ARTICLE

Television and DVD/Video Viewing in Children Younger Than 2 Years

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Objective: To determine the television-, DVD-, and video-viewing habits of children younger than 2 years.

Design: A telephone survey of 1009 parents of children aged 2 to 24 months.

Setting: Parents in Minnesota and Washington state were surveyed.

Participants: A random sample of parents of children born in the previous 2 years was drawn from birth certificate records. Households in which English was not spoken were excluded, as were children with major disabilities.

Main Outcome Measure: The amount of regular television and DVD/video viewing by content, reasons for viewing, and frequency of parent-child coviewing.

Results: By 3 months of age, about 40% of children regularly watched television, DVDs, or videos. By 24 months, this proportion rose to 90%. The median age at which regular media exposure was introduced was 9 months. Among those who watched, the average viewing time per day rose from 1 hour per day for children younger than 12 months to more than 1.5 hours per day by 24 months. Parents watched with their children more than half of the time. Parents gave education, entertainment, and babysitting as major reasons for media exposure in their children younger than 2 years.

Conclusions: Parents should be urged to make educated choices about their children's media exposure. Parental hopes for the educational potential of television can be supported by encouraging those parents who are already allowing screen time to watch with their children.

Arch Pediatr Adolesc Med. 2007;161:473-479

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THE PUBLIC HEALTH IMPLICATIONS of early television and video viewing are potentially large.[1,2] There are both theoretical[2] and empirical[3-6] reasons to believe that the effects of media exposure on children's development are more likely to be adverse before the age of about 30 months than afterward. The results of 1 study suggest that what children younger than 2 years watch may be important for subsequent vocabulary development.[7,8] Because of the importance of parental interaction to development, it is believed that how children watch—in particular, whether they watch alone or with a parent—is also relevant.[2,9]

Recent studies have found that 64% to 100% of all infants and toddlers watch television before the age of 2 years.[10-12] These reports are provocative but present an incomplete picture of early television viewing. For example, a recent report stated that "61% of babies under 2 years old use screen media."[11] This finding is interesting and important, but does not tell us how many children will become regular media consumers before they are aged 2 years. These surveys have also not identified what types of content young children are viewing.

Our understanding of why young children watch television deserves enhancement. Two recent reports documented the results of focus group assessments of parents' reasons for having their children watch television,[11,13] which included the use of television as an electronic babysitter and a belief that television is entertaining for their children. In addition, many parents believe the positive educational claims made for infant videos and television programs.[7,10,11,14]

A limitation of the current research is the paucity of recent data on media viewing among children younger than 2 years. While the findings outlined for older children have been illuminating, it is unclear to what extent they can be generalized to younger children; also, the reasons for viewing may be different for children younger than 2 years than for those aged

from 2 to 6 years. Finally, prior analyses have not attempted to identify the average age of first viewing or the effects of demographic variables, such as the number of older siblings on viewing habits.

Our study uses a large sample of parents of children aged 2 to 24 months to determine the amount of television, video, and DVD material viewed by young children, and to characterize the content of the viewing by age. Sociodemographic factors were tested for their associations to viewing time. The reasons parents gave for their child's viewing are also reported.

METHODS

DATA

The data were collected in a telephone survey in February 2006. Birth certificates were obtained from Washington state and Minnesota for all births in the 2 years prior to the survey. Only 1 child per household was eligible. From this population of births, a random sample of 7500 families was selected and stratified into 4 age categories: 0 to 5 months, 6 to 11 months, 12 to 17 months, and 18 to 23 months. Those in the random sample were mailed a letter informing them about the survey. Letters that came back as undeliverable were dropped from the sample. Remaining parents were called in random order until a desired sample size of 1000 or more families was surveyed.

To be eligible for the study, parents had to speak English fluently and have a working telephone number. In addition, children with significant disabilities were excluded. Eight callbacks were made per telephone number at various times during the day and week. Parents gave verbal consent to participate in the study and all study procedures were approved by the institutional review board at the University of Washington.

SURVEY INSTRUMENTS

Parents were asked detailed questions about the time their child spent playing with toys and interacting with adults (eg, being read to, listening to stories, and listening to music). Parents were asked whether their child ever watched television, DVDs, or videos. Those answering yes were asked to report the amount of viewing by the content their child typically viewed. This question emphasized foreground viewing. Although background viewing (in which the television is on but the child is not actively viewing) is also believed to have an effect on developmental outcomes[2]; this study focuses only on foreground viewing, to be consistent with previous work in this area and to generate a conservative estimate of children's media exposure, and because it was believed that parents could more accurately report on their child's foreground exposure.

