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Randomized Controlled Trial of Primary Care Pediatric Parenting Programs:

Effect on Reduced Media Exposure in Infants, Mediated Through Enhanced Parent-Child Interaction

Alan L. Mendelsohn, MD, **Benard P. Dreyer, MD**, **Carolyn A. Brockmeyer, PhD**, **Samantha B. Berkule-Silberman, PhD**, **Harris S. Huberman, MD, MPH**, and **Suzy Tomopoulos, MD**
Department of Pediatrics, Bellevue Hospital Center, New York University School of Medicine, New York (Drs Mendelsohn, Dreyer, Brockmeyer, Berkule-Silberman, Huberman, and Tomopoulos); Department of Psychology, Manhattanville College, Purchase, New York (Dr Berkule-Silberman); and Department of Pediatrics, Division of Child Development, State University of New York Downstate, University Hospital of Brooklyn, Brooklyn (Dr Huberman).

Abstract

Objectives—To determine whether pediatric primary care–based programs to enhance parenting and early child development reduce media exposure and whether enhanced parenting mediates the effects.

Design—Randomized controlled trial.

Setting—Urban public hospital pediatric primary care clinic.

Participants—A total of 410 mother-newborn dyads enrolled after childbirth.

Interventions—Patients were randomly assigned to 1 of 2 interventions, the Video Interaction Project (VIP) and Building Blocks (BB) interventions, or to a control group. The VIP intervention comprised 1-on-1 sessions with a child development specialist who facilitated interactions in play and shared reading through review of videotapes made of the parent and child on primary care

Correspondence: Alan L. Mendelsohn, MD, Department of Pediatrics, Division of Developmental-Behavioral Pediatrics, New York University School of Medicine and Bellevue Hospital Center, 550 First Ave, Old Bellevue Room A519, New York, NY 10016 (alm5@nyu.edu)..

Author Contributions: Dr Mendelsohn had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Mendelsohn, Dreyer, Brockmeyer, Berkule-Silberman, Huberman, and Tomopoulos. *Acquisition of data:* Mendelsohn, Brockmeyer, Berkule-Silberman, and Huberman. *Analysis and interpretation of data:* Mendelsohn, Dreyer, Brockmeyer, Berkule-Silberman, Huberman, and Tomopoulos. *Drafting of the manuscript:* Mendelsohn, Dreyer, Brockmeyer, Berkule-Silberman, Huberman, and Tomopoulos. Critical revision of the manuscript for important intellectual content: Mendelsohn, Dreyer, Brockmeyer, Berkule-Silberman, Huberman, and Tomopoulos. *Statistical analysis:* Mendelsohn, Dreyer, and Brockmeyer. *Obtained funding:* Mendelsohn, Dreyer, Brockmeyer, Berkule-Silberman, and Huberman. *Administrative, technical, and material support:* Mendelsohn, Dreyer, Brockmeyer, Berkule-Silberman, Huberman, and Tomopoulos. *Study supervision:* Mendelsohn, Dreyer, Brockmeyer, Berkule-Silberman, Huberman, and Tomopoulos.
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visit days; learning materials and parenting pamphlets were also provided. The BB intervention mailed parenting materials, including age-specific newsletters suggesting activities to facilitate interactions, learning materials, and parent-completed developmental questionnaires (Ages and Stages questionnaires).

Outcome Measures—Electronic media exposure in the home using a 24-hour recall diary.

Results—The mean (SD) exposure at 6 months was 146.5 (125.0) min/d. Exposure to VIP was associated with reduced total duration of media exposure compared with the BB and control groups (mean [SD] min/d for VIP, 131.6 [118.7]; BB, 151.2 [116.7]; control, 155.4 [138.7]; *P*=.009). Enhanced parent-child interactions were found to partially mediate relations between VIP and media exposure for families with a ninth grade or higher literacy level (Sobel statistic=2.49; *P*=.01).

Conclusion—Pediatric primary care may represent an important venue for addressing the public health problem of media exposure in young children at a population level.

