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CLINICAL REVIEW

Promoting Early Literacy in the Pediatrician's Office: What Have We Learned?

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Abstract

- *Objective:* To describe current knowledge about the effects of promoting literacy and early language development in young children.
- *Methods:* Review of the literature.
- *Results:* Children who are exposed to literacy-promoting interventions in their pediatricians' offices are more likely to be read to frequently by their caregivers and have improved language skills when compared to children who are not. Language disparities can have life-long consequences that are particularly important in children from disadvantaged socioeconomic backgrounds. The power of the intervention may lie in the fact that it begins in a parent's lap and helps build strong and nurturing parent-child relationships as well as language skills.
- *Conclusion:* Pediatric providers are in a unique position to positively influence a child's life course by promoting literacy starting at birth.

Over the past few decades, pediatric providers and parents have been inundated with information about the importance of reading to children, starting at a young age. In fact, a national organization, Reach Out and Read (ROR), has been promoting this idea for the past 25 years. ROR began in 1989 at Boston

members realized that this was likely the result of a lack of children's books in homes of disadvantaged children, and they decided to provide quality children's books and guidance about reading with young children as a component of their primary care [1,2]. Since then, ROR has proliferated, with now over 5000 sites throughout the nation. Millions of children between the ages of 6 months and 5 years are given books by their pediatricians at every well child visit. Their parents receive anticipatory guidance about the benefits and joys of reading aloud to their children.

Most pediatricians trained in the past 10 to 15 years cannot imagine a visit that will not include giving a book to a child and talking to his or her parents about the benefits of sharing books together. This practice was reinforced when in 2014 the American Academy of Pediatrics (AAP) released a policy statement making literacy promotion in pediatric practice the standard of care [3]. In this paper, we review the data supporting early literacy promoting interventions and the role that pediatricians have in improving children's literacy environments. We also discuss the ROR model as well as the impact of electronic media on children's language skills.

Early Brain Development and Literacy Interventions

About 90% of brain growth occurs before the age of 5. In the first year of life, the brain triples in volume and there is a dramatic increase in the number of synapses. As many as 700 new neural connections are formed every second, and the number grows exponentially from 50 trillion at birth to 1000 trillion by the time of the child's first birthday. This period of rapid proliferation is followed by a phase of synaptic retraction or "pruning," so that brain circuits become more efficient. The time course for synaptic "blooming and pruning" varies by

gradual retraction that occurs until the middle-end of the preschool period. A similar pattern is observed in areas of the brain that govern development of early language skills but with a somewhat later time course observed, peaking at about 9 months, followed by decline and stabilization in the preschool years. The prefrontal cortex, involved in higher cognitive functions, is the last to develop, reaching a peak overproduction in synapses by age 1, and it is not until late adolescence to early adulthood that a more streamlined density of synapses is obtained [4,5].

References

1. Needlman R, Fried L, Morley D, et al. Clinic-based intervention to promote literacy. Am J Dis Child 1991;145:881–4.

2. Reach Out and Read: a national pediatric literacy program. Available at http://reachoutandread.org.

3. High PC, Klass P. Literacy promotion: an essential component of primary care pediatric practice. Council on Early Childhood. Pediatrics 2014;134:404–9.

4. Huttenlocher PR, Dabholkar AS. Regional differences in synaptogenesis in human cerebral cortex. J Comp Neurol 1997; 387:167–78.

5. Center on the Developing Child. The science of early childhood development (in brief); 2007. Accessed 6 May 2016 at www.developingchild.harvard.edu.

6. Connecting Science, Policy, and Practice: Zero to Three's National Training Institute, 2015. Zero Three 2016;36(3).

7. Fox NA, Zeanah CH, Nelson CA. A matter of timing: enhancing positive change for the developing brain. Zero Three 2014;34(3):4–9.

8. Halfon N, Shulman E, Hochstein M. Brain development in early childhood. Technical report. UCLA Center for Healthier Children, Families and Communities. Aug 2001.

9. National Scientific Council on the Developing Child. The science of early childhood development: closing the gap between what we know and what we do. Center on the Developing Child. Harvard University; 2007.

11. Hart B, Risley TR. The early catastrophe: the 30 million word gap by age 3. Am Educator 2003;27:4–9.

12. The Annie E. Casey Foundation. Double jeopardy: how third grade reading skills and poverty influence high school graduation. 2012. Accessed 21 Feb 2016 at www.aecf.org/resources/double-jeopardy.

13. The Annie E. Casey Foundation. Early warning confirmed: a research update on third grade reading. 2013 Nov. Accessed 23 Feb 2016 at www.aecf.org/m/resourcedoc/AECF-EarlyWarningConfirmed-2013.pdf

14. Heckman J. The economics of inequality: the value of early childhood education. Am Educator 2011;47:31–5.

15. Christakis DA. The effects of infant media usage: what do we know and what should we learn? Acta Paediatr 2009;98: 8–16.

16. American Academy of Pediatrics, Council on Communications and Media. Policy statement. Media use by children younger than 2 years. Pediatrics 2011;128:1040–5.

17. Linebarger DL, Walker D. Infants' and toddlers' television viewing and language outcomes. Am Behav Sci 2005;48:624–45.

18. Masako T, Okuma K, Kyoshima K. Television viewing and reduced parental utterance, and delayed speech development in infants and young children. Arch Pediatr Adolesc Med 2007;161:618–9.

19. Rideout VJ, Hamel E. The media family: electronic media in the lives of infants, toddlers, preschoolers, and their parents. Menlo Park, CA: Kaiser Family Foundation; 2006.

20. Sosa AV. Association of the type of toy used during play with the quantity and quality of parent-infant communication. JAMA Pediatr 2016;170:132–7.

21. Vandewater EA, Bickham DS, Lee JH et al. When the television is always on: heavy television exposure and young children's development. Am Behav Sci 2005;48:562–77.

22. Zimmerman FJ, Christakis DA, Meltzoff AN. Associations between media viewing and language development in children under age two years. J Pediatr 2007;151:364–8.

23. Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. Acta Paediatr 2008;97:977–82.

24. Robb MB, Richert RA, Wartella EA. Just a talking book? Word learning from watching baby videos. Br J Dev Psychol 2009;27(Pt 1):27–45.

26. Mendelsohn A, Mogliner L, Dreyer B, et al. The impact of a clinic-based literacy intervention on language development in inner-city preschool children. Pediatrics 2001;107:130–4.

27. Mendelsohn AL. Promoting language and literacy through reading aloud: the role of the pediatrician. Curr Probl Pediatr Adolesc Health Care 2002;32:183–210.

28. High P, Hopman M, LaGasse L, et al. Evaluation of a clinic-based program to promote book sharing and bedtime routines among low-income urban families with young children. Arch Pediatr Adolesc Med 1998;152:459–65.

29. Golova N, Alario A, Vivier P, et al. Literacy promotion for Hispanic families in a primary care setting: a randomized controlled trial. Pediatrics 1999;103:993–7.

30. High PC, LaGasse L, Becker S, et al. Literacy promotion in primary care pediatrics: can we make a difference? Pediatrics 2000;105:927–34.