Six content types were identified a priori, based on previous work[12,15]: (1) children's educational programs on television (eg, *Blue's Clues* and *Arthur*), (2) children's educational programs on video or DVD (eg, *Sesame Street*), (3) children's noneducational television shows (eg, *SpongeBob SquarePants* and *Cartoon Network*), (4) children's movies on DVD or video (eg, *Toy Story*), (5) baby DVDs/videos (eg, *Baby Einstein*), and (6) grown-up television (eg, *Oprah* and sports programming). Parents were provided these categories with these examples and asked to report their child's viewing by category for a typical weekday and weekend day.

The programs given as examples of educational television have been shown by formal research to promote reading or vocabulary development among preschool-aged children. However, because the capacity of these shows to promote learning among children aged 0 to 2 years has never been evaluated, our categorization should be seen only as labels.

Parental reporting of children's television viewing has been used extensively in the literature[10-12,16] and has been shown to be highly correlated with media time, as observed by video recorders in the home.[17,18] Although parental reporting has more error than more intrusive methods, it has been shown not to exhibit any systematic bias.[18]

Parents who affirmed some viewing of either television or DVDs/videos were read a list of 6 possible reasons for doing so and asked which applied to them. They were then asked which was the most important. Another question asked parents to report the frequency with which they watched television or DVDs/videos with their child. Parents were also asked to report on average how much television they estimated their child's peers to watch.

Parents were also asked demographic questions, including how many other children were in the household, and questions about maternal and paternal education. The parents were asked to report the child's race. The child's age was available from the birth certificate.

OUTCOME AND COVARIATES

The primary outcome for this analysis is the amount of media viewing by content type. The 6 content categories were reduced to 4 by consolidating educational content on television and on DVDs/videos, and by consolidating children's movies with children's noneducational television. The 4 content categories were (1) children's educational, (2) children's noneducational, (3) baby DVDs/videos, and (4) grown-up television. Average daily viewing was used in all analyses. In addition to race and age, analyses controlled for whether both parents were living in the household, the child's hours in daycare, household income, and maternal and paternal education.

ANALYSES

Demographic data were compared with US census data for Washington state and Minnesota. The age of initiation of viewing either television or DVDs/videos was assessed by using a locally weighted smoothing regression (Lowess) with a binary indicator of whether the child watched as the outcome and the child's age as the main predictor.[19,20] Similarly, Lowess was used to present the relationship of the child's age to the total viewing time, subdivided by content type. Logistic regression was used to test the independent associations of demographic variables with any viewing by content type. Linear regression was used to test the independent associations of demographic variables with the amount of viewing by content type, conditional on any viewing of that content type. All analyses were conducted using Stata Statistical Software, version 9.0 (Stata Corp, College Station, Tex).

RESULTS

Of the 7267 families whose letters about the study were not returned as undeliverable, 297 mailed back refusals to participate, 1430 were determined by the investigators to have nonworking or wrong telephone numbers, and 3341 were pending at the time of the conclusion of the study, meaning that the requisite 8 attempts to call had not been made. Of 2199 households reached, 1791 were eligible. Of the 1791 eligible households plus the 297 who had mailed in refusals, 1009 families agreed to participate. Using standard definitions, the sample had

Table 1. Study Population and Census Sample Demographic Characteristics*

Characteristic	Study Sample	Minnesota and Washington Census Sample†	*P* Value of Difference
Age, mean (SD), mo	13.1 (6.0)	NA	NA
Sex, F	47	NA	NA
No siblings	31	39	<.001
1 Sibling	39	35	.009
≥2 Siblings	30	26	.005
Both parents present	95	83	<.001
Time in daycare, mean (SD), h/wk	11.0 (15.9)	NA	NA
Mother's education			
No high school	3	7	<.001
High school	16	23	<.001
Some college	22	36	<.001
College degree	40	33‡	NA
Postcollege education	19		NA
Father's education§			
No high school	2	6	<.001
High school	20	25	<.001
Some college	21	34	<.001
College degree	36	35‡	NA
Postcollege education	17		NA
Annual family income, $			
<20 000	6	13	<.001
20 000-40 000	15	23	<.001
40 001-60 000	26	24	.15
60 001-100 000	35	26	<.001
>100 000	18	13	<.001
Race			
Latino	5	6	.19
White	88	87	.36
African American	1	4	<.001
Multiracial	9	3	<.001
Other	2	9	<.001

Abbreviation: NA, not applicable.
*Values are presented as percentages unless otherwise indicated.
†From the 2000 US Census 5% Public Use Microsample.
‡Minnesota and Washington census information did not separate college and postcollege data.
§Father's education was imputed as some college if the father was absent.

a contact rate of 48.0%, a cooperation rate of 45.2%, a refusal rate of 24.3%, and a response rate of 20.1%.[21]

Table 1 reports demographics and the television and DVD/video viewing for the sample and for 2000 census data for Minnesota and Washington. Compared with the census data, the sample is more highly educated, less likely to be African American, more likely to report multiple races, and has higher incomes.