Trial Registration—clinicaltrials.gov Identifier: NCT00212576

Media exposure is increasingly recognized as a public health concern. There is emerging evidence of harm related to children younger than 3 years, especially for those with low socioeconomic status (SES) who are at greatest risk for developmental delay. One factor related to harm may be the reduced parent-child interaction associated with media.[1-4] The American Academy of Pediatrics has recommended[5,6] that parents reduce media while increasing interaction.

Limited study suggests that enhancing parent-child interactions might reduce exposure. In a randomized controlled trial, Dennison et al[7] showed that a day care–based intervention that works with parents to promote shared reading activities resulted in reduced media exposure in preschool-aged children in primarily middle-class white families. However, there have been no studies to date regarding whether interventions to promote parent-child interactions can reduce media exposure beginning earlier in infancy or in low-SES populations. In addition, although studies have shown that pediatric primary care–based interventions can be effective in promoting parent-child interactions, it is presently unknown whether such interventions can also affect media exposure.

In the context of a randomized controlled trial of 2 pediatric primary–care based interventions to enhance parent-child interactions and early child development (Bellevue Project for Early Language, Literacy, and Education Success), we sought to assess whether such interventions resulted in reduced media exposure and whether enhanced parenting mediated the effect on media exposure. The 2 interventions being studied were the Video Interaction Project (VIP) and Building Blocks (BB). The VIP intervention consists of 1-on-1 sessions with child development specialists who facilitate interactions in play and shared reading through review of videotapes made of the parent and child on primary care visit days; learning materials and parenting pamphlets are also provided. The BB intervention consists of monthly mailed parenting materials, including age-specific newsletters suggesting interactive activities, learning materials, and parent-completed developmental questionnaires (Ages and Stages questionnaires). As VIP and BB are each associated with enhanced parent-child interaction compared with controls at 6 months,[8] we hypothesized that we would find reduced media exposure related to intervention assignment, in part mediated through enhanced parenting.

METHODS

DESIGN

This was a single-blind, 3-way, randomized controlled trial with 2 intervention strategies (VIP and BB) compared with a control group who received routine well-child care. Institutional review board approval was obtained from New York University School of Medicine, Bellevue Hospital Center, and the New York City Health and Hospitals Corporation. Parents provided informed consent prior to participation.

SAMPLE

Enrollment was performed in the postpartum ward of an inner-city public hospital (Bellevue Hospital Center) that serves individuals with low SES, primarily immigrant families, between November 2005 and October 2008. We enrolled 675 consecutive mother-newborn dyads who planned to receive pediatric primary care at our institution and met additional eligibility criteria. Eligibility criteria were chosen to provide homogeneity regarding medical status, to enhance feasibility, and to reduce likelihood of receipt of prior or concurrent comparable services. Medical criteria were having no significant medical complications, full-term gestation (≥37 weeks), birth weight of 2500 g or greater, and singleton gestation. Feasibility criteria were the mother being the primary caregiver, the mother being able to maintain contact, and mother's primary language being English or Spanish. Criteria for no prior or concurrent services were the mother being aged 18 years or older and no participation in a prior study of VIP or BB.

RANDOMIZATION

Following enrollment, dyads were randomized to the VIP, BB, or control group using a random number generated by the project director using Microsoft Excel 2003 (Redmond, Washington). Randomization group assignments were concealed from research assistants who performed enrollment. Following enrollment, randomization group assignments were provided to study participants.

The VIP, BB, and control families received the same well-child care, delivered by the same primary care pediatricians. All 3 groups were scheduled to receive Reach Out and Read as part of routine care beginning at 6 months.

VIP Intervention—The VIP intervention, described in detail elsewhere,[8-10] takes place from birth to 3 years of age, with fifteen 30- to 45-minute sessions taking place primarily on the day of primary care visits. Sessions were facilitated by a child development specialist who met 1 on 1 with families, providing an individualized, relationship-based intervention.[11,12] The specialist delivered a curriculum focused on supporting verbal interactions in the context of pretend play, shared reading, and daily routines to enhance child development and school readiness. The VIP intervention uses 3 strategies: videotaping of mother-child interaction followed by review with the child development specialist, provision of learning materials, and provision of parenting pamphlets.