31. Needlman R, Toker KH, Dreyer BP, et al. Effectiveness of a primary care intervention to support reading aloud: a multicenter evaluation. Ambul Pediatr 2005;5:209–15.

32. Wu SC, Lue HC, Tseng LL. A pediatric clinic-based approach to early literacy promotion–experience in a well-baby clinic in Taiwan. J Formos Med Assoc 2012;111:258–64.

33. Sanders LM, Gershon TD, Huffman LC, et al. Prescribing books for immigrant children: a pilot study to promote emergent literacy among the children of Hispanic immigrants. Arch Pediatr Adolesc Med 2000;154:771–7.

34. Kitabayashi KM, Huang GY, Linskey KR, et al. Parent-child reading interactions among English and English as a second language speakers in an underserved pediatric clinic in Hawai'i. Hawaii Med J 2008;67:260–3.

35. Festa N, Loftus PD, Cullen MR, Mendoza FS. Disparities in early exposure to book sharing within immigrant families. Pediatrics. 2014;134:e162–8.

36. Shonkoff JP, Phillips DA, editors. From neurons to neighborhoods: the science of early childhood development. National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development. Washington, DC: National Academies Press; 2000.

37. Neuman SB. Guiding young children's participation in early literacy development: a family literacy program for adolescent mothers. Early Child Dev Care 1997;127:119–29.

39. Mendelsohn AL, Huberman HS, Berkule SB, et al. 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. Arch Pediatr Adolesc Med 2011;165:33–41.

40. Ginsburg K; American Academy of Pediatrics, Committee on Communications, Committee on Psychosocial Aspects of Child and Family Health. The importance of play in promoting healthy child development and maintaining strong parent-child bonds. Pediatrics 2007;119:182–91.

41. Preston JL, Frost SJ, Mencl WE, et al. Early and late talkers: school-age language, literacy and neurolinguistic differences. Brain 2010;133:2185–95.

42. Hugdahl K, Gundersen H, Brekke C, et al. fMRI Brain activation in a Finnish family with specific language impairment compared with a normal control group. J Speech Lang Hear Res 2004;47:162–72.

43. Pugh KR, Mencl WE, Jenner AR, et al. Functional neuroimaging studies of reading and reading disability (developmental dyslexia). Ment Retard Dev Disabil Res Rev 2000;6:207–13.

44. Pugh KR, Mencl WE, Jenner AR, et al. Neurobiological studies of reading and reading disability. J Commun Disord 2001;34:479–92.

45. Hutton JS, Horowitz-Kraus T, Mendelsohn AL, et al. Home reading environment and brain activation in preschool children listening to stories. Pediatrics 2015;136:466–78.

46. Data Resource Center for Child and Adolescent Health. 2011/12 National Survey of Children's Health. Accessed 28 Feb 2016 at www.nschdata.org.

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Both genetic guidance and experiential exposure are important and play a crucial role in brain development. In fact, the purpose of synaptic overproduction is in part to capture and incorporate experience into the developing synaptic architecture of the brain. Exposure is particularly important during "critical" and "sensitive" periods of development. Critical periods are times during which a set of signals must be present for neural systems to differentiate normally. For example, exposure to patterned visual information in the first few years of life is crucial for stereoscopic vision to develop. Sensitive developmental periods are times when opportunity exists for experience to define patterns of synaptic connectivity, optimizing a child's ability to adapt to specific environmental factors. Brain plasticity however decreases with age, and as the maturing brain becomes more specialized it is less capable of adapting to new or unexpected challenges. This makes early childhood an important sensitive period in a child's life, during which experiences directly mold neuronal circuits, offering a critical window for learning [6–9].

Pediatric providers have the unique opportunity to intervene at a time in which the brain is absorbing information at an incredible pace. When children miss the chance to acquire foundational language skills at a very young age, they in turn are at risk for immediate struggles with literacy when they begin attending school. Therefore, for an intervention to have a significant impact on the development of early literacy skills, it has to start early. In the ROR model, pediatric providers start providing anticipatory guidance about the benefits of shared reading, talking, singing, and rhyming starting soon after birth.

The term "word gap" was first coined by psychologists Betty Hart and Todd Risley in their 1995 book, Meaningful Differences in the Everyday Lives of Young American Children [10]. Their study included 42 healthy and intact young families: 13 high-income families (professional families), 23 families of middle/low socioeconomic status (working-class families), and 6 families who received welfare benefits. Monthly hour-long recordings of parent-child conversations and observations of each family were conducted from the time their index child was about 12 months old until they turned 3 years of age. Gender and race were balanced within the sample.

This study identified remarkable differences in the early vocabulary experiences of young children. The average child raised in a family receiving welfare was hearing half as many words per hour (616 words per hour) as was the average child in working-class family (1251 words per hour) and less than one-third as many than the average child raised in a professional family (2153 words per hour). By extrapolating these numbers in a linear fashion, their study found that the average child growing up in a family living in poverty would listen to about 13 million fewer words than the average child being raised by working class parents and 30 million fewer words than children living in higher income/professional families by the time they reached the age of 3.

To investigate if these findings had longer-term implications, 29 of the 42 families included in their initial study were recruited for follow-up when the children were in third grade. Researchers found that measures of accomplishment at age 3 were highly predictive of performance at the ages of 9 and 10 on several standardized vocabulary, language development, and reading comprehension measures. Thus, the foundation built at age 3 had a great bearing on their progress many years later [11]. This is important because

References

1. Needlman R, Fried L, Morley D, et al. Clinic-based intervention to promote literacy. Am J Dis Child 1991;145:881–4.

2. Reach Out and Read: a national pediatric literacy program. Available at http://reachoutandread.org.

3. High PC, Klass P. Literacy promotion: an essential component of primary care pediatric practice. Council on Early Childhood. Pediatrics 2014;134:404–9.

4. Huttenlocher PR, Dabholkar AS. Regional differences in synaptogenesis in human cerebral cortex. J Comp Neurol 1997; 387:167–78.

5. Center on the Developing Child. The science of early childhood development (in brief); 2007. Accessed 6 May 2016 at www.developingchild.harvard.edu.

6. Connecting Science, Policy, and Practice: Zero to Three's National Training Institute, 2015. Zero Three 2016;36(3).

7. Fox NA, Zeanah CH, Nelson CA. A matter of timing: enhancing positive change for the developing brain. Zero Three 2014;34(3):4–9.

8. Halfon N, Shulman E, Hochstein M. Brain development in early childhood. Technical report. UCLA Center for Healthier Children, Families and Communities. Aug 2001.

9. National Scientific Council on the Developing Child. The science of early childhood development: closing the gap between what we know and what we do. Center on the Developing Child. Harvard University; 2007.

10. Hart B, Risley TR. Meaningful differences in the everyday experience of young American children. Baltimore: Brookes; 1995.

11. Hart B, Risley TR. The early catastrophe: the 30 million word gap by age 3. Am Educator 2003;27:4–9.

12. The Annie E. Casey Foundation. Double jeopardy: how third grade reading skills and poverty influence high school graduation. 2012. Accessed 21 Feb 2016 at www.aecf.org/resources/double-jeopardy.

