

Children's Television Exposure and Behavioral and Social Outcomes at 5.5 Years: Does Timing of Exposure Matter?

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ABSTRACT

BACKGROUND. The American Academy of Pediatrics recommends children ≥ 2 years of age limit daily media exposure to ≤ 1 to 2 hours and not have a television set in children's bedrooms. However, there are limited prospective studies to address how timing of media exposure influences children's health.

OBJECTIVE. Our goal was to examine relations among children's early, concurrent, and sustained television exposure and behavioral and social skills outcomes at 5.5 years.

METHODS. We analyzed data collected prospectively from the Healthy Steps for Young Children national evaluation. Television exposure was defined as >2 hours of daily use (at 30–33 months and 5.5 years) and television in child's bedroom (at 5.5 years). At 5.5 years, outcomes were assessed by using the Child Behavior Checklist and social skills using the Social Skills Rating System. Linear regression was used to estimate the effect of television exposure on behavioral and social skills outcomes.

RESULTS. Sixteen percent of parents reported that their child watched >2 hours of television daily at 30 to 33 months only, 15% reported >2 hours of television daily at 5.5 years only, and 20% reported >2 hours of television daily at both times. Forty-one percent of the children had televisions in their bedrooms at 5.5 years. In adjusted analyses, sustained television viewing was associated with behavioral outcomes. Concurrent television exposure was associated with fewer social skills. For children with heavy television viewing only in early childhood, there was no consistent relation with behavioral or social skills outcomes. Having a television in the bedroom was associated with sleep problems and less emotional reactivity at 5.5 years but was not associated with social skills.

CONCLUSIONS. Sustained exposure is a risk factor for behavioral problems, whereas early exposure that is subsequently reduced presents no additional risk. For social skills, concurrent exposure was more important than sustained or early exposure. Considering the timing of media exposure is vital for understanding the consequences of early experiences and informing prevention strategies.

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Key Words

children, television, media

Abbreviations

HS—Healthy Steps for Young Children
CBCL—Child Behavior Checklist

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THE AMERICAN ACADEMY of Pediatrics discourages television viewing among children <2 years of age and recommends children ≥ 2 years of age limit their time with entertainment media to ≤ 1 to 2 hours of programming daily. The American Academy of Pediatrics also recommends not having a television set in children's bedrooms.¹ Despite these recommendations, many young children are consuming significantly more than 2 hours of television viewing daily,² and 36% of children ≤ 6 years of age have a television in their bedroom.³

Over the past decade, television viewing and media exposure increasingly have been recognized as major public health concerns.⁴ A number of studies have demonstrated negative effects of heavy television viewing in early childhood on a range of subsequent health and developmental outcomes including obesity, poor cognitive skills, and irregular sleeping patterns.⁵⁻⁷ It also has been suggested that heavy television exposure may have detrimental effects on behavioral problems and social skills in early childhood, although the results, to date, have been mixed.^{4,8-11} The inconsistencies in previous studies may, in large part, be because of the failure of these studies to examine the differential effects of television viewing by timing of exposure.

Evidence from a wide variety of disciplines indicates that timing of early experiences matter.^{12,13} There are "sensitive periods" in a child's development when specific structures or functions of the human brain become especially vulnerable to particular exposures.¹² The effect of television viewing on children's outcomes is likely to vary by age or neurodevelopmental stage of the child at the time of exposure, as well as by media content.¹⁴ Timing of exposure to particular messages must be considered, because the same content may have differential effects based on a child's age and developmental stage. Thus, examining the timing of exposure is vital not only for understanding the consequences of early experiences but also to inform prevention strategies.

Although many studies have examined effects of television viewing at different ages on a number of health and developmental outcomes, few have teased apart the independent effects of timing of exposure in early childhood.^{4,5,7-11} Zimmerman and Christakis,⁶ using data from the National Longitudinal Survey of Youth, assessed the differential effects of timing of television exposure in early childhood on cognitive outcomes. They found that television viewing before age 3 years had adverse effects on cognitive development at ages 6 and 7 years, whereas viewing at later ages (3-5 years) had beneficial effects on selected cognitive outcomes.⁷