Figure 1 shows the initiation of viewing by medium and by age. Initiation of television and DVD/video viewing was similar. By 3 months of age, about 40% of infants were watching television or DVDs/videos. The median age of initiating media time is 9 months. By 2 years, about 90% of children were regularly viewing television or DVDs/videos. The average amount of viewing time across the entire sample of children from 2 to 24 months of age was 40.2 minutes per day. Parents estimate their child's peers' viewing to be considerably higher, at 69.6 minutes per day (significant at $P<.001$).

Figure 2 shows the evolution of viewing by content type with age. Those who watched any television or DVDs/videos watched just less than an hour per day at 3 months of age, rising to just more than 1.5 hours per day by age 24 months. Approximately half of the viewing was of

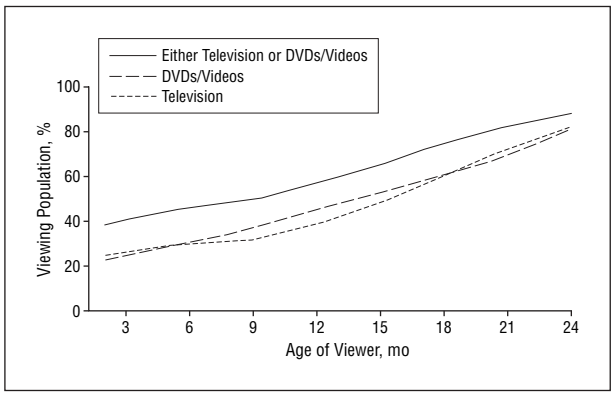

Figure 1. Initiation of television or DVD/video viewing by medium and age (locally weighted smoothing regression).

shows that parents reported to be in the children's educational category. The remaining half was approximately equally split among children's noneducational content, baby DVDs/videos, and grown-up television.

Table 2 presents the most commonly cited reasons for having young children watch television or DVDs/videos. The most common "most-important reason," en-

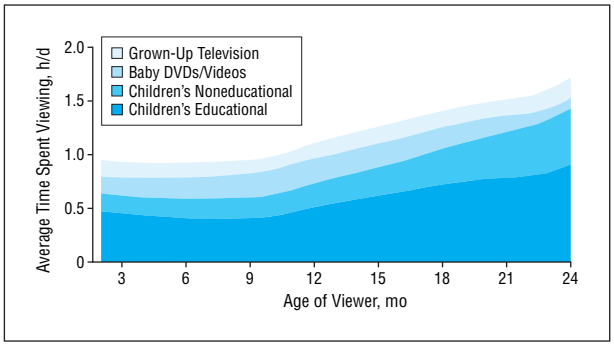

Figure 2. Television and DVD/video viewing by content and age among those with any viewing (locally weighted smoothing regression).

Table 2. Reasons Parents Gave as Being the Most Important for Their Children Watching Television or DVDs/Videos

Reason	Most Important Reason, %	Of Total Cited Reasons, %
The television and video programs that I have my child watch teach him/her something or are good for his/her brain	28.9	22.4
It is something he/she really enjoys doing	22.7	23.3
I need some time to get things done on my own	20.5	19.7
It is time he/she spends together with a sibling	9.1	12.8
The child needs or wants to relax	4.4	10.9
It teaches the child to get along well with others	1.4	8.0
It is family time, bonding time, or quality time	0	1.0
It grabs and holds my child's attention	0	0.7
Other reasons	13.0	1.4

dorsed by 29% of parents, was the belief that television is educational or good for their child's brain. The second most popular "most-important reason," at 23% of parents, was that it is enjoyable or relaxing for the child. Twenty-one percent of parents reported that the "most-important reason" was that they needed time to get things done.

Table 3 presents results of fully adjusted logistic regressions of watching any television or DVDs/videos, overall and by 4 specific content types. Compared with children without siblings, children with 2 or more siblings were less likely to view grown-up television (odds ratio [OR], 0.41; 95% confidence interval [CI], 0.26-0.64) and baby DVDs/videos (OR, 0.53; 95% CI, 0.36-0.78). Children with 1 sibling were more likely to watch children's noneducational content than children with no siblings (OR, 1.66; 95% CI, 1.16-2.38). Parental perception of more viewing by other children of a similar age (measured in hours per day) is associated with a greater likelihood of viewing overall (OR, 1.64; 95% CI, 1.41-1.91) of every type of content (Table 3; ORs: range, 1.29-1.76).