Media exposure was not addressed in the context of videotaping and was not a primary targeted outcome of the curriculum. However, as part of the counseling regarding play and shared reading, one aspect regularly discussed with parents was replacement of media with these activities. In addition, one of the pamphlets provided for and discussed with parents prior to 6 months of age had a specific message addressing media exposure: “Plan for time together without TV or radio on.”

BB Intervention—The BB intervention, also described elsewhere,[8-10] takes place from birth to 3 years of age. As with VIP, BB delivers a curriculum focused on supporting verbal interactions in the context of pretend play, shared reading, and daily routines to enhance child development and school readiness. In contrast to VIP, this curriculum is delivered through written pamphlets and learning materials that are mailed monthly to the family rather than by an interventionist. The BB intervention uses the following strategies: *Building Blocks* newsletters, learning materials, and parent-completed developmental questionnaires (Ages and Stages questionnaires).[13]

Messages recommending no television for children younger than 2 years were included within BB pamphlets, but the first message was not provided until 6 months of age.

Control Group—As described above, control families received all standard pediatric care, including all routine anticipatory guidance and developmental surveillance as recommended by the American Academy of Pediatrics.[14]

MEASURES

Assessments were performed by bilingual research assistants masked to group assignment.

Dependent Variables

Measures of Media Exposure: We assessed electronic media exposure in the home using a 24-hour recall diary based on an interview with the mother, a widely used method.[15-18] We asked the mother to provide information about all electronic media (television, videos/DVDs, movies, and games) to which the infant had been exposed on the most recent typical day, including the name and duration of each program. We asked the mother to include all programs for which the infant was present and awake, from the infant's awakening in the morning until going to sleep for the night. Information from the diary was used to calculate the study variables.

Total Duration of Exposure: We calculated total daily duration by adding the durations of each exposure in minutes for the child during the 24-hour period

Content of Exposure: We assessed program content, measured in minutes, using information obtained from industry rating systems and a consumer media Web site.[19-21] Media content was categorized using a classification system developed by 2ofus.[2,17] Educational young child–oriented programs consisted primarily of programming with educational content intended for children aged 2 to 6 years, including live-action and animated programs. Noneducational young child–oriented programs consisted of programming intended for children aged 2 to 6 years but without educational content. Older child programs consisted of those considered appropriate for school-aged children (≥7 years), teenagers, and adults but not appropriate for young children on the basis of violence and other content. Unknown programs represented instances in which we were unable to categorize a program owing to incomplete information.

Duration of Programming That Was Turned on for Child: For each program, we asked the mother who the program had been turned on for. We calculated total daily duration in minutes of programs that were reported to have been turned on for the child by adding the durations of each of these exposures during the 24-hour period.

Age Child First Watched Television or Videos: This was measured in months and assessed by asking mothers, “At what age did your child watch TV or videos for the first time?”

Likelihood of Very Low Media Exposure: Infants with 30 min/d or less exposure were considered to have very low exposure, consistent with approaches taken in other studies.[22,23]

Mediating Variable: Parent-Child Interactions—Parent-child interactions were assessed using StimQ.[24] StimQ uses a structured interview with the child's caregiver to assess parent-child interactions in the home related to provision of toys and learning materials, shared reading, teaching, and verbal responsivity. It is validated for use in low-SES populations in English and Spanish,[25] and has been used in a number of recent studies of early child development performed with urban economically disadvantaged populations.[26,27] It has good internal consistency (α=.88), test-retest reliability (intraclass correlation coefficient,0.93), and criterion-related validity (correlation with HOME Inventory: r=0.5-0.6). It also has good concurrent validity with measures of cognitive and language development (r=0.3-0.5).