Although there is evidence that timing of exposure is important for cognitive development, few studies have examined television in relation to young children's behavioral and social skills outcomes, and none have examined the effect of sustained exposure over time or

independent timing effects at different ages.^{10,11} Studies of television exposure and behavioral outcomes have considered age. For example, Christakis et al¹⁰ found hours of television viewed per day at both ages 1 and 3 years to be associated with attentional problems at age 7 years. Stevens and Mulrow¹¹ examined the relationship between television exposure at age 5 years and attentional problems a year later but found no meaningful relationship. Comparison of these 2 studies may suggest that exposure in early childhood could matter more than later exposure in relation to attentional problems. However, neither study assessed the independent effects of timing of exposure. Christakis et al¹⁰ evaluated early exposure at 2 time points (1 and 3 years, respectively) but did not estimate the independent effect at either time point; as such, it is not clear whether exposure at age 1 year had a differential effect on behavioral outcomes at age 7 years compared with exposure at age 3 years or whether watching at both ages poses unique risks. Similarly, Stevens and Mulrow¹¹ focused only on a single time point, and they also could not comment on differences in adverse effects by timing of exposure.

To understand the differential impact of television exposure by timing, we present the results of an assessment of independent effects of >2 hours of television viewing daily by timing of exposure (30-33 months only or early exposure, 5.5 years only or concurrent exposure, both 30-33 months and 5.5 years or sustained exposure, or neither 30-33 months nor 5.5 years of exposure) on behavioral and social skills outcomes at 5.5 years. In addition, we examined the effect of having a television in the child's bedroom on behavioral and social skills outcomes at age 5.5 years. A better understanding of the consequences of the timing of exposure on children's behavioral and social skills outcomes will allow for more tailored recommendations for anticipatory guidance.

METHODS

Participants

This study relied on data collected prospectively as part of the Healthy Steps for Young Children (HS) national evaluation. HS is a clinical intervention designed to enhance the delivery of developmental services for families of young children. Participants were enrolled from September 1996 to November 1998 at 6 randomization and 9 quasiexperimental sites across the United States. Children were followed from birth through the age of 5.5 years. Of the 5565 families who were originally enrolled in the national evaluation, 3737 (67%) and 3165 (58%) participated in parent interviews at 30 to 33 months and 5.5 years, respectively.

Data Sources

Three data sources informed these analyses. The HS enrollment form provided data on family demographic

characteristics at time of the child's birth including mother's age, race, ethnicity and parity, HS intervention status, and child's gender. Parent interviews conducted when children were 30 to 33 months and 5.5 years of age provided information on additional family demographic characteristics (mother's marital status, employment, education, and household income), children's health status, parental involvement in child's activities, maternal depressive symptoms, television exposure, and behavioral and social skills outcomes. Respondents were predominantly mothers (99%).

Dependent Variables

At 5.5 years, behavioral and social skills outcomes were assessed using the Child Behavior Checklist (CBCL)¹⁵ and the Social Skills Rating System,¹⁶ respectively. The CBCL for ages 1.5 to 5 years included measures of parents' perceptions of their child's behavioral problems. Five syndrome scales, including emotionally reactive (9 items), anxious or depressed (8 items), sleep problems (7 items), attention problems (5 items), and aggressive behavior (19 items), were included in the analysis. Scores for each syndrome scale were based on the sum of parent ratings (not true = 0, somewhat or sometimes true = 1, very or often true = 2) on multiple items. In addition, attention problems and aggressive behavior syndrome scale scores were summed to compute a broad-based externalizing scale (24 items). Scores on the externalizing scale ranged from 0 to 45 in our sample. α coefficients for each syndrome scale exceeded .70, with the exception of the attention problems scale, which was .59.

Four social skills subscales of the Social Skills Rating System included domains of cooperation, assertion, responsibility, and self-control. Each domain consisted of 10 items asking parents how often the child engaged in specific behaviors such as sharing materials (cooperation), introducing oneself (assertion), regard for property or work (responsibility), and responding appropriately to teasing (self-control). Based on parents rating (never = 0, sometimes = 1, very often = 2), items were scored and summed for each subscale. In addition to subscale scores, a composite measure of social skills was created by summing each of the subscale scores. Scores on the total social skills scale ranged from 6 to 79 in our sample. α coefficients for each subscale exceeded .70, with the exception of the responsibility scale, which was .60.