Table 4 presents fully adjusted regression results of the amount of viewing (minutes per day) among those who reported any viewing by content type. Those with 2 or more siblings watched about 18 fewer minutes per day in all content types (95% CI, –32.2 to –3.2) than those with no siblings. Children living in households with both parents present watched about 42 minutes per day (95% CI, –71.3 to –12.4) less of children's educational content than children in households with only 1 parent present.

Parents who reported higher viewing among children of their child's age also reported higher amounts of viewing by their own child. The effect was significant for overall viewing and for every content type besides grown-up television. Each additional hour of perceived average viewing for the age was associated with about 13 additional minutes per day of viewing on the part of the respondent's child, whether defined as overall viewing (estimated regression coefficient, 13.1; 95% CI, 8.5-17.7) or as children's educational or children's noneducational content specifically (Table 4).

Table 5 presents the proportions of children whose parents watched television or DVDs/videos with them by frequency of watching. Approximately 11% of children's parents rarely watched with them; 6% watched with them less than half of the time; 23% watched with them about half of the time; 27% watched with them more than half of the time; and 32% always watched with them.

COMMENT

It is clear that the American Academy of Pediatrics' recommendation of no screen time for children younger than 2 years has not been widely heeded. Approximately 40% of these young children are already watching by 3 months of age, and about 90% are watching by 24 months. The median age of initiating viewing is 9 months. These results are consistent with previous assessments.[10-12,14,16]

The results here show that only 32% of parents report watching television or videos with their child every time the child watches. Responses to similar questions in 2 previous studies range from 26% to 47%.[10-12] This finding is noteworthy in the context of the claim by producers of content for young children that their goal is to promote parent-child interaction.[14,22]

It is a common view that parents turn to television and DVDs/videos as an electronic babysitter for their children. The results here support a more nuanced picture that has emerged in the literature, one that suggests that babysitting is in fact not the single overriding reason children watch television.[11,23] In reporting on the reasons for having their children watch television or DVDs/videos, parents themselves emphasize the educational potential first.

Another reason is that viewing is perceived by the parents to be fun or relaxing for the child. About 1 in 5 parents cited a need to get things done as a major reason for having their children watch television or videos. It is possible that parents are responding to social expectations in citing these reasons. However, the regression results also would suggest that babysitting is not the major motivation. One would expect that single parents or parents with many children would have less time available per child and would therefore have more need for babysitting. Yet families with more children—and those with a single parent present—are no more likely to report that their child watches any media than families with 1 child