SOCIODEMOGRAPHIC CHARACTERISTICS

We assessed sociodemographic and other data characterizing the sample based on parental interview at enrollment. For parents, this included mother's age, country of origin, education, primary language, and marital status, and family Hollingshead Four Factor Socioeconomic Status[28] based on parental education and occupation. Mothers were considered to be at increased social risk if they had 1 or more of the following characteristics: homelessness, victim of violence, involvement with child protective services, limited or late prenatal care, or history of mental illness including depression. For the child, we obtained information about sex and birth order. In addition, at the 6-month assessment, we assessed maternal literacy in the mother's preferred language using the Woodcock-Johnson III/Bateria III Woodcock-Munoz Tests of Achievement, Letter-Word Identification Test[29]; this test correlates moderately with but tends to overestimate reading comprehension.[30]

STATISTICAL ANALYSIS

A total of 225 families were enrolled per group, based on power analyses related to assessment of parent-child interaction, as described previously.[8] Statistical analyses comparing groups for media exposure were performed based on intention to treat. We performed comparisons of means using analyses of variance. Because estimates of media exposure for families in the BB group were comparable with those of control families, exploratory post hoc analyses were performed using Scheffé multiple contrasts, based on a null hypothesis of no difference between VIP and mean of BB and control. Effect size was assessed using partial eta squared. We performed comparisons of frequencies using χ^2 tests. Path analysis, with BB and controls collapsed into a single group, was used to determine whether enhanced parent-child interactions, measured by StimQ, mediated VIP-associated reductions in media exposure. Because the greatest effects on cognitive stimulation had been found for families with literacy levels of ninth grade or higher in this study,[8] we also performed additional path analyses limiting the sample to these families. The Sobel test was used to statistically test for the presence of mediation.

Because the distribution of media exposure was significantly different than normal (Kolmogorov-Smirnov z=3.1; P<.001) with positive skew (skewness [SE],2.2 [0.1]), analyses of media duration and content were performed using log transformations; because some of the values were zero, a constant (1 minute) was added to each value prior to all transformations of media duration.[31] This analytic approach was also consistent with theoretical concerns, as effects of media exposure are likely to be nonlinear. This has been found in a number of studies both of negative effects of exposure[32-34] as well as of learning in relation to educational exposure.[35]

RESULTS

SAMPLE

Enrollment has been described previously.[8] A total of 410 families were assessed at a mean (SD) child age of 6.9 (1.3) months, including 126 of 225 in the VIP group (56.0%), 150 of 225 in the BB group (66.7%), and 134 of 225 controls (59.6%). Media exposure was missing for 3 families, all in the BB group. **Table 1** shows characteristics by group at baseline and at 6 months. Groups did not differ for any sociodemographic characteristics or for word reading at either enrollment or assessment. Assessed mothers did not significantly differ from those who were not assessed for ethnicity, country of origin, marital status, SES, social risks, or child birth order or sex. However, assessed mothers were more likely to speak Spanish as their primary language (81.7% vs 66.8%; $P<.001$).

MEDIA EXPOSURE

Mean (SD) media exposure at 6 months of age was 146.5 (125.0) min/d, with a median of 120 minutes. A total of 14.0% (57 of 407) met the definition of very low media exposure (≤30 minutes). Of the total daily duration of media exposure, 24.7 (41.3) minutes were categorized as educational, 9.2 (24.6) as noneducational, 73.2 (81.9) minutes as older child/adult, and 39.4 (86.5) minutes as unknown.

EFFECT OF GROUP ASSIGNMENT ON MEDIA EXPOSURE

As shown in **Table 2**, differences were found across groups for duration of media exposure ($P=.03$), with children in the VIP group having less exposure compared with those in the BB and control groups by Scheffé test ($P=.009$). Effect size was small, with partial eta squared of 0.017 (95% confidence interval, 0.001-0.049). Effects were not found related to any specific content category (educational, noneducational, school-aged/adult), except for unknown media content, which was reduced for VIP families ($P=.03$). However, differences between groups were found in which there was reduced media directed to the child for VIP families ($P=.006$ by Scheffé). Children in the VIP group were reported to have been first exposed to media approximately half a month later than children in the BB and control groups ($P=.01$). Overall, 20.6% of children in the VIP group had very low exposure to media compared with 10.9% of children in the BB group and 11.2% of controls ($\chi^2=6.7$; $P=.04$).