Independent Variables

The main independent measures of interest were >2 hours television viewing daily, including videos, and having a television in the child's bedroom. Parents reported on the number of hours that their child viewed television at 30 to 33 months and at 5.5 years of age. Based on parents' reports, 3 dichotomous variables were

created to describe the timing of television viewing. "Early television exposure" was defined as >2 hours of television viewing at 30 to 33 months only. "Concurrent exposure" was defined as >2 hours of television viewing at 5.5 years only. We consider this to be concurrent because it was measured at the same time point as the outcome measures. "Sustained exposure" was defined as >2 hours television viewing at both 30 to 33 months and 5.5 years. Television exposure also was assessed by a dichotomous variable indicating the presence of a television in the child's bedroom at 5.5 years. Data on the presence of a television in the child's bedroom at age 30 to 33 months was not available.

Covariates

Several variables shown to be associated with the main dependent measures were included as covariates. These included maternal demographic characteristics (age at child's birth, race, ethnicity, marital status, employment, and education), child's gender, parity, household income, child's health status, maternal depressive symptoms, and parental involvement in child's activities. Household income when child was 5.5 years was divided into tertiles (less than \$20 000, \$20 000 to \$49 999, and at or more than \$50 000). A dichotomous variable was created to describe the child's health status that was grouped as poor, fair, and good versus excellent health.

Maternal depressive symptoms were assessed at 5.5 years using a modified 14-item version of the 20-item Center for Epidemiologic Studies-Depression Scale.¹⁷ Response categories ranged from 1 (rarely or none of the time) to 4 (most or all of the time). The presence of depressive symptoms was indicated by a score ≥ 11 . Both the response categories and cutoff for the reduced item scale corresponded with the original cutoff of 16 for the 20-item scale. The internal consistency of the 14-item scale in the HS sample, as measured by Cronbach's α , was .88 at 5.5 years.

Parental involvement at 5.5 years was measured using a 9-item scale from the Early Childhood Longitudinal Study.¹⁸ Items assessing level of participation in children's activities included reading, telling stories, singing, helping with arts/crafts, completing chores, playing games, building things, teaching about nature, and playing sports. Four response categories reflected the frequency of participation (1 = not at all, 2 = once or twice a week, 3 = 3–6 times a week, and 4 = every day.) The internal consistency of the scale in the HS sample was .77 at 5.5 years.

Statistical Analysis

Bivariate analyses explored associations between television exposure and the child's behavioral and social skills outcomes using χ^2 statistics for categorical variables and analysis of variance for continuous variables. Linear regression estimated the effect of television exposure and

having a television in the child's bedroom on children's outcomes. Mutually exclusive dummy variables were created to assess the independent effects of television viewing by the timing of exposure (early, concurrent, and sustained). The reference category for this analysis was television watching ≤ 2 hours daily at both time points. Models were adjusted for family demographic characteristics, HS participation, maternal depressive symptoms, and parental involvement. We also tested for effect modification by income and parental involvement for each of the behavior and social skill variables. Missing observations did not exceed 3% for any variable. Study subjects with missing data were excluded from the analysis. Results were similar when subjects with missing values were included in the reference group. All of the analyses were performed by using Intercooled Stata 8.0 (Stata Corp, College Station, TX). The study was approved by the Johns Hopkins Committee on Human Research.

RESULTS

Sample Characteristics

The study sample included 2707 children whose mothers completed telephone interviews at both 30 to 33 months and 5.5 years and reported television exposure at both time points. Of those completing both interviews, 41 children (1%) were excluded because of missing data on television exposure at 1 or both time points. Compared with those enrolled in the HS clinical trial, parents in the study sample were disproportionately older, white, more educated, and married. Fewer parents completing both 30- to 33-month and 5.5-year interviews had children who watched >2 hours television viewing daily at 30 to 33 months compared with those completing the 30- to 33-month interview (34.2% vs 35.5%).

Among the final study sample, 7% had less than a high school education, 9% were teenagers when their HS child was born, and 27% had annual household incomes less than \$20 000 when their HS child was 5.5 years of age (Table 1). Sixteen percent of parents reported their child watched >2 hours of television daily at 30 to 33 months only (early exposure) and 15% reported >2 hours of television daily at 5.5 years only (concurrent exposure). A higher percentage of parents, $\sim 20\%$, reported that their child watched >2 hours of television daily at both times (sustained exposure). Finally, 41% of children had televisions in their bedrooms at age 5.5 years.

Bivariate Associations

In the bivariate analysis, mothers who reported having a child who viewed >2 hours were more likely to be less educated, younger, black, Hispanic, low income, and not married or living with biological father; to have depres-

sive symptoms; and to be less involved in their child's activities (Table 1). Similar associations were observed for relations between having a television in the child's bedroom and sample characteristics.