Table 3. Fully Adjusted Logistic Regressions of Any Viewing by Content Type*

Variable	Content Type, Odds Ratio (95% Confidence Interval)				
	Total Screen Time (n = 1004)	Children's Educational (n = 998)	Children's Noneducational (n = 999)	Baby DVD/Videos (n = 1003)	Grown-Up Television (n = 1005)
Female sex	0.85 (0.64-1.12)	0.96 (0.72-1.28)	0.93 (0.69-1.26)	1.21 (0.91-1.61)	0.91 (0.65-1.26)
Siblings (reference category, no siblings)					
1 Sibling	0.99 (0.71-1.39)	1.17 (0.83-1.64)	1.66 (1.16-2.38)†	0.68 (0.49-0.95)‡	0.57 (0.40-0.83)†
≥2 Siblings	0.73 (0.50-1.05)	0.97 (0.66-1.41)	1.12 (0.74-1.67)	0.53 (0.36-0.78)†	0.41 (0.26-0.64)†
Both parents present in home	0.59 (0.26-1.36)	0.76 (0.33-1.73)	0.46 (0.20-1.05)	1.07 (0.46-2.50)	1.12 (0.45-2.79)
Time in daycare, h/wk	1.00 (0.99-1.01)	1.00 (0.99-1.01)	1.01 (1.00-1.02)	0.99 (0.99-1.00)	1.00 (0.99-1.01)
Mother's education (reference category, college degree)					
<High school	1.57 (0.59-4.19)	1.79 (0.68-4.73)	4.44 (1.65-11.95)†	1.72 (0.65-4.53)	1.93 (0.71-5.27)
High school	0.81 (0.49-1.33)	0.97 (0.59-1.60)	1.23 (0.74-2.05)	1.03 (0.63-1.67)	0.7 (0.40-1.24)
Some college	1.33 (0.90-1.98)	1.21 (0.81-1.80)	1.29 (0.85-1.96)	1.04 (0.70-1.55)	0.87 (0.54-1.39)
Postcollege education	0.75 (0.50-1.13)	0.63 (0.42-0.95)‡	0.68 (0.43-1.08)	0.53 (0.34-0.81)†	0.72 (0.44-1.19)
Father's education					
<High school	1.33 (0.47-3.75)	0.71 (0.25-2.02)	0.75 (0.25-2.27)	0.7 (0.23-2.11)	1.64 (0.55-4.91)
High school	1.35 (0.86-2.13)	1.01 (0.64-1.60)	1.23 (0.76-1.98)	1.15 (0.73-1.82)	1.25 (0.75-2.10)
Some college	1.06 (0.70-1.60)	1.27 (0.84-1.93)	1.27 (0.82-1.96)	1.08 (0.71-1.65)	0.96 (0.59-1.57)
Postcollege education	1.05 (0.68-1.60)	1.00 (0.65-1.54)	0.90 (0.56-1.44)	1 (0.65-1.55)	0.85 (0.50-1.45)
Annual family income (reference category, >100 000), $					
<20 000	1.02 (0.46-2.25)	1.63 (0.73-3.61)	0.97 (0.43-2.18)	0.57 (0.25-1.27)	1.33 (0.53-3.32)
20 000-40 000	1.07 (0.62-1.84)	1.5 (0.87-2.60)	1.18 (0.66-2.09)	0.71 (0.41-1.23)	1.8 (0.93-3.50)
40 001-60 000	1.06 (0.68-1.66)	1.11 (0.70-1.75)	0.69 (0.42-1.12)	0.45 (0.28-0.71)†	1.83 (1.05-3.19)‡
60 001-100 000	1.3 (0.86-1.96)	1.35 (0.89-2.06)	0.79 (0.51-1.23)	0.76 (0.50-1.14)	1.38 (0.81-2.34)
Race					
Latino	0.59 (0.30-1.18)	0.97 (0.50-1.89)	0.79 (0.40-1.56)	0.98 (0.49-1.97)	0.72 (0.33-1.57)
African American	9.64 (1.98-46.85)†	7.99 (1.60-39.79)‡	8.63 (2.18-34.18)†	1.94 (0.60-6.27)	2.33 (0.65-8.41)
Multiracial	1.53 (0.92-2.55)	1.32 (0.78-2.21)	1.86 (1.10-3.13)‡	0.62 (0.35-1.09)	1.48 (0.85-2.59)
Other	2.57 (0.96-6.87)	1.77 (0.66-4.71)	2.21 (0.80-6.06)	0.66 (0.21-2.08)	1.71 (0.57-5.13)
Minnesota residence	1.1 (0.81-1.48)	1.28 (0.94-1.73)	1.11 (0.80-1.53)	1.2 (0.89-1.63)	1.08 (0.76-1.53)
Parental report of other children's viewing	1.64 (1.41-1.91)†	1.76 (1.50-2.06)†	1.42 (1.23-1.64)†	1.29 (1.13-1.48)†	1.71 (1.47-1.98)†
R^2	0.15	0.16	0.14	0.06	0.11

*Results also adjusted for child's age in months.
†$P<.01$.
‡$P<.05$.

or with both parents present. Similarly, children in such families are also no more likely to watch more television or DVDs/videos, if they watch any. On balance, these results suggest that the widespread notion that parents turn to television only as an electronic babysitter is a misconception. Other rationales (eg, the child's education and entertainment) appear to be as important. These results are similar to those for older children,[11] a similarity that is remarkable, given the very different educational potential of television for children younger than 2 years vs that for preschoolers and older children. Parents are clearly hungry for truly educational content for children younger than 2 years. More research is urgently required to determine whether it is realistic to produce genuinely educational content for children younger than 2 years, and if so, what it would be.

The presence of siblings is not significantly associated with the likelihood of watching any content, but is associated with less viewing when viewing takes place. The presence of siblings also appears to be related to the type of content viewed, with those with siblings more likely to watch entertainment television and less likely to watch baby videos/DVDs and grown-up television. These findings underscore the role that siblings play in shaping the early cognitive environment of young children. Given the research that demonstrates how infants and young children learn from and imitate their older siblings and peers,[24,25] these results suggest that it may not only be the amount or content type that children view but also the role of siblings in helping to process this content that may affect whether television viewing helps or hinders development.

