants' conceptualizations of learning*. *Harvard Educational Review*, 87, 309–334.
- Adamson, L. B., Kaiser, A. P., Tamis-LaMonda, C. S., Owen, M. T., & Dimitrova, N. (2020). The developmental landscape of early parent-focused language intervention. *Early Childhood Research Quarterly*, 50(P1), 59–67. <http://dx.doi.org/10.1016/j.ecresq.2018.11.005>
- Aikens, N. L., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology*, 100(2), 235–251.
- Baugh, J. (2017). Meaning-less differences: Exposing fallacies and flaws in the word gap: Hypothesis that conceal a dangerous "language trap" for low-income American families and their children. *International Multilingual Research Journal*, 11, 39–51.
- Biel, C. H., Buzhardt, J., Brown, J. A., Romano, M. K., Lorio, C. M., Windsor, K. S., et al. (2020). Language interventions taught to caregivers in homes and classrooms:

- A review of intervention and implementation fidelity. *Early Childhood Research Quarterly*, 50(P1), 140–156. <http://dx.doi.org/10.1016/j.ecresq.2018.12.002>
- Bronfenbrenner, U. (1994). *Ecological models of human development*. pp. 1643–1647. *Effects on child and adolescent development* (Vol. 2) NY: Elsevier Science.
- Burchinal, M. R., Roberts, J. E., Riggins, R., Jr, Zeisel, S. A., Neebe, E., & Bryant, D. (2000). Relating quality of center-based child care to early cognitive and language development longitudinally. *Child Development*, 71, 339–357.
- Canfield, C. F., Seery, A., Weisleder, A., Workman, C., Cates, C. B., Roby, R., et al. (2020). Encouraging parent-child book sharing: Potential additive benefits of literacy promotion in health care and the community. *Early Childhood Research Quarterly*, 50(P1), 221–229. <http://dx.doi.org/10.1016/j.ecresq.2018.11.002>
- Carta, J., Greenwood, C., Baggett, K., Buzhardt, J., & Walker, D. (2012). *Research-based approaches for individual caregiving and educational interventions for infants and toddlers in poverty*. In S. L. Odom, E. Pungello, & N. Gardner-Neblett (Eds.), *Re-visioning the beginning: The implications of developmental and health science for infants and toddler care and poverty* (pp. 333–349). New York: Guilford Press.
- Carta, J. C., Greenwood, C. R., & Walker, D. (2014). *Bridging the word gap national research network*. Washington, DC: Child and Maternal Health; Human Resources Services Administration (HRSA) (HRSA: UA6MC27762).
- Children's Defense Fund. (2019). *Ending child poverty now* Report available at: <http://www.childrensdefense.org/library/PovertyReport/EndingChildPovertyNow.html>
- Council on Early Childhood. (2014). *Literacy promotion: An essential component of primary care pediatric practice*. *Pediatrics*, 134, 404–409.
- Darcy Mahoney, A., McConnell, S. R., Larson, A. L., Becklenberg, A., & Stapel-Wax, J. L. (2020). Where do we go from here? Examining pediatric and population-level interventions to improve child outcomes. *Early Childhood Research Quarterly*, 50(P1), 205–220. <http://dx.doi.org/10.1016/j.ecresq.2019.01.009>
- Dickinson, D., Golinkoff, R. M., & Hirsh-Pasek, K. (2010). *Speaking out for language: Why language is central to reading development*. *Educational Researcher*, 4, 305–310.
- Dickinson, D. K., & Porche, M. V. (2011). *Relation between language experiences in preschool classrooms and children's kindergarten and fourth-grade language and reading abilities*. *Child Development*, 82(3), 870–886.