In unadjusted analyses, concurrent and sustained viewing were significantly associated with parental report of problem behaviors and fewer social skills (Table 2). Early television viewing was associated with reduced cooperation, self-confidence, and emotional reactivity. Finally, having a television in the child's bedroom at 5.5 years of age was generally associated with multiple behavioral problems and reduced social skills (Table 2).

Multivariate Regression Models

In adjusted analyses, there was limited effect on children's behavioral outcomes for those children whose parents reported early exposure or concurrent exposure. The 1 significant relation was emotional reactivity, which was negatively associated with early television viewing (Table 3). However, sustained exposure was associated with more sleep problems, attention problems, aggressive behavior, and externalizing behaviors.

For social skill outcomes, there was no effect of early or sustained exposure, with the exception of self-control. However, a negative association was observed between concurrent exposure and measures of cooperation, assertion, self-control, and the composite social skills measure (Table 3). Having a television in the bedroom was also associated with more sleep problems and less emotional reactivity. There was no association between having a television in the child's bedroom and concurrent social skills (Table 3).

DISCUSSION

This study confirms the central role of media in the lives of young children in the United States. Approximately 1 in 6 children viewed >2 hours of television daily either at 30 to 33 months or at 5.5 years of age but not both. More children, ~ 1 in 5, viewed >2 hours of television daily at both 30 to 33 months and 5.5 years of age. In addition, $>40\%$ of children at 5.5 years of age had a television in their bedrooms. These findings are similar to those reported in previous studies of television viewing among toddlers and preschoolers.^{2,3}

The study results offer evidence regarding the importance of timing of exposure. The findings suggest sustained television viewing of >2 hours daily in early childhood is associated with behavioral problems but is not associated with fewer social skills at 5.5 years of age. However, concurrent exposure was found to be associated with fewer social skills. For children with heavy television viewing only in early childhood, there was no consistent relation with either behavioral or social skills outcomes. It is not clear why concurrent exposure was associated with fewer social skills, whereas sustained exposure was not. It is possible that these findings may

TABLE 1 Selected Family Characteristics According to Timing of Television Exposure

Characteristic	>2 h of Television Daily				Total (N = 2702)	
	Neither (n = 1350), %	Early Exposure (n = 428), %	Concurrent Exposure (n = 396), %	Sustained Exposure (n = 528), %	%	n
Maternal education (at 5.5 y) ^a						
≤11 y	4.8	7.9	8.6	10.2	6.9	186
High school	17.2	27.6	22.4	34.3	22.9	618
Some college	25.5	31.9	34.1	34.1	29.5	795
College graduate or more	52.6	32.7	34.8	21.4	40.8	1100
Maternal age at child's birth ^a						
≤20 y	5.5	53.3	47.9	51.9	8.8	237
20–29 y	43.7	10.4	9.4	15.5	47.4	1278
≥30 y	50.8	36.4	42.7	32.6	43.9	1183
Maternal race ^a						
White	77.0	61.6	58.3	49.2	66.4	1776
Black	11.3	22.9	27.6	34.9	20.1	539
Asian/Native American	4.6	3.9	2.4	4.0	4.0	107
Other	7.2	11.6	11.8	11.9	9.5	254
Maternal ethnicity ^b						
Hispanic	13.8	20.0	16.8	18.0	16.0	432
Income tertiles (at 5.5 y) ^a						
Low (less than \$20 000)	19.4	29.2	29.2	41.2	26.7	702
Middle (\$20 000 to \$49 000)	26.4	34.1	30.9	28.2	28.6	752
High (more than \$50 000)	54.2	36.7	39.9	30.6	44.8	1178
First-time mother						
Yes	45.3	51.8	48.4	50.4	47.7	1290
Mother's marital status (at 5.5 y) ^a						
Married and living with infant's father	81.1	68.6	71.4	60.3	73.7	1987
Not married and lives with infant's father	4.2	8.4	6.3	8.5	6.0	161
Not living with infant's father	14.8	23.0	22.3	31.1	20.4	549
Mother employed (at 5.5 y)						
Yes	62.5	66.2	62.9	60.0	62.6	1692
Child's gender						
Male	48.5	50.5	53.0	45.5	49.0	1323
Maternal depressive symptoms (at 5.5 y) ^a						
Yes	11.5	14.4	14.5	26.1	15.3	404
Parental involvement (at 5.5 y) ^b						
Mean (SD)	26.8 (4.4)	25.9 (4.6)	26.1 (5.0)	25.8 (4.9)	26.3 (4.7)	

χ^2 test was conducted for association for categorical variables and analysis of variance for continuous variables. The data include <1% of missing data on all of the variables except for income (2.6%) and depressive symptoms (2.4%).