Path analysis was used to determine whether enhanced parent-child interactions, measured by StimQ, mediated VIP-associated reductions in media exposure. For the sample as a whole, mediation was not found (Sobel statistic, 1.62; $P=.10$). We next limited the sample to families with a literacy level of ninth grade or higher, as the greatest effects on cognitive stimulation had been found for these families in this study.[8] As shown in the **Figure**, the 4 standard criteria for mediation were met,[36] with VIP associated with media exposure in unadjusted analysis, VIP associated with cognitive stimulation (mediating variable), cognitive stimulation associated with media exposure, and VIP no longer associated with media exposure after adjustment for StimQ (Sobel statistic,2.49; $P=.01$).

COMMENT

This study has demonstrated that a pediatric primary care parenting intervention, the Video Interaction Project, resulted in a small reduction in media exposure for 6-month-old infants. Exposure was reduced across several measures including overall duration, duration of exposure intended for the child, older age of initiating exposure, and greater likelihood of having very low exposure. Given increasing exposure to media earlier in childhood[37] and recent studies suggesting adverse effects on early development[38] and later school

performance,[39] these findings suggest pediatric primary care as a potential platform for addressing this significant public health issue.

This study provides the strongest evidence to date for a causal relationship, albeit indirect, between parent-child interactions and media exposure. In this randomized controlled trial, an intervention primarily targeting parent-child interactions resulted in reduced media exposure, in part mediated by enhanced parenting. The current findings replicate and extend Dennison and colleagues'[7] study on child care by demonstrating effects for parents with low SES of young infants and by suggesting enhancement of parent-child interaction as a mechanism by which these effects were obtained. In addition, we have added significantly to existing observational studies showing limited measured spoken language exposure in association with media,[1] limited report of talking about programs,[2] and reduced shared reading and teaching,[3] although the latter has not been a consistent finding.[40] While our findings suggest enhancement of parenting as an avenue for reduction of media exposure, further research is needed to determine whether the converse is also true, ie, whether reductions in media would result in increased parent-child interactions.

While we did not find differences related to specific content, a trend was seen for group differences in exposure to unknown content, with reduced exposure for families in VIP. Media was typically coded as unknown when parents did not know enough about the program for us to determine the program's name, making it impossible to categorize content. Together with the finding of reduced exposure to media for the child, this suggests that reductions in media in association with enhanced parenting were related primarily to exposure that was either in the background or unsupervised; further study is warranted.

Contrary to our hypothesis, no effects were found relating the BB intervention to media exposure. This finding may have been related to BB not including specific messages regarding television exposure prior to 6 months. It cannot be determined from the present data whether BB might have effects on media at later time points. In addition, BB, as a lower intensity intervention, may not have sufficiently enhanced interactions to the extent necessary to indirectly affect media exposure.[8]

We would like to note some limitations of this study. First, while the use of media diaries allowed the collection of detailed information regarding content, we must acknowledge the possibility that data collected via this assessment tool cover only 1 typical day and may underestimate quantity of media in the home.[41] Second, our results apply to exposure in infants primarily from Hispanic immigrant families with low SES and may not be generalizable to children in families with more resources. Third, there was larger than expected loss to follow-up at 6 months owing to limitations in resources, which led us to prioritize later assessment points. The threat to validity resulting from loss to follow-up may have been limited, as assessed participants were equivalent across groups for all measures. However, differences between assessed and nonassessed participants, likely owing to differential accessibility, may limit generalizability. In addition, effects on media exposure were small. Additional study of the cohort, in progress, will enable us to determine whether the reduction in media found in these analyses mediates the effect of VIP on child development.

In conclusion, VIP, a pediatric primary care–based intervention, resulted in reduced exposure to media beginning in early infancy. This effect was partially mediated by enhanced parent-child interaction. Pediatric primary care may represent an important venue for addressing the public health problem of media exposure in young children at a population level. Additional research is needed to determine whether integration of more

specific strategies to reduce media exposure in primary care parenting interventions results in greater effect.