13. The Annie E. Casey Foundation. Early warning confirmed: a research update on third grade reading. 2013 Nov. Accessed 23 Feb 2016 at www.aecf.org/m/resourcedoc/AECF-EarlyWarningConfirmed-2013.pdf

15. Christakis DA. The effects of infant media usage: what do we know and what should we learn? Acta Paediatr 2009;98: 8–16.

16. American Academy of Pediatrics, Council on Communications and Media. Policy statement. Media use by children younger than 2 years. Pediatrics 2011;128:1040–5.

17. Linebarger DL, Walker D. Infants' and toddlers' television viewing and language outcomes. Am Behav Sci 2005;48:624–45.

18. Masako T, Okuma K, Kyoshima K. Television viewing and reduced parental utterance, and delayed speech development in infants and young children. Arch Pediatr Adolesc Med 2007;161:618–9.

19. Rideout VJ, Hamel E. The media family: electronic media in the lives of infants, toddlers, preschoolers, and their parents. Menlo Park, CA: Kaiser Family Foundation; 2006.

20. Sosa AV. Association of the type of toy used during play with the quantity and quality of parent-infant communication. JAMA Pediatr 2016;170:132–7.

21. Vandewater EA, Bickham DS, Lee JH et al. When the television is always on: heavy television exposure and young children's development. Am Behav Sci 2005;48:562–77.

22. Zimmerman FJ, Christakis DA, Meltzoff AN. Associations between media viewing and language development in children under age two years. J Pediatr 2007;151:364–8.

23. Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. Acta Paediatr 2008;97:977–82.

24. Robb MB, Richert RA, Wartella EA. Just a talking book? Word learning from watching baby videos. Br J Dev Psychol 2009;27(Pt 1):27–45.

25. DeLoache JS, Chiong C, Sherman K, et al. Do babies learn from baby media? Psychol Sci 2010;21:1570–4.

26. Mendelsohn A, Mogliner L, Dreyer B, et al. The impact of a clinic-based literacy intervention on language development in inner-city preschool children. Pediatrics 2001;107:130–4.

27. Mendelsohn AL. Promoting language and literacy through reading aloud: the role of the pediatrician. Curr Probl Pediatr Adolesc Health Care 2002;32:183–210.

28. High P, Hopman M, LaGasse L, et al. Evaluation of a clinic-based program to promote book sharing and bedtime routines among low-income urban families with young children. Arch Pediatr Adolesc Med

randomized controlled trial. Pediatrics 1999;103:993–7.

30. High PC, LaGasse L, Becker S, et al. Literacy promotion in primary care pediatrics: can we make a difference? Pediatrics 2000;105:927–34.

31. Needlman R, Toker KH, Dreyer BP, et al. Effectiveness of a primary care intervention to support reading aloud: a multicenter evaluation. Ambul Pediatr 2005;5:209–15.

32. Wu SC, Lue HC, Tseng LL. A pediatric clinic-based approach to early literacy promotion–experience in a well-baby clinic in Taiwan. J Formos Med Assoc 2012;111:258–64.

33. Sanders LM, Gershon TD, Huffman LC, et al. Prescribing books for immigrant children: a pilot study to promote emergent literacy among the children of Hispanic immigrants. Arch Pediatr Adolesc Med 2000;154:771–7.

34. Kitabayashi KM, Huang GY, Linskey KR, et al. Parent-child reading interactions among English and English as a second language speakers in an underserved pediatric clinic in Hawai'i. Hawaii Med J 2008;67:260–3.

35. Festa N, Loftus PD, Cullen MR, Mendoza FS. Disparities in early exposure to book sharing within immigrant families. Pediatrics. 2014;134:e162–8.

36. Shonkoff JP, Phillips DA, editors. From neurons to neighborhoods: the science of early childhood development. National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development. Washington, DC: National Academies Press; 2000.

37. Neuman SB. Guiding young children's participation in early literacy development: a family literacy program for adolescent mothers. Early Child Dev Care 1997;127:119–29.

38. Tomopoulos S, Dreyer BP, Tamis-LeMonda C, et al. Books, toys, parent-child interaction, and development in young Latino children. Ambul Pediatr 2006;6:72–8.

39. Mendelsohn AL, Huberman HS, Berkule SB, et al. 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. Arch Pediatr Adolesc Med 2011;165:33–41.

40. Ginsburg K; American Academy of Pediatrics, Committee on Communications, Committee on Psychosocial Aspects of Child and Family Health. The importance of play in promoting healthy child development and maintaining strong parent-child bonds. Pediatrics 2007;119:182–91.

42. Hugdahl K, Gundersen H, Brekke C, et al. fMRI Brain activation in a Finnish family with specific language impairment compared with a normal control group. J Speech Lang Hear Res 2004;47:162–72.

43. Pugh KR, Mencl WE, Jenner AR, et al. Functional neuroimaging studies of reading and reading disability (developmental dyslexia). Ment Retard Dev Disabil Res Rev 2000;6:207–13.

44. Pugh KR, Mencl WE, Jenner AR, et al. Neurobiological studies of reading and reading disability. J Commun Disord 2001;34:479–92.

45. Hutton JS, Horowitz-Kraus T, Mendelsohn AL, et al. Home reading environment and brain activation in preschool children listening to stories. Pediatrics 2015;136:466–78.

46. Data Resource Center for Child and Adolescent Health. 2011/12 National Survey of Children's Health. Accessed 28 Feb 2016 at www.nschdata.org.

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Outcomes of Poor Literacy

Poor early literacy skills are associated with lifelong academic, social, and income disparities. Studies have repeatedly shown that high school graduation rates are directly correlated to reading abilities by the end of 3rd grade. Poor early readers are at a much higher risk of dropping out of school later on. In turn, dropping out of high school is associated with higher risks of delinquency, substance abuse, and incarceration [12,13].

To break the cycle of poverty, we need to help our children—particularly children coming from low-income, disadvantaged homes—become better readers. One of the ways in which we can achieve this is by giving them the tools they need starting in infancy. By giving them books at every well child visit and by encouraging parents to read aloud with their children every day, we can strengthen their early literacy skills, providing a foundation for later success in school and ultimately impacting the quality of their lives.

As Nobel laureate economist James Heckman stated [14]:

Investment in early education for disadvantaged children from birth to age 5 helps reduce the achievement gap, reduce the need for special education, increase the likelihood of healthier lifestyles, lower the crime rate, and reduce overall social costs. In fact, every dollar invested in high-quality early childhood education produces a 7 to 10 percent per annum return on investment.

In an era of electronics par excellence, we have to look at what the data say about the effects of electronics on children's brains and language development. To date, studies looking at the effects of electronic media on infant and toddler development have failed to show any benefits. In fact, heavy exposure to electronic devices has been linked to language delays [15]. The data is so strong that in 2011, the AAP released an update of the 1999 policy statement on media use in children. The revised policy stated once again that "pediatricians should urge parents to avoid television viewing in children less than 2 years of age." The updated statement addresses (1) the lack of evidence supporting educational or developmental benefits for media use by children younger than 2 years, (2) the potential adverse health and developmental effects of media use by children younger than 2 years, and (3) adverse effects of parental media use (background media) on children younger than 2 years [16].