^a P value is <.001.

^b P value is ≤.01.

be attributable to differential contexts of exposure (eg, background versus primary activity or independent versus coviewing). Finally, having a television in the child's bedroom was associated with selected behavioral outcomes (more problems with sleep and less emotional reactivity) but not associated with social skills at 5.5 years of age. It is likely that having a television in the bedroom may lead to increased television viewing at bedtime, thereby interfering with regular sleep patterns and decreasing the intensity with which children react to stimulation.

In addition to examining the main effects, we tested for effect modification by income and parental involvement for each of the behavior and social skill outcomes. We hypothesized that the association between television exposure and behavioral and social skills outcomes may be weaker for children from families with higher income

and greater levels of parental involvement. However, our analysis revealed no significant interactions. There could be several potential reasons for this finding. First, greater income and parental involvement may not serve as sufficient buffers. Second, there may be other more subtle aspects of parental involvement, such as parenting style and expectations, that were not available in the data set.

It is difficult to compare our results with previous studies because of differences in methodology. The few studies that have considered the role of timing in their analysis have not examined independent effects of exposure at different ages versus sustained heavy viewing on behavioral or social skills outcomes. Unlike the aforementioned study by Christakis et al,¹⁰ we did not find an association between early television exposure (at 30–33 months only) and behavior outcomes. It is possible that

TABLE 2 Unadjusted and Adjusted Associations for Behavioral Problems and Television Exposure

Variables	Early Exposure	Concurrent Exposure	Sustained Exposure	Television in Child's Bedroom at 5.5 y
CBCL scores				
Emotionally reactive	-0.33 (-0.59 to -0.07) ^a	0.13 (-0.12 to 0.37)	0.48 (0.26 to 0.71) ^b	0.01 (-0.17 to 0.17)
Anxious or depressed	0.01 (-0.25 to 0.25)	0.37 (0.12 to 0.6) ^c	0.70 (0.47 to 0.93) ^b	0.46 (0.28 to 0.63) ^b
Sleep problems	-0.04 (-0.31 to 0.22)	0.20 (-0.05 to 0.46)	0.55 (0.32 to 0.79) ^b	0.31 (0.14 to 0.50) ^c
Attention problems	0.14 (-0.05 to 0.33)	0.37 (0.18 to 0.55) ^b	0.75 (0.58 to 0.92) ^b	0.45 (0.32 to 0.58) ^b
Aggressive behavior	0.11 (-0.57 to 0.80)	0.72 (0.06 to 1.38) ^a	2.26 (1.64 to 2.87) ^b	0.55 (0.76 to 1.02) ^a
Externalizing	0.25 (-0.56 to 1.06)	1.06 (0.28 to 1.85) ^c	3.00 (2.27 to 3.72) ^b	1.00 (0.44 to 1.55) ^b
CBCL scores ^d				
Emotionally reactive	-0.43 (-0.69 to -0.17) ^c	0.03 (-0.22 to 0.28)	0.17 (-0.07 to 0.41)	-0.26 (-0.47 to -0.08) ^c
Anxious or depressed	-0.22 (-0.47 to 0.04)	0.17 (-0.08 to 0.41)	0.21 (-0.03 to 0.44)	0.05 (-0.14 to 0.25)
Sleep problems	-0.11 (-0.38 to 0.16)	0.17 (-0.09 to 0.43)	0.38 (0.13 to 0.63) ^c	0.22 (0.01 to 0.42) ^a
Attention problems	-0.07 (-0.25 to 0.12)	0.14 (-0.04 to 0.32)	0.35 (0.18 to 0.53) ^b	0.07 (-0.08 to 0.21)
Aggressive behavior	-0.30 (-0.98 to 0.39)	0.39 (-0.27 to 1.05)	1.41 (0.77 to 2.04) ^b	-0.36 (-0.88 to 0.16)
Externalizing	-0.37 (-1.18 to 0.43)	0.50 (-0.28 to 1.27)	1.74 (0.99 to 2.48) ^b	-0.29 (-0.90 to 0.32)

Values are expressed as β coefficients (95% confidence intervals) and represent differences from the reference group (≤ 2 hours of television daily at both 30–33 months or 5.5 years).