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REFERENCES

1. Christakis DA, Gilkerson J, Richards JA, et al. Audible television and decreased adult words, infant vocalizations, and conversational turns: a population-based study. Arch Pediatr Adolesc Med. 2009; 163(6):554–558. [PubMed: 19487612]
2. Mendelsohn AL, Berkule SB, Tomopoulos S, et al. Infant television and video exposure associated with limited parent-child verbal interactions in low socioeconomic status households. Arch Pediatr Adolesc Med. 2008; 162(5):411–417. [PubMed: 18458186]
3. Tomopoulos S, Valdez PT, Dreyer BP, et al. Is exposure to media intended for preschool children associated with less parent-child shared reading aloud and teaching activities? Ambul Pediatr. 2007; 7(1):18–24. [PubMed: 17261478]
4. Kirkorian HL, Pempek TA, Murphy LA, Schmidt ME, Anderson DR. The impact of background television on parent-child interaction. Child Dev. 2009; 80(5):1350–1359. [PubMed: 19765004]
5. American Academy of Pediatrics Committee on Public Education. Media education. Pediatrics. 1999; 104(2, pt 1):341–343. [PubMed: 10429023]
6. American Academy of Pediatrics Committee on Public Education. Children, adolescents, and television. Pediatrics. 2001; 107(2):423–426. [PubMed: 11158483]
7. Dennison BA, Russo TJ, Burdick PA, Jenkins PL. An intervention to reduce television viewing by preschool children. Arch Pediatr Adolesc Med. 2004; 158(2):170–176. [PubMed: 14757609]
8. Mendelsohn AL, Huberman HS, Berkule SB, Brockmeyer CA, Morrow LM, Dreyer BP. 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 (BELLE). Arch Pediatr Adolesc Med. 2011; 165(1):33–41. [PubMed: 21199978]
9. Mendelsohn AL, Dreyer BP, Flynn V, et al. Use of videotaped interactions during pediatric well-child care to promote child development: a randomized, controlled trial. J Dev Behav Pediatr. 2005; 26(1):34–41. [PubMed: 15718881]
10. Mendelsohn AL, Valdez PT, Flynn V, et al. Use of videotaped interactions during pediatric well-child care: impact at 33 months on parenting and on child development. J Dev Behav Pediatr. 2007; 28(3):206–212. [PubMed: 17565287]
11. Foley G, Hochman J. Programs, parents and practitioners: perspectives on integrating early intervention and infant mental health. Zero Three. 1998; 18(3):13–18.
12. Barnard KE. Developing, implementing, and documenting interventions with parents and young children. Zero Three. 1998; 18(4):23–29.
13. Squires, J.; Potter, L.; Bricker, D. The ASQ User's Guide. Paul H. Brookes Publishing Co; Baltimore, MD: 1999.
14. American Academy of Pediatrics. Bright Futures.. http://brightfutures.aap.org/.
15. Singer DG, Singer JL. Television viewing and aggressive behavior in preschool children: a field study. Ann N Y Acad Sci. 1980; 347:289–303. [PubMed: 6930911]
16. Wright JC, Huston AC, Murphy KC, et al. The relations of early television viewing to school readiness and vocabulary of children from low-income families: the early window project. Child Dev. 2001; 72(5):1347–1366. [PubMed: 11700636]
17. Tomopoulos S, Dreyer BP, Valdez P, et al. Media content and externalizing behaviors in Latino toddlers. Ambul Pediatr. 2007; 7(3):232–238. [PubMed: 17512884]