- Fernald, A., Marchman, V. A., & Weisleder, A. (2013). *SES differences in language processing skill and vocabulary are evident at 18 months*. *Developmental Science*, 16(2), 234–248.
- Feil, E. G., Baggett, K., Davis, B., Landry, S., Sheeber, L., Leve, C., et al. (2020). Randomized control trial of an internet-based parenting intervention for mothers of infants. *Early Childhood Research Quarterly*, 50(P1), 36–44. <http://dx.doi.org/10.1016/j.ecresq.2018.11.003>
- Ford, A. L. B., Elmquist, M., Merbler, A. M., Kriese, A., Will, K., & McConnell, S. R. (2020). *Toward an ecobehavioral model of early language development*. *Early Childhood Research Quarterly*, 50(P1), 246–258. <http://dx.doi.org/10.1016/j.ecresq.2018.11.004>
- Gilkerson, J., Richards, J. A., Warren, S. F., Oller, K., Russo, R., & Vohr, B. (2018). *Language experience in the second year of life and language outcomes in late childhood*. *Pediatrics*, 142(4), e20174276.
- Golinkoff, R. M., Hoff, E., Rowe, M. L., Tamis-LaMonda, C. S., & Hirsh-Pasek, K. (2018). *Language matters: Denying the existence of the 30-million-word gap has serious consequences*. *Child Development*, <http://dx.doi.org/10.1111/cdev.13128>
- Gottfredson, D. C., Cook, T. D., Gardner, F. E. M., Gorman-Smith, D., Howe, G. W., Sandler, I. N., et al. (2015). *Standards of evidence for efficacy, effectiveness, and scale-up research in prevention science: Next generation*. *Prevention Science*, 16(7), 893–926.
- Greenwood, C. R., Carta, J. J., Walker, D., Watson-Thompson, J., Gilkerson, J., Larson, A. L., et al. (2017). *Conceptualizing a public health prevention intervention for bridging the 30 million word gap*. *Clinical Child and Family Psychology Review*, 20, 3–24.
- Greenwood, C. R., Schnitz, A. G., Carta, J. J., Wallisch, A., & Irvin, D. W. (2020). *A systematic review of language intervention research with low-income families: A word gap prevention perspective*. *Early Childhood Research Quarterly*, 50(P1), 230–245. <http://dx.doi.org/10.1016/j.ecresq.2019.04.001>
- Hackman, D. A., & Farah, M. J. (2009). Socioeconomic status and the developing brain. *Trends in Cognitive Sciences*, 13, 65–73.
- Hart, B., & Risley, T. R. (1992). *American parenting in language-learning children: Persisting differences in family-child interactions observed in natural home environments*. *Developmental Psychology*, 28(6), 1096–1105.
- Hart, R., & Risley, T. R. (1995). *Meaningful differences in the everyday experiences of young American children*. Baltimore: Brookes.
- Hart, B., & Risley, T. R. (2003). *The early catastrophe: The 30 million word gap by age 3*. *American Educator*, 27(1), 4–9.
- Heckman, J. J. (2006). *Skill formation and the economics of investing in disadvantaged children*. *Science*, 312(5782), 1900–1902.
- Heidlage, J. K., Cunningham, J. E., Kaiser, A. P., Trivette, C. M., Barton, E. E., Frey, J. R., et al. (2020). *The effects of parent-implemtened language interventions on child linguistic outcomes: A meta-analysis*. *Early Childhood Research Quarterly*, 50(P1), 6–23. <http://dx.doi.org/10.1016/j.ecresq.2018.12.006>
- Hirsh-Pasek, K., Adamson, L., Bakeman, R., Owen, M. T., Golinkoff, R. M., Pace, A., et al. (2015). *The contribution of early communication quality to low-income children's language success*. *Psychological Science*, 26(7), 1071–1083.

- Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development*, 74, 1368–1378.
- Huttenlocher, J., Waterfall, H., Vasilyeva, M., Vevea, J., & Hedges, L. V. (2010). Sources of variability in children's language growth. *Cognitive Psychology*, 61(4), 343–365.
- Justice, L. M., Chen, J., Tambyraja, S., & Logan, J. (2018). Increasing caregivers' adherence to a literacy intervention improves the print knowledge of children with language impairment. *Journal of Autism and Developmental Disorders*, 48, 4179–4192.
- Justice, L. M., Logan, J. R., & Damschroder, L. (2015). Designing caregiver-implemented shared-reading interventions to overcome implementation barriers. *Journal of Speech, Language, and Hearing Research: JSLHR*, 58(6), S1851–S1863.
- Klass, P., Dreyer, B. P., & Mendelsohn, A. L. (2009). Reach out and read: Literacy promotion in pediatric primary care. *Advances in Pediatrics*, 56, 11–27.
- Knauer, H. A., Jakiela, P., Ozier, O., Aboud, F., & Fernald, L. C. H. (2020). Enhancing young children's language acquisition through parent-child book-sharing: A randomized trial in rural Kenya. *Early Childhood Research Quarterly*, 50(P1), 179–190. <http://dx.doi.org/10.1016/j.ecresq.2019.01.002>
- Kratochwill, T. R., Hitchcock, J. H., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., et al. (2013). Single-case intervention research design standards. *Remedial and Special Education*, 34(1), 26–38.
- Kuhl, P. K. (2010). Brain mechanisms in early language acquisition. *Neuron*, 67(5), 713–727.
- Larson, A. L., Cycyk, L. M., Carta, J. J., Hammer, C. S., Baralt, M., Uchikoshi, Y., et al. (2020). A systematic review of language-focused interventions for young children from culturally and linguistically diverse backgrounds. *Early Childhood Research Quarterly*, 50(P1), 157–178. <http://dx.doi.org/10.1016/j.ecresq.2019.06.001>
- Leung, C. Y. Y., Hernandez, M. W., & Suskind, D. L. (2020). Enriching home language environment among families from low-SES backgrounds: A randomized controlled trial of a home visiting curriculum. *Early Childhood Research Quarterly*, 50(P1), 24–35. <http://dx.doi.org/10.1016/j.ecresq.2019.12.005>
- Levine, D., Pace, A., Luo, R., Hirsh-Pasek, K., Golinkoff, R. M., de Villiers, J., et al. (2020). Evaluating socioeconomic gaps in preschoolers' vocabulary, syntax and language process skills with the Quick Interactive Language Screener (QUILS). *Early Childhood Research Quarterly*, 50(P1), 114–128. <http://dx.doi.org/10.1016/j.ecresq.2018.11.006>
- Lorio, C. M., & Woods, J. J. (2020). Multi-component professional development for educators in an Early Head Start: Explicit vocabulary instruction during interactive shared book reading. *Early Childhood Research Quarterly*, 50(P1), 86–100. <http://dx.doi.org/10.1016/j.ecresq.2019.12.003>
- Mendelsohn, A. L., Huberman, H. S., Berkule, S. B., Brockmeyer, C. A., Morrow, L. M., & Dreyer, B. P. (2011). Primary care strategies for promoting parent-child interactions and school readiness in at-risk families: The Bellevue Project for Early Language, Literacy and Education Success. *Archives of Pediatric Adolescent Medicine*, 165(1), 33–41.
- Neuman, S. (2008). *Educating the other America: Top experts tackle poverty, literacy, and achievement in our schools*. Baltimore, MD: Brookes.
- Pace, A., Luo, R., Hirsh-Pasek, K., & Golinkoff, R. M. (2017). Identifying pathways between socioeconomic status and language development. *Annual Review of Linguistics*, 3, 285–308.
- Pan, B., Rowe, M. L., Singer, J. D., & Snow, C. E. (2005). Maternal correlates of growth in toddler vocabulary production in low-income families. *Child Development*, 76(4), 763–782.
- Phillips, D., & Adams, G. (2001). Child care and our youngest children. *The Future of Children*, 11(1), 35–51.
- Radesky, J. S., Carta, J. J., & Bair-Merritt, M. (2016). The 30 million-word gap relevance for pediatrics. *JAMA Pediatrics*, 170(9), 825–826. <http://dx.doi.org/10.1001/jamapediatrics.2016.1486>
- 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.
- Romano, M. K., & Windsor, K. (2020). Increasing deictic gesture use to support the language development of toddlers from high poverty backgrounds. *Early Childhood Research Quarterly*, 50(P1), 129–139. <http://dx.doi.org/10.1016/j.ecresq.2019.12.004>