^a P value is $\leq .05$.

^b P value is $< .001$.

^c P value is $\leq .01$.

^d Models were adjusted for mother's education, mother's age at child's birth, mother's race, mother's ethnicity, household income, parity, mother's marital status, mother's employment, child's gender, mother's depressive symptoms, parental involvement, and intervention status.

TABLE 3 Unadjusted and Adjusted Associations for Social Skills and Television Exposure

Variables	Early Exposure	Concurrent Exposure	Sustained Exposure	Television in Child's Bedroom at 5.5 y
Social skills rating system: social skills scale scores				
Cooperation	-0.39 (-0.73 to -0.05) ^a	-0.74 (-1.07 to -0.42) ^b	-0.61 (-0.91 to -0.31) ^b	-0.23 (-0.46 to 0.01)
Assertion	-0.07 (-0.41 to 0.26)	-0.63 (-0.95 to -0.31) ^b	-0.42 (-0.71 to -0.12) ^c	-0.37 (-0.60 to -0.14) ^c
Self-control	-0.46 (-0.82 to -0.10) ^a	-0.88 (-1.23 to -0.53) ^b	-0.98 (-1.31 to -0.66) ^b	-0.82 (-1.07 to -0.58) ^b
Responsibility	0.08 (-0.43 to 0.27)	-0.43 (-0.76 to -0.10) ^a	-0.43 (-0.74 to -0.13) ^c	-0.17 (-0.40 to 0.65)
Total social skills	-0.97 (-2.11 to 0.16)	-2.57 (-3.64 to -1.50) ^b	-2.16 (-3.15 to -1.16) ^b	-1.59 (-2.35 to -0.82) ^b
Social Skills Rating System: social skills scale scores ^d				
Cooperation	-0.19 (-0.52 to 0.15)	-0.57 (-0.89 to -0.25) ^b	-0.29 (-0.60 to 0.01)	0.16 (-0.09 to 0.41)
Assertion	0.16 (-0.18 to 0.50)	-0.45 (-0.77 to -0.13) ^c	-0.01 (-0.32 to 0.30)	0.08 (-0.18 to 0.33)
Self-control	-0.16 (-0.52 to 0.20)	-0.60 (-0.94 to -0.25) ^c	-0.41 (-0.75 to -0.08) ^a	-0.17 (-0.44 to 0.10)
Responsibility	0.02 (-0.33 to 0.36)	-0.27 (-0.60 to 0.06)	-0.19 (-0.51 to 0.12)	0.13 (-0.12 to 0.38)
Total social skills	-0.16 (-1.26 to 0.94)	-1.84 (-2.88 to -0.81) ^c	-0.69 (-1.69 to 0.32)	0.18 (-0.64 to 1.00)

Values are expressed as β coefficients (95% confidence intervals) and represent differences from the reference group (≤ 2 hours of television daily at both 30–33 months or 5.5 years).

^a P value is $\leq .05$.

^b P value is $\leq .001$.

^c P value is $\leq .01$.

^d Models were adjusted for mother's education, mother's age at child's birth, mother's race, mother's ethnicity, household income, parity, mother's marital status, mother's employment, child's gender, mother's depressive symptoms, parental involvement, and intervention status.

the differences in findings may be because Christakis et al¹⁰ measured early television viewing at an earlier age than we did (12 vs 30–33 months) or that they modeled each time point separately and did not examine the independent effects of timing. Similarly, the study by Stevens and Mulrow¹¹ also did not examine independent effects. Their finding of no meaningful association between television exposure at age 5 years and attentional problems at age 6 years cannot be compared with our finding because they, too, did not distinguish between children watching at 5 years only and those that have had sustained exposure of > 2 hours of television.

Our results demonstrate that the consequences asso-

ciated with timing of television exposure (early, concurrent, and sustained) vary. Overall, our analysis shows that sustained exposure is a risk factor for behavioral problems, whereas early exposure that is subsequently reduced presents no additional risk for poor outcomes. For social skills, however, concurrent exposure seemed to be more important than sustained or early exposure. Thus, timing of exposure should be considered in future observational and experimental studies.