18. Tomopoulos S, Dreyer BP, Berkule-Silberman SB, Fierman A, Brockmeyer CA, Mendelsohn AL. Infant media exposure: adverse effects on toddler development. Arch Pediatr Adolesc Med. 2010; 164(12):1105–1111. [PubMed: 21135338]
19. The TV Parental Guidelines. http://www.tvguidelines.org.
20. TVGuide.com. http://www.TVGuide.com.
21. Motion Picture Association of America (MPAA). http://www.mpaa.org.
22. Certain LK, Kahn RS. Prevalence, correlates, and trajectory of television viewing among infants and toddlers. Pediatrics. 2002; 109(4):634–642. [PubMed: 11927708]
23. Barr R, Lauricella A, Zack E, Calvert SL. Infant and early childhood exposure to adult-directed and child-directed television programming relations with cognitive skills at age four. Merrill-Palmer Q. 2010; 56(1):21–48. doi:10.1353/mpq.0.0038.
24. StimQ Cognitive Home Environment. http://pediatrics.med.nyu.edu/patient-care/for-healthcare-providers/stimq-cognitive-home-environment.
25. Dreyer BP, Mendelsohn AL, Tamis-LeMonda C. Assessing the child's cognitive home environment through parental report: reliability and validity. Early Dev Parent. 1996; 5:271–287. doi:10.1002/(SICI)1099-0917(199612)5:4<271::AID-EDP138>3.3.CO;2-4.
26. Green CM, Berkule SB, Dreyer BP, et al. Maternal literacy and associations between education and the cognitive home environment in low-income families. Arch Pediatr Adolesc Med. 2009; 163(9):832–837. [PubMed: 19736337]
27. Tomopoulos S, Dreyer BP, Tamis-LeMonda C, et al. Books, toys, parent-child interaction, and development in young Latino children. Ambul Pediatr. 2006; 6(2):72–78. [PubMed: 16530142]
28. Hollingshead, AB. Four Factor Index of Social Status. Yale University; New Haven, CT: 1975.
29. Woodcock, RW.; Munoz-Sandoval, AR. Bateria Woodcock-Munoz: Preubas de habilidad cognitiva-Revisada. Riverside Publishing; Itasca, IL: 1996.
30. Keiffer MJ, Lesaux NK. The role of derivational morphology in the reading comprehension of Spanish-speaking English language learners. Read Writ. 2008; 21(8):738–804. doi:10.1007/s11145-007-9092-8.
31. Howell, DC. Statistical Methods for Pscyhology. 2nd ed.. Wadsworth Publishing; Belmont, CA: 2010.
32. Christakis DA, Zimmerman FJ, DiGiuseppe DL, McCarty CA. Early television exposure and subsequent attentional problems in children. Pediatrics. 2004; 113(4):708–713. [PubMed: 15060216]
33. Preiss, RW. Mass Media Effects Research: Advances Through Meta-Analysis. Lawrence Erlbaum Associates; Mahwah, NJ: 2007.
34. Eveland WPJ. Interactions and nonlinearity in mass communication: connecting theory and methodology. Journalism Mass Commun Q. 1997; 74(2):400–416.
35. Barr R, Muentener P, Garcia A. Age-related changes in deferred imitation from television by 6- to 18-month-olds. Dev Sci. 2007; 10(6):910–921. [PubMed: 17973804]
36. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. J Pers Soc Psychol. 1986; 51(6): 1173–1182. [PubMed: 3806354]
37. Schmidt, ME.; Bickham, D.; King, B.; Slaby, R.; Branner, A.; Rich, M. The Effects of Electronic Media on Children Ages Zero to Six: A History of Research: Prepared for Kaiser Family Foundation by the Center on Media and Child Health. Henry J. Kaiser Family Foundation; Menlo Park, CA: 2005.
38. Chonchaiya W, Pruksananonda C. Television viewing associates with delayed language development. Acta Paediatr. 2008; 97(7):977–982. [PubMed: 18460044]
39. Zimmerman FJ, Christakis DA. Children's television viewing and cognitive outcomes: a longitudinal analysis of national data. Arch Pediatr Adolesc Med. 2005; 159(7):619–625. [PubMed: 15996993]
40. Vandewater EA, Bickham DS, Lee JH. Time well spent? relating television use to children's free-time activities. Pediatrics. 2006; 117(2):e181–e191. [PubMed: 16452327]

41. Anderson DR, Field DE, Collins PA, Lorch EP, Nathan JG. Estimates of young children's time with television: a methodological comparison of parent reports with time-lapse video home observation. Child Dev. 1985; 56(5):1345–1357. [PubMed: 4053746]

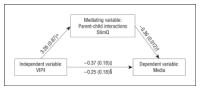

Figure.