The existing literature suggests that media use does not promote language skills in infants and toddlers and that vocabulary growth is directly related to the amount of time parents spend speaking to and interacting with their children [17–19]. For example, a study comparing the quantity and quality of language interactions of 25 parent-infant dyads during a total of six 15-minute play sessions with electronic toys, traditional toys, and books showed that during play with electronic toys, there were fewer adult words, fewer conversational turns, fewer parental responses, and fewer productions of content-specific words than during play with traditional toys or books. Children vocalized less during play with electronic toys than during play with books. Parents produced fewer words during play with traditional toys than during play with books and use of content-specific words was lower during play with

References

1. Needlman R, Fried L, Morley D, et al. Clinic-based intervention to promote literacy. Am J Dis Child 1991;145:881–4.

2. Reach Out and Read: a national pediatric literacy program. Available at http://reachoutandread.org.

3. High PC, Klass P. Literacy promotion: an essential component of primary care pediatric practice. Council on Early Childhood. Pediatrics 2014;134:404–9.

4. Huttenlocher PR, Dabholkar AS. Regional differences in synaptogenesis in human cerebral cortex. J Comp Neurol 1997; 387:167–78.

5. Center on the Developing Child. The science of early childhood development (in brief); 2007. Accessed 6 May 2016 at www.developingchild.harvard.edu.

6. Connecting Science, Policy, and Practice: Zero to Three's National Training Institute, 2015. Zero Three 2016;36(3).

7. Fox NA, Zeanah CH, Nelson CA. A matter of timing: enhancing positive change for the developing brain. Zero Three 2014;34(3):4–9.

8. Halfon N, Shulman E, Hochstein M. Brain development in early childhood. Technical report. UCLA Center for Healthier Children, Families and Communities. Aug 2001.

9. National Scientific Council on the Developing Child. The science of early childhood development: closing the gap between what we know and what we do. Center on the Developing Child. Harvard University; 2007.

10. Hart B, Risley TR. Meaningful differences in the everyday experience of young American children. Baltimore: Brookes; 1995.

11. Hart B, Risley TR. The early catastrophe: the 30 million word gap by age 3. Am Educator 2003;27:4–9.

12. The Annie E. Casey Foundation. Double jeopardy: how third grade reading skills and poverty influence high school graduation. 2012. Accessed 21 Feb 2016 at www.aecf.org/resources/double-jeopardy.

13. The Annie E. Casey Foundation. Early warning confirmed: a research update on third grade reading. 2013 Nov. Accessed 23 Feb 2016 at www.aecf.org/m/resourcedoc/AECF-EarlyWarningConfirmed-2013.pdf

15. Christakis DA. The effects of infant media usage: what do we know and what should we learn? Acta Paediatr 2009;98: 8–16.

16. American Academy of Pediatrics, Council on Communications and Media. Policy statement. Media use by children younger than 2 years. Pediatrics 2011;128:1040–5.

17. Linebarger DL, Walker D. Infants' and toddlers' television viewing and language outcomes. Am Behav Sci 2005;48:624–45.

18. Masako T, Okuma K, Kyoshima K. Television viewing and reduced parental utterance, and delayed speech development in infants and young children. Arch Pediatr Adolesc Med 2007;161:618–9.

19. Rideout VJ, Hamel E. The media family: electronic media in the lives of infants, toddlers, preschoolers, and their parents. Menlo Park, CA: Kaiser Family Foundation; 2006.

20. Sosa AV. Association of the type of toy used during play with the quantity and quality of parent-infant communication. JAMA Pediatr 2016;170:132–7.

21. Vandewater EA, Bickham DS, Lee JH et al. When the television is always on: heavy television exposure and young children's development. Am Behav Sci 2005;48:562–77.

22. Zimmerman FJ, Christakis DA, Meltzoff AN. Associations between media viewing and language development in children under age two years. J Pediatr 2007;151:364–8.

23. Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. Acta Paediatr 2008;97:977–82.

24. Robb MB, Richert RA, Wartella EA. Just a talking book? Word learning from watching baby videos. Br J Dev Psychol 2009;27(Pt 1):27–45.

25. DeLoache JS, Chiong C, Sherman K, et al. Do babies learn from baby media? Psychol Sci 2010;21:1570–4.

26. Mendelsohn A, Mogliner L, Dreyer B, et al. The impact of a clinic-based literacy intervention on language development in inner-city preschool children. Pediatrics 2001;107:130–4.

27. Mendelsohn AL. Promoting language and literacy through reading aloud: the role of the pediatrician. Curr Probl Pediatr Adolesc Health Care 2002;32:183–210.

28. High P, Hopman M, LaGasse L, et al. Evaluation of a clinic-based program to promote book sharing and bedtime routines among low-income urban families with young children. Arch Pediatr Adolesc Med

randomized controlled trial. Pediatrics 1999;103:993–7.

30. High PC, LaGasse L, Becker S, et al. Literacy promotion in primary care pediatrics: can we make a difference? Pediatrics 2000;105:927–34.

31. Needlman R, Toker KH, Dreyer BP, et al. Effectiveness of a primary care intervention to support reading aloud: a multicenter evaluation. Ambul Pediatr 2005;5:209–15.

32. Wu SC, Lue HC, Tseng LL. A pediatric clinic-based approach to early literacy promotion–experience in a well-baby clinic in Taiwan. J Formos Med Assoc 2012;111:258–64.

33. Sanders LM, Gershon TD, Huffman LC, et al. Prescribing books for immigrant children: a pilot study to promote emergent literacy among the children of Hispanic immigrants. Arch Pediatr Adolesc Med 2000;154:771–7.

34. Kitabayashi KM, Huang GY, Linskey KR, et al. Parent-child reading interactions among English and English as a second language speakers in an underserved pediatric clinic in Hawai'i. Hawaii Med J 2008;67:260–3.

35. Festa N, Loftus PD, Cullen MR, Mendoza FS. Disparities in early exposure to book sharing within immigrant families. Pediatrics. 2014;134:e162–8.

36. Shonkoff JP, Phillips DA, editors. From neurons to neighborhoods: the science of early childhood development. National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development. Washington, DC: National Academies Press; 2000.

37. Neuman SB. Guiding young children's participation in early literacy development: a family literacy program for adolescent mothers. Early Child Dev Care 1997;127:119–29.

38. Tomopoulos S, Dreyer BP, Tamis-LeMonda C, et al. Books, toys, parent-child interaction, and development in young Latino children. Ambul Pediatr 2006;6:72–8.

39. Mendelsohn AL, Huberman HS, Berkule SB, et al. 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. Arch Pediatr Adolesc Med 2011;165:33–41.

40. Ginsburg K; American Academy of Pediatrics, Committee on Communications, Committee on Psychosocial Aspects of Child and Family Health. The importance of play in promoting healthy child development and maintaining strong parent-child bonds. Pediatrics 2007;119:182–91.

42. Hugdahl K, Gundersen H, Brekke C, et al. fMRI Brain activation in a Finnish family with specific language impairment compared with a normal control group. J Speech Lang Hear Res 2004;47:162–72.