As with other health behaviors, including drinking,[26] perceived norms of others' television viewing are higher than actual viewing and highly correlated with a child's own viewing. Parents believe their children watch less than the average amount; the perceived average viewing by other children is 73% higher than the actual average. The more their own children watch, the higher parents believe the average viewing by others to be. Research for other health behaviors has shown that communication of true norms of behavior can be a powerful motivator of behavior change.[27]

Several aspects of the sample make any conclusions drawn from it tentative. The sample is not highly representative of the population from which it is drawn, though

Table 4. Fully Adjusted Regressions Among Those With Any Viewing by Category*

Characteristic	Regression Coefficient (95% Confidence Interval)				
	Total Screen Time (n = 456)	Children's Educational (n = 454)	Children's Noneducational (n = 309)	Baby DVD/Videos (n = 298)	Grown-Up Television (n = 210)
Female sex	−2.8 (−13.42 to 7.82)	3.71 (−6.84 to 14.26)	−1.66 (−13.49 to 10.18)	6.21 (−0.91 to 13.32)	1.89 (−10.84 to 14.62)
1 Sibling	−4.18 (−16.57 to 8.21)	4.09 (−8.40 to 16.58)	3.8 (−10.55 to 18.15)	−2.44 (−10.41 to 5.52)	−2.35 (−16.39 to 11.70)
≥2 Siblings	−17.72 (−32.20 to −3.23)†	−4.18 (−18.43 to 10.08)	−4.94 (−21.73 to 11.85)	−2.7 (−12.30 to 6.90)	−10.14 (−27.58 to 7.30)
Both parents present	−5.06 (−34.38 to 24.26)	−41.85 (−71.28 to −12.42)‡	−19.45 (−48.30 to 9.40)	4.04 (−20.44 to 28.53)	7.57 (−33.44 to 48.57)
Time in daycare, h/wk	−0.12 (−0.46 to 0.22)	−0.25 (−0.59 to 0.10)	0.01 (−0.35 to 0.38)	−0.12 (−0.35 to 0.12)	−0.14 (−0.54 to 0.27)
Mother's education					
<High school	32.94 (−3.34 to 69.22)	7.3 (−27.51 to 42.12)	27.68 (−3.86 to 59.22)	34.44 (8.21 to 60.66)†	29.73 (−9.63 to 69.09)
High school	13.38 (−4.81 to 31.56)	2.43 (−15.00 to 19.87)	6.09 (−13.73 to 25.91)	4.46 (−7.03 to 15.95)	15.29 (−6.28 to 36.86)
Some college	6.18 (−8.27 to 20.62)	3 (−11.41 to 17.40)	−2.42 (−18.95 to 14.10)	−2.35 (−12.23 to 7.53)	15.21 (−2.60 to 33.02)
Postcollege education	−0.77 (−16.60 to 15.06)	−3.29 (−19.55 to 12.96)	−1.12 (−20.12 to 17.88)	5.62 (−5.61 to 16.85)	−8.01 (−27.33 to 11.32)
Father's education					
<High school	40.00 (0.22 to 79.78)†	57.55 (17.78 to 97.32)‡	25.97 (−15.30 to 67.24)	−11.05 (−43.50 to 21.40)	−19.93 (−64.06 to 24.20)
High school	−1.87 (−19.17 to 15.43)	13.12 (−4.28 to 30.52)	20.13 (0.35 to 39.91)†	−4.21 (−15.48 to 7.06)	−3.6 (−24.58 to 17.39)
Some college	2.05 (−13.20 to 17.30)	0.35 (−14.58 to 15.27)	6.54 (−10.39 to 23.47)	−0.3 (−10.40 to 9.81)	−8.44 (−27.22 to 10.34)
Postcollege education	−4.64 (−20.90 to 11.61)	−1.52 (−18.24 to 15.20)	2.58 (−16.87 to 22.03)	−4.76 (−15.57 to 6.05)	−6.87 (−27.40 to 13.67)
Annual household income, $					
<20 000	1.09 (−28.00 to 30.18)	−10.35 (−38.73 to 18.03)	10.51 (−18.67 to 39.69)	−11.46 (−32.97 to 10.06)	11.12 (−26.27 to 48.52)
20 000-40 000	7.06 (−14.47 to 28.59)	5.19 (−16.12 to 26.51)	3.14 (−19.72 to 26.00)	8.37 (−4.74 to 21.47)	−1.9 (−27.68 to 23.88)
40 001-60 000	3.62 (−13.96 to 21.20)	−3.34 (−21.11 to 14.42)	−1.62 (−21.66 to 18.43)	−2.6 (−13.91 to 8.71)	9.29 (−12.80 to 31.38)
60 001-100 000	0.26 (−15.29 to 15.81)	5.83 (−10.04 to 21.69)	2.08 (−15.38 to 19.54)	2.64 (−7.14 to 12.42)	7.45 (−13.13 to 28.03)
Child's race					
Latino	−30.03 (−55.76 to 4.29)†	−14.5 (−37.89 to 8.88)	4.19 (−20.64 to 29.01)	6.58 (−10.78 to 23.93)	10.41 (−19.43 to 40.25)
African American	38.06 (2.77 to 73.34)†	90.23 (55.38 to 125.08)‡	33.92 (−0.16 to 67.99)	14.93 (−10.87 to 40.72)	−3.68 (−45.85 to 38.48)
Multiracial	23.17 (5.20 to 41.14)†	12.95 (−5.05 to 30.95)	−2.31 (−21.22 to 16.60)	1.57 (−12.82 to 15.97)	5.39 (−14.79 to 25.56)
Other	−3.8 (−36.87 to 29.28)	−17.58 (−53.67 to 18.51)	−18.89 (−56.75 to 18.97)	−0.59 (−31.62 to 30.43)	11.8 (−29.73 to 53.33)
Minnesota residence	−2.87 (−14.34 to 8.60)	−1.47 (−12.86 to 9.93)	−0.45 (−13.30 to 12.39)	−0.58 (−8.15 to 7.00)	−4.96 (−18.40 to 8.48)
Parental report of other children's viewing, h/d	13.08 (8.47 to 17.69)†	13.41 (8.88 to 17.94)†	12.97 (7.81 to 18.13)†	6.86 (3.53 to 10.20)†	4.28 (−0.55 to 9.10)
R^2	0.19	0.22	0.21	0.17	0.11