Path analysis. Enhanced parent-child interactions (StimQ[24]) partially mediating Video Interaction Project (VIP) (intervention)–associated reductions in media exposure for mothers with a literacy level of ninth grade or higher. Values shown are unstandardized regression coefficients (standard error) (n=275); **P* < .001, unadjusted; †*P*=.004, adjusted for VIP; ‡*P*=.04, unadjusted; §*P*=.10, adjusted for StimQ; ‖VIP (n=85) compared with all others (n=90; for Building Blocks intervention, n=95; for controls, n=95).

Table 1

Maternal Characteristics at Enrollment and 6 Months

Characteristic	Enrollment (Birth), %				6-mo Assessment, %			
	VIP (n=225)	BB (n=225)	Control (n=225)	*P* Value	VIP (n=126)	BB (n=150)	Control (n=134)	*P* Value
Mother								
Hispanic	92.4	93.8	88.9	.16	91.3	95.3	92.5	.39
Immigrant	87.6	89.9	82.7	.14	89.7	86.0	88.1	.64
Spanish primary language	78.2	73.8	75.6	.54	80.2	79.3	85.8	.32
Married/partner	83.1	83.1	83.6	.99	82.5	86.7	82.8	.57
Maternal education, mean (SD)[a]	10.0 (3.7)	10.5 (3.7)	10.5 (3.5)	.30	10.2 (3.7)	10.3 (3.7)	9.6 (3.5)	.21
Maternal literacy, word reading, mean (SD)[b]					12.4 (4.8)	12.5 (5.0)	12.6 (4.6)	.95
Low SES[c]	90.5	88.1	90.9	.57	89.7	87.9	91.7	.58
Social risks[d]	23.9	22.3	24.9	.81	26.4	22.0	22.0	.62
Child								
Female sex	52.9	45.3	48.9	.28	54.0	51.3	50.0	.81
First born	42.2	41.3	39.1	.79	42.1	40.7	41.8	.97

Abbreviations: BB, Building Blocks (intervention); SES, socioeconomic status; VIP, Video Interaction Project (intervention).

[a] Last grade completed.

[b] Grade level for word reading, measured at 6 months.

[c] Hollingshead socioeconomic status level 4 or 5.

[d] One or more of physical abuse, homelessness, child protection services involvement, late prenatal care, or mental illness.

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Table 2

Group Differences in Media Exposure at 6 Months

Variable	Mean (SD)			Test of Null Hypothesis of All Groups Equal (ANOVA)		Test of Contrast Between VIP and Mean of BB and Control (Scheffe Test)	
	VIP (n=126)	BB (n = 147)[a]	Control (n=134)	*F*	*P* Value	*t*	*P* Value
Total daily duration of media, min/d	131.6 (118.7)	151.2 (116.7)	155.4 (138.7)	3.43	.03	2.62	.009
By content, min/d							
Educational	20.9 (38.6)	27.3 (44.6)	25.4 (40.1)	0.34	.71	NA	NA
Noneducational	7.9 (21.1)	10.8 (27.9)	8.7 (24.0)	0.12	.89	NA	NA
Older child/adult	72.7 (82.0)	77.6 (84.6)	70.0 (79.3)	0.13	.88	NA	NA
Unknown	30.2 (77.5)	35.5 (69.3)	52.4 (108.1)	2.5	.08	2.2	.03
Program on for child, min/d	48.7 (82.5)	63.2 (86.1)	64.1 (84.9)	3.18	.04	2.48	.006
Age first exposed to TV or videos, mo	4.0 (1.7)	3.5 (1.7)	3.5 (1.5)	3.81	.02	2.76	.01

Abbreviations: ANOVA, analysis of variance; BB, Building Blocks (intervention); NA, not applicable; TV, television; VIP Video Interaction Project (intervention).

[a]Three BB families receiving follow up at 6 months missed assessment of media exposure.