The lack of an effect of early exposure may be a product of misclassification, because children who were categorized as having early exposure might have had lower levels of television watching than those catego-

alized as having sustained exposure. To address this possibility, we repeated the analysis using continuous exposure measures at both time points. Early viewing was still not significantly related to behavioral and social skill outcomes. This finding confirms that there was no effect of only early viewing and supports our conclusion regarding the need for prevention efforts in the pediatric settings aimed at reducing television viewing among those watching heavily in early childhood.

Several limitations of this study should be noted. First, we relied on parental report of television exposure. However, there is no gold standard for measuring media exposure.¹⁴ Moreover, Anderson et al¹⁹ found that parental report of television exposure was an adequate measure when compared with parental diary estimates assessed by videotape observations. Second, we had no data on the content of the television being viewed. Research has suggested that it is not only the amount of viewing that matters but also the content of what is viewed.^{8,9} Anderson et al¹⁹ reviewed a number of studies examining the effects of educational television and found both short-term and long-term benefits from curriculum-based programming, such as *Sesame Street*. In addition, a more recent systematic literature review by Thakkar et al⁹ examined controlled trials focused on the effect of television content on an array of child outcomes. The results suggest that educational and prosocial programming may positively affect specific aspects of child development, such as imaginativeness and knowledge. Future studies should focus on content, as well as the context, of viewing.

A third limitation is the observational nature of this study, which does not allow us to make causal inferences. There may be additional contextual factors that influence behavioral and social skills outcomes. Although we controlled for family demographic characteristics, maternal depressive symptoms, and parental involvement, there may be additional confounders, such as child's temperament, which were not captured. Finally, it remains possible that parental practices regarding television viewing are determined by the parental response to their child's behavior and not the reverse. To partially address this limitation, we examined 3 subscales of the CBCL (aggressive behavior, anxious depressed, and sleep problems) measured at 30 to 33 months. We estimated additional regression models controlling for behaviors at 30 to 33 months; the effects remained robust, suggesting that there is an effect of television viewing over and above early behavioral patterns.

Despite these limitations, our findings have several important implications for policy and practice. First, pediatric providers are ideally situated to identify children viewing >2 hours of television in early childhood because of early and frequent contact with families. The adverse effects of sustained exposure on behavioral out-

comes and later introduction of heavy television viewing on social skills underscore the importance of primary prevention and promotion of children's alternate activities. In addition, given that children who discontinue heavy television viewing by 5.5 years of age had no greater risk of adverse behavioral and social skills outcomes, it is vital for clinicians to also emphasize that importance of reducing television viewing in early childhood among those children with early use. Our results indicate that >50% of children who watched >2 hours of television daily in early childhood continue heavy television exposure in later childhood. This represents a significant opportunity for secondary prevention strategies within pediatric settings. As suggested by Gentile et al,²⁰ however, further efforts are needed to assess the effectiveness of such anticipatory guidance given that perceived futility is a recognized barrier to counseling regarding media use. Finally, further understanding of these relations requires an increasing focus on both the content of media exposure and additional contextual factors, such as the setting in which exposure occurs (background versus primary activity) and parental rules and perceptions regarding television use associated with children's well-being.²¹ This study highlights the importance of considering the timing of media exposure in future studies in clinical settings and intervention research.

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IS AN EARLY-HELP PROGRAM SHORTCHANGING KIDS?

“School districts have long complained about the high cost of special education. Now, spurred by changes in federal law, many are pursuing a contentious new strategy designed to reduce the number of children who need to be in such pricey programs. Known as ‘response to intervention,’ or RTI, it aims to bring early help to children struggling in regular-education classrooms and thus avoid having to provide them with special-education services later, when they typically cost 50% more per student. While few educators and disability advocates disagree with the theory behind RTI, some fear that, in implementation, it could become an excuse for shortchanging children with some of the most common disabilities. Under 2004 revisions to the federal special-education law, states must permit the use of RTI, and districts can use as much as 15% of their federal special-education money to pay for help in regular-education classes. . . . In most places, RTI is being directed at children with so-called ‘specific learning disabilities.’ Created under federal law, the fast-growing category includes dyslexia and other mental processing disorders that prevent children from listening, speaking, reading or computing up to their potential. SLD students account for about 46% of the nation’s 6.1 million special-education students, up from less than a quarter in the 1970s.”

Tomsho R. Wall Street Journal. August 16, 2007

Noted by JFL, MD