43. Pugh KR, Mencl WE, Jenner AR, et al. Functional neuroimaging studies of reading and reading disability (developmental dyslexia). Ment Retard Dev Disabil Res Rev 2000;6:207–13.

44. Pugh KR, Mencl WE, Jenner AR, et al. Neurobiological studies of reading and reading disability. J Commun Disord 2001;34:479–92.

45. Hutton JS, Horowitz-Kraus T, Mendelsohn AL, et al. Home reading environment and brain activation in preschool children listening to stories. Pediatrics 2015;136:466–78.

46. Data Resource Center for Child and Adolescent Health. 2011/12 National Survey of Children's Health. Accessed 28 Feb 2016 at www.nschdata.org.

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Heavy television use in a household can interfere with a child's language development likely because parents spend less time talking to their child. In turn, children who live in households with heavy media use spend less time being read to. In the short-term, children younger than 2 years who spend a significant amount of time watching television or videos have higher chances of having a language delay [21–23]. Children who are exposed to infant videos also develop fewer language skills than children who are read to [24,25]. What is clear from all of this work is that young children learn best by interacting with the caring people in their lives, not with screens.

Given these facts, the AAP continues to discourage media use among children younger than 2, encourages parents to spend time reading and playing with their children, and discourages parents from having the TV or other electronics on as "background noise" when their children are present, since it decreases the amount of talking and interacting between parents and their children [16].

Benefits of the Reach Out and Read Model

For the past 25 years, pediatricians have been promoting early literacy in their practices following the ROR model, which consists of the following components:

1. Giving a new, colorful, age-appropriate book to babies, toddlers, and preschoolers at every well child visit starting at 6 months of age

3. Having a literacy-rich waiting room area (which at times includes volunteers reading to the children)

The data supporting this very simple, inexpensive intervention is robust. Multiple studies have shown that children exposed to the ROR model have improved language skills when compared to children who are not. Parents also report a much higher frequency of reading with their children when exposed to ROR than parents who are not [26–28].

In a randomized controlled study of literacy promotion in Hispanic families, when parents were asked open-endedly "What are your 3 most favorite things to do with your child?," parents who had received literacy-promoting anticipatory guidance and books reported "reading with my toddler" significantly more often than parents who had not (43% intervention vs. 13% controls). When asked about the frequency of reading to their toddlers, intervention parents were significantly more likely to report reading books with their children at least 3 days/week than controls (66% intervention vs. 24% controls). Applying a multiple logistic regression model controlling for child and parent age, parent reading habits, and English proficiency, we found that the odds of parents reading to their child at least 3 days/week were 10 times greater in intervention families (odds ratio [OR] 10.1, 95% confidence interval 4.0–25.6) than in controls [29].

In a parallel study with English-speaking low income families, when parents were asked open-endedly, "What are your child's 3 most favorite activities?," parents who had been exposed to the intervention, were significantly more likely to report "reading books" as one of their toddler's 3 favorite activities than parents who were not exposed (27% intervention vs. 12% controls). Toddler

References

1. Needlman R, Fried L, Morley D, et al. Clinic-based intervention to promote literacy. Am J Dis Child 1991;145:881–4.

2. Reach Out and Read: a national pediatric literacy program. Available at http://reachoutandread.org.

3. High PC, Klass P. Literacy promotion: an essential component of primary care pediatric practice. Council on Early Childhood. Pediatrics 2014;134:404–9.

4. Huttenlocher PR, Dabholkar AS. Regional differences in synaptogenesis in human cerebral cortex. J Comp Neurol 1997; 387:167–78.

5. Center on the Developing Child. The science of early childhood development (in brief); 2007. Accessed 6 May 2016 at www.developingchild.harvard.edu.

6. Connecting Science, Policy, and Practice: Zero to Three's National Training Institute, 2015. Zero Three 2016;36(3).

7. Fox NA, Zeanah CH, Nelson CA. A matter of timing: enhancing positive change for the developing brain. Zero Three 2014;34(3):4–9.

8. Halfon N, Shulman E, Hochstein M. Brain development in early childhood. Technical report. UCLA Center for Healthier Children, Families and Communities. Aug 2001.

9. National Scientific Council on the Developing Child. The science of early childhood development: closing the gap between what we know and what we do. Center on the Developing Child. Harvard University; 2007.

10. Hart B, Risley TR. Meaningful differences in the everyday experience of young American children. Baltimore: Brookes; 1995.

11. Hart B, Risley TR. The early catastrophe: the 30 million word gap by age 3. Am Educator 2003;27:4–9.

12. The Annie E. Casey Foundation. Double jeopardy: how third grade reading skills and poverty influence high school graduation. 2012. Accessed 21 Feb 2016 at www.aecf.org/resources/double-jeopardy.

13. The Annie E. Casey Foundation. Early warning confirmed: a research update on third grade reading. 2013 Nov. Accessed 23 Feb 2016 at www.aecf.org/m/resourcedoc/AECF-EarlyWarningConfirmed-2013.pdf

15. Christakis DA. The effects of infant media usage: what do we know and what should we learn? Acta Paediatr 2009;98: 8–16.

16. American Academy of Pediatrics, Council on Communications and Media. Policy statement. Media use by children younger than 2 years. Pediatrics 2011;128:1040–5.

17. Linebarger DL, Walker D. Infants' and toddlers' television viewing and language outcomes. Am Behav Sci 2005;48:624–45.

18. Masako T, Okuma K, Kyoshima K. Television viewing and reduced parental utterance, and delayed speech development in infants and young children. Arch Pediatr Adolesc Med 2007;161:618–9.

19. Rideout VJ, Hamel E. The media family: electronic media in the lives of infants, toddlers, preschoolers, and their parents. Menlo Park, CA: Kaiser Family Foundation; 2006.

20. Sosa AV. Association of the type of toy used during play with the quantity and quality of parent-infant communication. JAMA Pediatr 2016;170:132–7.

21. Vandewater EA, Bickham DS, Lee JH et al. When the television is always on: heavy television exposure and young children's development. Am Behav Sci 2005;48:562–77.

22. Zimmerman FJ, Christakis DA, Meltzoff AN. Associations between media viewing and language development in children under age two years. J Pediatr 2007;151:364–8.

23. Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. Acta Paediatr 2008;97:977–82.

24. Robb MB, Richert RA, Wartella EA. Just a talking book? Word learning from watching baby videos. Br J Dev Psychol 2009;27(Pt 1):27–45.

25. DeLoache JS, Chiong C, Sherman K, et al. Do babies learn from baby media? Psychol Sci 2010;21:1570–4.

26. Mendelsohn A, Mogliner L, Dreyer B, et al. The impact of a clinic-based literacy intervention on language development in inner-city preschool children. Pediatrics 2001;107:130–4.

27. Mendelsohn AL. Promoting language and literacy through reading aloud: the role of the pediatrician. Curr Probl Pediatr Adolesc Health Care 2002;32:183–210.

28. High P, Hopman M, LaGasse L, et al. Evaluation of a clinic-based program to promote book sharing and bedtime routines among low-income urban families with young children. Arch Pediatr Adolesc Med

randomized controlled trial. Pediatrics 1999;103:993–7.