*Results also adjusted for child's age in months. Reference categories are the same as in Table 3.
†$P<.05$.
‡$P<.01$.

Table 5. Parental Report of Watching Media With Children Among Parents Whose Children Watch Any Media

Frequency of Viewing With Children	Value, No. (%)
Rarely	72 (11.45)
<Half the time	40 (6.36)
About half the time	142 (22.58)
>Half the time	169 (26.87)
Always	203 (32.27)
Don't know	3 (0.48)

it is comparable to recent work in this area.[10-12] A particular group of interest would be non-native speakers of English, who were excluded from this study and whose viewing patterns would presumably be different in interesting ways from the results presented here.

The content categorization was provided by parents, with some guidance from the wording of the questions. That said, the research base is so thin at present that there is little sound rationale for coding any particular show as educational vs entertainment. As such, the content categorization of viewing presented here, while suggestive of overall patterns and a major advance on previous research, is not highly precise.

Even with these limitations, this survey represents a significant contribution to the literature in which the only previous studies were conducted years ago,[16] limited to the suburbs of 1 city,[12] or not focused on young children.[10,11,16] No previous studies have collected detailed data on content children are watching, and no large-scale surveys have assessed parents' reasons for having children watch.

The phenomenon of very young children watching television and DVDs or videos is now routine. Children start watching television at a very young age and watch a lot of it. This phenomenon would seem to be driven as much by parental beliefs in the educational and entertainment value of television for very young children as by parental need for an electronic babysitter. More research is urgently needed to determine whether these parental beliefs are justified and whether future public health interventions targeting this age group's viewing should be mindful of parental motivations for use.

In the meantime, these results have relevance for pediatric practice. The finding that parents perceive that television has the potential for educational benefit can

be used to reinforce the message to increase the proportion of viewing that is with a parent, which may serve to foster the parent-child interactions that have been associated with vocabulary acquisition during infancy. In addition, special attention and sensitive intervention may be warranted for heavy television households. Finally, parents could be given realistic comparative information about how much television viewing is being done by age-matched peers, so they can make more informed choices for their own families in relation to actual (not simply perceived) societal norms.

Accepted for Publication: November 8, 2006.
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Author Contributions: Throughout this project, Dr Zimmerman 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:* Zimmerman, Christakis, and Meltzoff. *Acquisition of data:* Zimmerman and Christakis. *Analysis and interpretation of data:* Zimmerman, Christakis, and Meltzoff. *Drafting of the manuscript:* Zimmerman, Christakis, and Meltzoff. *Critical revision of the manuscript for important intellectual content*: Zimmerman, Christakis, and Meltzoff. *Statistical analysis:* Zimmerman, Christakis, and Meltzoff. *Obtained funding:* Meltzoff. *Administrative, technical, and material support:* Zimmerman and Meltzoff. *Study supervision:* Meltzoff.
Financial Disclosure: None reported.
Funding/Support: We gratefully acknowledge the generous financial support provided by the Tamaki Foundation. Dr Zimmerman is supported by grant 1K01MH06446-01A1 from the National Institute of Mental Health.