- Romeo, R. R., Leonard, J. A., Robinson, S. T., West, M. R., Mackey, A. P., Rowe, M. L., et al. (2018). Beyond the 30-million-word-gap: Children's conversational exposure is associated with language-related brain function. *Psychological Science*, 29(5), 700–710.
- Rowe, M. L. (2008). Child-directed speech: Relation to socioeconomic status, knowledge of child development and child vocabulary skill. *Journal of Child Language*, 35(1), 185–205.
- Rowe, M. L., Raudenbush, S., & Goldin-Meadow, S. (2012). The pace of early vocabulary growth helps predict later vocabulary skill. *Child Development*, 83(2), 508–525.
- Sameroff, A. (2000). Ecological perspectives on developmental risk. In J. Osofsky, & H. Fitzgerald (Eds.), *WAIMH handbook of infant mental health* (Vol. 4) (pp. 4–33). NY: Wiley.
- Schwartz, I. S., Carta, J. J., & Grant, S. (1996). Examining the use of recommended language intervention practices in early childhood special education classrooms. *Topics in Early Childhood Special Education*, 16(2), 251–272.
- Seven, Y., & Goldstein, H. (2020). Effects of embedding decontextualized language during book-sharing delivered by fathers in Turkey. *Early Childhood Research Quarterly*, 50(P1), 191–204. <http://dx.doi.org/10.1016/j.ecresq.2019.01.001>
- Shonkoff, J. P., & Phillips, D. A. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.
- Smith, J. D., Warren, S. F., Yoder, P. J., & Feurer, I. (2004). Teachers' use of naturalistic communication intervention practices. *Journal of Early Intervention*, 27, 1–14.
- Sperry, D. E., Sperry, L. L., & Miller, P. J. (2018). Reexamining the verbal environments of children from different socioeconomic backgrounds. *Child Development*. <http://dx.doi.org/10.1111/cdev.13072>
- Suskind, D. L., Suskind, B., & Lewinter-Suskind, L. (2015). *Thirty million words: Building a child's brain—Tune in, talk more, take turns*. New York, NY: Dutton.
- Troseth, G. L., Strouse, G. A., Flores, I., Stuckelman, Z. D., & Johnson, C. R. (2020). An enhanced eBook facilitates parent-child talk during shared reading by families of low socioeconomic status. *Early Childhood Research Quarterly*, 50(P1), 45–58. <http://dx.doi.org/10.1016/j.ecresq.2019.02.009>
- Walker, D., Bigelow, K. M., & Harjusola-Webb, S. (2008). Increasing communication and language-learning opportunities for infants and toddlers. *Young Exceptional Children Monograph Series*, #10, 105–121.
- Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development*, 65, 606–621.
- Walker, D., Sepulveda, S. J., Hoff, E., Rowe, M., Schwartz, I. S., Dale, P. S., et al. (2020). Language intervention research in early childhood care and education: A systematic survey of the literature. *Early Childhood Research Quarterly*, 50(P1), 68–85. <http://dx.doi.org/10.1016/j.ecresq.2019.02.010>
- Warren, S. F., & Walker, D. (2005). Fostering early communication and language development. In D. M. Teti (Ed.), *Handbook of research methods in developmental science* (pp. 249–270). Malden, MA: Blackwell Publishing.
- Wasik, B. A., & Hindman, A. H. (2020). Increasing preschoolers' vocabulary development through a streamlined teacher professional development intervention. *Early Childhood Research Quarterly*, 50(P1), 101–113. <http://dx.doi.org/10.1016/j.ecresq.2018.11.001>
- Weisleder, A., Cates, C. B., Dreyer, B. P., Berkule Johnson, S., Huberman, H. S., Seery, A. M., et al. (2016). Promotion of positive parenting and prevention of socioemotional disparities. *Pediatrics*, 137(2), e20153239.
- Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development*, 69(3), 848–872.
- Zuckerman, B. (2009). Promoting early literacy in pediatric practice: Twenty years of reach out and read. *Pediatrics*, 124, 1660.

Dale Walker\*

Judith J. Carta

Juniper Gardens Children's Project, University of Kansas, United States

\* Corresponding author at: Juniper Gardens Children's Project, Schiefelbusch Institute for Life Span Studies, University of Kansas, 444 Minnesota Ave. Suite 300, Kansas City, KS 66101, United States.

E-mail address: [walkerd@ku.edu](mailto:walkerd@ku.edu) (D. Walker)

Available online 8 November 2019