30. High PC, LaGasse L, Becker S, et al. Literacy promotion in primary care pediatrics: can we make a difference? Pediatrics 2000;105:927–34.

31. Needlman R, Toker KH, Dreyer BP, et al. Effectiveness of a primary care intervention to support reading aloud: a multicenter evaluation. Ambul Pediatr 2005;5:209–15.

32. Wu SC, Lue HC, Tseng LL. A pediatric clinic-based approach to early literacy promotion–experience in a well-baby clinic in Taiwan. J Formos Med Assoc 2012;111:258–64.

33. Sanders LM, Gershon TD, Huffman LC, et al. Prescribing books for immigrant children: a pilot study to promote emergent literacy among the children of Hispanic immigrants. Arch Pediatr Adolesc Med 2000;154:771–7.

34. Kitabayashi KM, Huang GY, Linskey KR, et al. Parent-child reading interactions among English and English as a second language speakers in an underserved pediatric clinic in Hawai'i. Hawaii Med J 2008;67:260–3.

35. Festa N, Loftus PD, Cullen MR, Mendoza FS. Disparities in early exposure to book sharing within immigrant families. Pediatrics. 2014;134:e162–8.

36. Shonkoff JP, Phillips DA, editors. From neurons to neighborhoods: the science of early childhood development. National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development. Washington, DC: National Academies Press; 2000.

37. Neuman SB. Guiding young children's participation in early literacy development: a family literacy program for adolescent mothers. Early Child Dev Care 1997;127:119–29.

38. Tomopoulos S, Dreyer BP, Tamis-LeMonda C, et al. Books, toys, parent-child interaction, and development in young Latino children. Ambul Pediatr 2006;6:72–8.

39. Mendelsohn AL, Huberman HS, Berkule SB, et al. 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. Arch Pediatr Adolesc Med 2011;165:33–41.

40. Ginsburg K; American Academy of Pediatrics, Committee on Communications, Committee on Psychosocial Aspects of Child and Family Health. The importance of play in promoting healthy child development and maintaining strong parent-child bonds. Pediatrics 2007;119:182–91.

42. Hugdahl K, Gundersen H, Brekke C, et al. fMRI Brain activation in a Finnish family with specific language impairment compared with a normal control group. J Speech Lang Hear Res 2004;47:162–72.

43. Pugh KR, Mencl WE, Jenner AR, et al. Functional neuroimaging studies of reading and reading disability (developmental dyslexia). Ment Retard Dev Disabil Res Rev 2000;6:207–13.

44. Pugh KR, Mencl WE, Jenner AR, et al. Neurobiological studies of reading and reading disability. J Commun Disord 2001;34:479–92.

45. Hutton JS, Horowitz-Kraus T, Mendelsohn AL, et al. Home reading environment and brain activation in preschool children listening to stories. Pediatrics 2015;136:466–78.

46. Data Resource Center for Child and Adolescent Health. 2011/12 National Survey of Children's Health. Accessed 28 Feb 2016 at www.nschdata.org.

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A multicenter study (19 clinical sites in 10 different states) that compared 730 children aged 6 to 72 months exposed to the ROR model with a comparison group of 917 matched children who did not participate in this literacy promoting model found significant associations between exposure to ROR and reading aloud as a favorite parent activity (adjusted OR 1.6, $P < 0.001$); reading aloud at bedtime (adjusted OR 1.5, $P < 0.001$); reading aloud 3 or more days per week (adjusted OR 1.8, $P < 0.001$); and ownership of 10 or more picture books (adjusted OR 1.6, $P < 0.001$) [31].

Across the world, others have been replicating and testing the ROR model. Interestingly, studies conducted in Taiwan and with immigrants from Latin America and Asia have all shown similar effects on parental literacy behaviors and on the development of children's early oral language skills [32–35].

Parent-Child Bonding from Sharing Books

According to the 2014 AAP policy statement, literacy promotion is an essential component of pediatric primary care [3]. The statement emphasizes that parent-child shared reading is a "very personal and nurturing experience that promotes parent-child interaction, social-emotional development, and language and literacy skills during this critical period of early brain and child development." It recognizes the importance of shared reading as a bonding experience that could start in early infancy. These early nurturing relationships are critical to promoting healthy child development [36].

that parents who have received guidance around the importance of reading together and high-quality books to share with their infants, toddlers, and preschoolers include reading aloud as one of their 3 most favorite activities, compared to control families who did not receive this intervention [28–31]. When activities are favorites, they are enriched by this shared enjoyment and are far more likely to occur often and perhaps become treasured family routines. Children's books and early play and discussions around the themes in these books stimulate increased interaction between caregivers and children [37]. These interactions build secure relationships that are key to children's healthy cognitive, language, and social-emotional development [38–40].

The Effects on the Brain From Listening to Stories

In a recent study, 48 children aged 6 to 11 years were classified as early talkers (16), on-time talkers (16), or late talkers (16) by parental report [41]. Group assignments were based on whether the parent recalled their child making 2- to 3-word sentences early, on-time, or late. None of the "early talkers" had spoken their first sentences after 24 months, and none of the "late talkers" had spoken sentences before age 2. Utilizing functional MRI, researchers analyzed talker group differences in processing of speech and print and functional activation differences on auditory stimuli and when visualizing print. The groups were matched by age, gender, and performance IQ. This study showed strong group differences in the activation of several regions of the brain, including the left superior temporal gyrus, left putamen, globus pallidus, right putamen, left insula, and thalamus. In each of these areas, late talkers demonstrated significantly less activation that early talkers in both speech and print conditions ($P < 0.001$). Talker group status was strongly related to neural activation patterns during simple linguistic tasks. These cortical differences in

findings highlight the importance of early language development on the formation of critical language and reading circuits and how these neural pathways are affected many years later [41].

References

1. Needlman R, Fried L, Morley D, et al. Clinic-based intervention to promote literacy. Am J Dis Child 1991;145:881–4.

2. Reach Out and Read: a national pediatric literacy program. Available at http://reachoutandread.org.

3. High PC, Klass P. Literacy promotion: an essential component of primary care pediatric practice. Council on Early Childhood. Pediatrics 2014;134:404–9.

4. Huttenlocher PR, Dabholkar AS. Regional differences in synaptogenesis in human cerebral cortex. J Comp Neurol 1997; 387:167–78.

5. Center on the Developing Child. The science of early childhood development (in brief); 2007. Accessed 6 May 2016 at www.developingchild.harvard.edu.

6. Connecting Science, Policy, and Practice: Zero to Three's National Training Institute, 2015. Zero Three 2016;36(3).

7. Fox NA, Zeanah CH, Nelson CA. A matter of timing: enhancing positive change for the developing brain. Zero Three 2014;34(3):4–9.

8. Halfon N, Shulman E, Hochstein M. Brain development in early childhood. Technical report. UCLA Center for Healthier Children, Families and Communities. Aug 2001.

9. National Scientific Council on the Developing Child. The science of early childhood development: closing the gap between what we know and what we do. Center on the Developing Child. Harvard University; 2007.

10. Hart B, Risley TR. Meaningful differences in the everyday experience of young American children. Baltimore: Brookes; 1995.