REFERENCES

1. Christakis DA, Zimmerman FJ. Media as a public health issue. *Arch Pediatr Adolesc Med*. 2006;160:445-446.
2. Anderson DR, Pempek TA. Television and very young children. *Am Behav Sci*. 2005;48:505-522.
3. Zimmerman FJ, Christakis DA. Children's television viewing and cognitive outcomes: a longitudinal analysis of national data. *Arch Pediatr Adolesc Med*. 2005; 159:619-625.
4. Christakis DA, Zimmerman FJ, DiGiuseppe DL, McCarty CA. Early television exposure and subsequent attentional problems in children. *Pediatrics*. 2004;113: 708-713.
5. Stevens T, Mulsow M. There is no meaningful relationship between television exposure and symptoms of attention-deficit/hyperactivity disorder. *Pediatrics*. 2006;117:665-672.
6. Christakis DA, Zimmerman FJ. Viewing television before age 3 is not the same as viewing television at age 5. *Pediatrics*. 2006;118:435-436.
7. Linebarger DL, Walker D. Infants' and toddlers' television viewing and language outcomes. *Am Behav Sci*. 2005;48:624-645.
8. Anderson DR. Educational television is not an oxymoron. *Ann Am Acad Pol Soc Sci*. 1998;557:24-38.
9. Jordan A. The role of media in children's development: an ecological perspective. *J Dev Behav Pediatr*. 2004;25:196-206.
10. Rideout VJ, Vandewater EA, Wartella EA. *Zero to Six: Electronic Media in the Lives of Infants, Toddlers, and Preschoolers*. Menlo Park, Calif: Kaiser Family Foundation; 2003.
11. Rideout V, Hamel E. *The Media Family: Electronic Media in the Lives of Infants, Toddlers, Preschoolers, and Their Parents*. Menlo Park, Calif: Henry J. Kaiser Foundation; 2006.
12. Weber DS, Singer DG. The media habits of infants and toddlers: findings from a parent survey. *Zero to Three*. 2004;25:30-36.
13. He M, Irwin JD, Sangster Bouck LM, Tucker P, Pollett GL. Screen-viewing behaviors among preschoolers parents' perceptions. *Am J Prev Med*. 2005;29: 120-125.
14. Garrison M, Christakis D. *A Teacher in the Living Room? Educational Media for Babies, Toddlers, and Preschoolers*. Menlo Park, Calif: Kaiser Family Foundation; 2005.
15. Woodard EH. *Media in the Home, 2000: The Fifth Annual Survey of Parents and Children*. Philadelphia, Pa: The Annenberg Public Policy Center of the University of Pennsylvania; 2000.
16. Certain LK, Kahn RS. Prevalence, correlates, and trajectory of television viewing among infants and toddlers. *Pediatrics*. 2002;109:634-642.
17. 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;56:1345-1357.
18. Borzekowski D, Robinson T. Viewing the viewers: ten video cases of children's television viewing behaviors. *J Broadcasting and Electronic Media*. 1999;43: 506-528.
19. Fox J. *Applied Regression Analysis, Linear Models, and Related Methods*. Thousand Oaks, Calif: Sage Publications; 1997.
20. Härdle W, Müller M, Sperlich S, Werwatz A. *Nonparametric and Semiparametric Models*. New York, NY: Springer; 2004.
21. American Association for Public Opinion Research. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 4th ed. Lenexa, Kan: American Association for Public Opinion Research; 2006.
22. Associated Press. HBO criticized for pushing TV to infants. *MSNBC*. May 12, 2005.
23. Vandewater EA, Park S-E, Huang X, Wartella EA. "No, you can't watch that": parental rules and young children's media use. *Am Behav Sci*. 2005;48:608-623.
24. Barr R, Hayne H. It's not what you know, it's who you know: older siblings facilitate imitation during infancy. *Int J Early Years Educ*. 2003;11:7-21.
25. Hanna E, Meltzoff AN. Peer imitation by toddlers in laboratory, home, and daycare contexts: implications for social learning and memory. *Dev Psychol*. 1993; 29:701-710.
26. Perkins HW, Haines MP, Rice R. Misperceiving the college drinking norm and related problems: a nationwide study of exposure to prevention information, perceived norms and student alcohol misuse. *J Stud Alcohol*. 2005;66:470-478.
27. Neighbors C, Larimer ME, Lewis MA. Targeting misperceptions of descriptive drinking norms: efficacy of a computer-delivered personalized normative feedback intervention. *J Consult Clin Psychol*. 2004;72:434-447.