11. Hart B, Risley TR. The early catastrophe: the 30 million word gap by age 3. Am Educator 2003;27:4–9.

12. The Annie E. Casey Foundation. Double jeopardy: how third grade reading skills and poverty influence high school graduation. 2012. Accessed 21 Feb 2016 at www.aecf.org/resources/double-jeopardy.

2015.pdf

14. Heckman J. The economics of inequality: the value of early childhood education. Am Educator 2011;47:31–5.

15. Christakis DA. The effects of infant media usage: what do we know and what should we learn? Acta Paediatr 2009;98: 8–16.

16. American Academy of Pediatrics, Council on Communications and Media. Policy statement. Media use by children younger than 2 years. Pediatrics 2011;128:1040–5.

17. Linebarger DL, Walker D. Infants' and toddlers' television viewing and language outcomes. Am Behav Sci 2005;48:624–45.

18. Masako T, Okuma K, Kyoshima K. Television viewing and reduced parental utterance, and delayed speech development in infants and young children. Arch Pediatr Adolesc Med 2007;161:618–9.

19. Rideout VJ, Hamel E. The media family: electronic media in the lives of infants, toddlers, preschoolers, and their parents. Menlo Park, CA: Kaiser Family Foundation; 2006.

20. Sosa AV. Association of the type of toy used during play with the quantity and quality of parent-infant communication. JAMA Pediatr 2016;170:132–7.

21. Vandewater EA, Bickham DS, Lee JH et al. When the television is always on: heavy television exposure and young children's development. Am Behav Sci 2005;48:562–77.

22. Zimmerman FJ, Christakis DA, Meltzoff AN. Associations between media viewing and language development in children under age two years. J Pediatr 2007;151:364–8.

23. Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. Acta Paediatr 2008;97:977–82.

24. Robb MB, Richert RA, Wartella EA. Just a talking book? Word learning from watching baby videos. Br J Dev Psychol 2009;27(Pt 1):27–45.

25. DeLoache JS, Chiong C, Sherman K, et al. Do babies learn from baby media? Psychol Sci 2010;21:1570–4.

26. Mendelsohn A, Mogliner L, Dreyer B, et al. The impact of a clinic-based literacy intervention on language development in inner-city preschool children. Pediatrics 2001;107:130–4.

28. High P, Hopman M, LaGasse L, et al. Evaluation of a clinic-based program to promote book sharing and bedtime routines among low-income urban families with young children. Arch Pediatr Adolesc Med 1998;152:459–65.

29. Golova N, Alario A, Vivier P, et al. Literacy promotion for Hispanic families in a primary care setting: a randomized controlled trial. Pediatrics 1999;103:993–7.

30. High PC, LaGasse L, Becker S, et al. Literacy promotion in primary care pediatrics: can we make a difference? Pediatrics 2000;105:927–34.

31. Needlman R, Toker KH, Dreyer BP, et al. Effectiveness of a primary care intervention to support reading aloud: a multicenter evaluation. Ambul Pediatr 2005;5:209–15.

32. Wu SC, Lue HC, Tseng LL. A pediatric clinic-based approach to early literacy promotion–experience in a well-baby clinic in Taiwan. J Formos Med Assoc 2012;111:258–64.

33. Sanders LM, Gershon TD, Huffman LC, et al. Prescribing books for immigrant children: a pilot study to promote emergent literacy among the children of Hispanic immigrants. Arch Pediatr Adolesc Med 2000;154:771–7.

34. Kitabayashi KM, Huang GY, Linskey KR, et al. Parent-child reading interactions among English and English as a second language speakers in an underserved pediatric clinic in Hawai'i. Hawaii Med J 2008;67:260–3.

35. Festa N, Loftus PD, Cullen MR, Mendoza FS. Disparities in early exposure to book sharing within immigrant families. Pediatrics. 2014;134:e162–8.

36. Shonkoff JP, Phillips DA, editors. From neurons to neighborhoods: the science of early childhood development. National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development. Washington, DC: National Academies Press; 2000.

37. Neuman SB. Guiding young children's participation in early literacy development: a family literacy program for adolescent mothers. Early Child Dev Care 1997;127:119–29.

38. Tomopoulos S, Dreyer BP, Tamis-LeMonda C, et al. Books, toys, parent-child interaction, and development in young Latino children. Ambul Pediatr 2006;6:72–8.

39. Mendelsohn AL, Huberman HS, Berkule SB, et al. 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. Arch Pediatr Adolesc Med 2011;165:33–41.

development and maintaining strong parent-child bonds. Pediatrics 2007;119:182–91.

41. Preston JL, Frost SJ, Mencl WE, et al. Early and late talkers: school-age language, literacy and neurolinguistic differences. Brain 2010;133:2185–95.

42. Hugdahl K, Gundersen H, Brekke C, et al. fMRI Brain activation in a Finnish family with specific language impairment compared with a normal control group. J Speech Lang Hear Res 2004;47:162–72.

43. Pugh KR, Mencl WE, Jenner AR, et al. Functional neuroimaging studies of reading and reading disability (developmental dyslexia). Ment Retard Dev Disabil Res Rev 2000;6:207–13.

44. Pugh KR, Mencl WE, Jenner AR, et al. Neurobiological studies of reading and reading disability. J Commun Disord 2001;34:479–92.

45. Hutton JS, Horowitz-Kraus T, Mendelsohn AL, et al. Home reading environment and brain activation in preschool children listening to stories. Pediatrics 2015;136:466–78.

46. Data Resource Center for Child and Adolescent Health. 2011/12 National Survey of Children's Health. Accessed 28 Feb 2016 at www.nschdata.org.

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In another study of nineteen 3- to 5-year-olds, researchers used functional MRI to examine the relationship between home reading environment and brain activity during a story listening task. The study showed that while listening to stories, children with greater home reading exposure exhibited higher activation of left-sided brain regions involved with processing of meaning. Higher reading exposure at home as measured by the StimQ-P Reading subscale score, was positively correlated with neural activation in the left-sided parietal-temporal-occipital association cortex, a region of the brain supporting semantic language processing, when controlling for household income ($P < 0.05$) [45].

Conclusion

Pediatric providers are in a unique position to impact a child's life by promoting literacy starting at birth. The effects of shared reading and parent-child interactions on early language development, on the formation of brain circuitry, and on children's ability to become better readers and arrive to school ready to learn is now known.

We have an obligation to not only make literacy promotion in pediatric encounters the standard of care, but to continue to expand these types of interventions to other settings to reach as many young children as possible. Children from disadvantaged socioeconomic backgrounds and those from immigrant families are at highest risk and should be the primary focus of our intervention efforts. However, data from the 2011–2012 National Survey of

suggest that more affluent, professional families should also be counseled by their pediatricians about the benefits of shared reading and about the detrimental effects of "electronics" at this critical time in their child's development.

More research is needed to fully understand the long-term impacts of literacy promotion interventions in primary care settings. Longitudinal studies directly measuring the potential effects of the ROR model on reading skills in 3rd grade, on high school graduation rates, and on other measures of social and academic success are lacking. However, the existing evidence suggests that this kind of program can fulfill the promise of child health supervision visits. While providing guidance and the tools aimed at improving the home environment, pediatric providers can shape the course of young children's lives.

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References

1. Needlman R, Fried L, Morley D, et al. Clinic-based intervention to promote literacy. Am J Dis Child 1991;145:881–4.

2. Reach Out and Read: a national pediatric literacy program. Available at http://reachoutandread.org.

3. High PC, Klass P. Literacy promotion: an essential component of primary care pediatric practice. Council on Early Childhood. Pediatrics 2014;134:404–9.

4. Huttenlocher PR, Dabholkar AS. Regional differences in synaptogenesis in human cerebral cortex. J Comp Neurol 1997; 387:167–78.

5. Center on the Developing Child. The science of early childhood development (in brief); 2007. Accessed 6 May 2016 at www.developingchild.harvard.edu.

7. Fox NA, Zeanah CH, Nelson CA. A matter of timing: enhancing positive change for the developing brain. Zero Three 2014;34(3):4–9.

8. Halfon N, Shulman E, Hochstein M. Brain development in early childhood. Technical report. UCLA Center for Healthier Children, Families and Communities. Aug 2001.

9. National Scientific Council on the Developing Child. The science of early childhood development: closing the gap between what we know and what we do. Center on the Developing Child. Harvard University; 2007.

10. Hart B, Risley TR. Meaningful differences in the everyday experience of young American children. Baltimore: Brookes; 1995.

11. Hart B, Risley TR. The early catastrophe: the 30 million word gap by age 3. Am Educator 2003;27:4–9.

12. The Annie E. Casey Foundation. Double jeopardy: how third grade reading skills and poverty influence high school graduation. 2012. Accessed 21 Feb 2016 at www.aecf.org/resources/double-jeopardy.

13. The Annie E. Casey Foundation. Early warning confirmed: a research update on third grade reading. 2013 Nov. Accessed 23 Feb 2016 at www.aecf.org/m/resourcedoc/AECF-EarlyWarningConfirmed-2013.pdf

14. Heckman J. The economics of inequality: the value of early childhood education. Am Educator 2011;47:31–5.

15. Christakis DA. The effects of infant media usage: what do we know and what should we learn? Acta Paediatr 2009;98: 8–16.

16. American Academy of Pediatrics, Council on Communications and Media. Policy statement. Media use by children younger than 2 years. Pediatrics 2011;128:1040–5.

17. Linebarger DL, Walker D. Infants' and toddlers' television viewing and language outcomes. Am Behav Sci 2005;48:624–45.

18. Masako T, Okuma K, Kyoshima K. Television viewing and reduced parental utterance, and delayed speech development in infants and young children. Arch Pediatr Adolesc Med 2007;161:618–9.

19. Rideout VJ, Hamel E. The media family: electronic media in the lives of infants, toddlers, preschoolers, and their parents. Menlo Park, CA: Kaiser Family Foundation; 2006.

21. Vandewater EA, Bickham DS, Lee JH et al. When the television is always on: heavy television exposure and young children's development. Am Behav Sci 2005;48:562–77.

22. Zimmerman FJ, Christakis DA, Meltzoff AN. Associations between media viewing and language development in children under age two years. J Pediatr 2007;151:364–8.

23. Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. Acta Paediatr 2008;97:977–82.

24. Robb MB, Richert RA, Wartella EA. Just a talking book? Word learning from watching baby videos. Br J Dev Psychol 2009;27(Pt 1):27–45.

25. DeLoache JS, Chiong C, Sherman K, et al. Do babies learn from baby media? Psychol Sci 2010;21:1570–4.

26. Mendelsohn A, Mogliner L, Dreyer B, et al. The impact of a clinic-based literacy intervention on language development in inner-city preschool children. Pediatrics 2001;107:130–4.

27. Mendelsohn AL. Promoting language and literacy through reading aloud: the role of the pediatrician. Curr Probl Pediatr Adolesc Health Care 2002;32:183–210.

28. High P, Hopman M, LaGasse L, et al. Evaluation of a clinic-based program to promote book sharing and bedtime routines among low-income urban families with young children. Arch Pediatr Adolesc Med 1998;152:459–65.

29. Golova N, Alario A, Vivier P, et al. Literacy promotion for Hispanic families in a primary care setting: a randomized controlled trial. Pediatrics 1999;103:993–7.

30. High PC, LaGasse L, Becker S, et al. Literacy promotion in primary care pediatrics: can we make a difference? Pediatrics 2000;105:927–34.

31. Needlman R, Toker KH, Dreyer BP, et al. Effectiveness of a primary care intervention to support reading aloud: a multicenter evaluation. Ambul Pediatr 2005;5:209–15.

32. Wu SC, Lue HC, Tseng LL. A pediatric clinic-based approach to early literacy promotion–experience in a well-baby clinic in Taiwan. J Formos Med Assoc 2012;111:258–64.

33. Sanders LM, Gershon TD, Huffman LC, et al. Prescribing books for immigrant children: a pilot study to promote emergent literacy among the children of Hispanic immigrants. Arch Pediatr Adolesc Med 2000;154:771–7.

2008;67:260–5.

35. Festa N, Loftus PD, Cullen MR, Mendoza FS. Disparities in early exposure to book sharing within immigrant families. Pediatrics. 2014;134:e162–8.

36. Shonkoff JP, Phillips DA, editors. From neurons to neighborhoods: the science of early childhood development. National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development. Washington, DC: National Academies Press; 2000.

37. Neuman SB. Guiding young children's participation in early literacy development: a family literacy program for adolescent mothers. Early Child Dev Care 1997;127:119–29.

38. Tomopoulos S, Dreyer BP, Tamis-LeMonda C, et al. Books, toys, parent-child interaction, and development in young Latino children. Ambul Pediatr 2006;6:72–8.

39. Mendelsohn AL, Huberman HS, Berkule SB, et al. 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. Arch Pediatr Adolesc Med 2011;165:33–41.

40. Ginsburg K; American Academy of Pediatrics, Committee on Communications, Committee on Psychosocial Aspects of Child and Family Health. The importance of play in promoting healthy child development and maintaining strong parent-child bonds. Pediatrics 2007;119:182–91.

41. Preston JL, Frost SJ, Mencl WE, et al. Early and late talkers: school-age language, literacy and neurolinguistic differences. Brain 2010;133:2185–95.

42. Hugdahl K, Gundersen H, Brekke C, et al. fMRI Brain activation in a Finnish family with specific language impairment compared with a normal control group. J Speech Lang Hear Res 2004;47:162–72.

43. Pugh KR, Mencl WE, Jenner AR, et al. Functional neuroimaging studies of reading and reading disability (developmental dyslexia). Ment Retard Dev Disabil Res Rev 2000;6:207–13.

44. Pugh KR, Mencl WE, Jenner AR, et al. Neurobiological studies of reading and reading disability. J Commun Disord 2001;34:479–92.

45. Hutton JS, Horowitz-Kraus T, Mendelsohn AL, et al. Home reading environment and brain activation in preschool children listening to stories. Pediatrics 2015;136:466–78.

46. Data Resource Center for Child and Adolescent Health. 2011/12 National Survey of Children's Health. Accessed 28 Feb 2016 at www.nschdata.org.