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Time Well Spent? Relating Television Use to Children's Free-Time Activities

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ABSTRACT

OBJECTIVES. This study assessed the claim that children's television use interferes with time spent in more developmentally appropriate activities.

METHODS. Data came from the first wave of the Child Development Supplement, a nationally representative sample of children aged 0 to 12 in 1997 ($N = 1712$). Twenty-four-hour time-use diaries from 1 randomly chosen weekday and 1 randomly chosen weekend day were used to assess children's time spent watching television, time spent with parents, time spent with siblings, time spent reading (or being read to), time spent doing homework, time spent in creative play, and time spent in active play. Ordinary least squares multiple regression was used to assess the relationship between children's television use and time spent pursuing other activities.

RESULTS. Results indicated that time spent watching television both with and without parents or siblings was negatively related to time spent with parents or siblings, respectively, in other activities. Television viewing also was negatively related to time spent doing homework for 7- to 12-year-olds and negatively related to creative play, especially among very young children (younger than 5 years). There was no relationship between time spent watching television and time spent reading (or being read to) or to time spent in active play.

CONCLUSIONS. The results of this study are among the first to provide empirical support for the assumptions made by the American Academy of Pediatrics in their screen time recommendations. Time spent viewing television both with and without parents and siblings present was strongly negatively related to time spent interacting with parents or siblings. Television viewing was associated with decreased homework time and decreased time in creative play. Conversely, there was no support for the widespread belief that television interferes with time spent reading or in active play.

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Key Words

child development, children, media, television

Abbreviations

AAP—American Academy of Pediatrics
CDS-I—first wave of the Child Development Supplement
PSID—Panel Study of Income Dynamics
OLS—ordinary least squares

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TELEVISION VIEWING HAS been blamed for a variety of social ills, including the creation of passive learners who have difficulty paying attention and concentrating on learning tasks (and, by extension, declining test scores), inactivity (and, by extension, obesity), immorality, aggression, and even murder. In part, these charges stem from the basic belief that television viewing interferes with the time that children spend in activities that are deemed more developmentally appropriate. This belief is both long standing and widely held.¹

The widespread conviction of the veracity of this belief has shaped at least 2 prominent public health policies. The American Academy of Pediatrics (AAP) recommends that pediatricians advise parents to avoid television viewing entirely for children who are younger than 2 years and limit the viewing time of older children to <2 hours a day.² The AAP recommendation states that pediatricians should “discourage television viewing for children younger than 2 years and encourage more interactive activities that will promote proper brain development, such as talking, playing, singing, and reading together.”² Although concern for young children’s neurologic development prompted this recommendation, the implicit assumption is that the time that children spend viewing screen media will interfere with time spent in social interaction, particularly with parents. Along the same lines, the Centers for Disease Control and Prevention in its *Healthy People 2010* has identified, for the first time, the reduction of television viewing as a fitness objective. Like the AAP recommendation, this goal assumes that time spent viewing television interferes with time spent in more physically active pursuits.

It is true that American children spend anywhere between 2 and 5 hours a day watching television,^{3–6} more time than in any other single discretionary activity except for sleep.⁷ If time spent in activities is zero-sum, then the assumption that time spent watching television impinges on the total time available for social interaction or for other activities makes intuitive sense. This is essentially the notion of the “displacement effect.”¹

However, it is important to note that empirical examination of displacement or time “trade-offs” requires a full accounting of all activities in which children engage during a 24-hour period. Otherwise, it is impossible to assess accurately the extent of the relationships among activities in which children engage. This realization is far from recent. In 1972, Robinson⁸ remarked, “A major weakness of the available literature has been its failure to employ an adequate sampling framework of daily life with which to assess television’s full impact.” Surprising, however, few existing studies used an appropriate time-sampling method. Given that concern about the displacement of healthier activities by television has loomed large in both popular and academic consciousness for decades, the relative dearth of empirical research on this topic is surprising.

In this article, we examine the relationship between the amount of time that children spend watching television and the amount of time that they spend in activities that are viewed as more developmentally appropriate. We use data from the first wave of the Child Development Supplement (CDS-I). One of the strongest elements of the CDS-I is its reliance on 24-hour time-use diaries to document time spent using media and in other activities. The CDS data have distinct strengths for examining the relationship between time spent viewing television and time spent in other activities: (1) the data are drawn from a nationally representative sample of children, which allows inference about time trade-offs at the population level; (2) children’s activities and media use were measured using 24-hour time-use diaries, which allow direct comparison of time trade-offs; and (3) data were collected from children who were aged 0 to 12, which allows an examination of time trade-offs among even very young children.

To address health policy, scholarly, and popular concerns, we focus on the relationship between television viewing and 5 activities that are deemed developmentally appropriate: (1) time spent interacting with family (parents and siblings), (2) time spent reading (including being read to), (3) time spent doing homework, (4) time spent in creative play, and (5) time spent in active play. We address the following questions: (1) Do children “trade-off” time spent in more developmentally appropriate activities for time watching television? (2) Do these trade-offs differ by type of activity and by age?

METHODS

SAMPLE

Data from this study come from the first wave of the Panel Study of Income Dynamics (PSID) CDS-I. The PSID began as a longitudinal study that focused on the transfer of capital within families. In 1997, it was expanded to include a host of measures that are pertinent to children aged 12 and younger. These measures ranged from parenting, children’s academic achievement, behavior, and time use. Of the families in the PSID with children younger than 12 years, 2380 participated, yielding a sample of 2902 children who returned at least 1 time-use diary. Appropriately weighted, these data provide nationally representative estimates (see Hofferth and Sandberg⁹ for a detailed discussion of PSID and CDS-I sampling procedures).

The current study used a subsample of the CDS ($n = 1712$) in which children had at least 1 time-use diary and complete data on all variables and covariates of interest. Sampling weights were recalibrated such that the subsample remained representative of the US population. The median income of families in CDS-I was \$39 409, with 18.1% of families falling below the 1997 federal poverty level. Twenty percent of heads of house-

hold had not graduated high school, 31% had a high school diploma, 23% had some college, and 26% had attained a bachelors degree or higher. Sixty-six percent of the sample were white, 15.4% were black, 11.5% were Hispanic, and 7% were of other ethnicities. The study was approved by the Institutional Review Boards of the University of Michigan, where the data were collected, and the University of Texas at Austin, where analyses for this study were conducted.

Time-Use Diaries

Children's time-use information was collected during the school year (September through May) using 24-hour time-use diaries on 1 randomly chosen weekday and 1 randomly chosen weekend day. On the diary, every minute of the two 24-hour periods was accounted for with a primary activity and, if applicable, a secondary activity. Also reported were who was doing the activity with the child and who was there but not participating directly in the activity with the child (eg, if the parent was in the house but not watching television with the child). The diaries were completed, by and large, by the children's primary caregivers, with some assistance from older children in the sample (10- to 12-year-olds). Caregivers were reminded to keep track of their child's activities with a telephone call the day before their randomly chosen diary day. Because the structure of children's time, particularly their discretionary time, differs on weekdays and weekends, day types were analyzed separately.

A substantial amount of attention has been paid to measurement issues involving the use of time diaries to assess time use,^{10,11} and a fairly extensive body of research now exists demonstrating the validity and the reliability of such diaries as representations of the way both children and adults spend their time.^{8,11,12} When direct observation techniques are compared with time dairies, the mean values for time allocated to different activities were very close, and the correlations were high, on the order of .70 to .80.^{10,11}

Of particular relevance to this study, Anderson et al¹³ specifically examined the accuracy of parent report of young children's (age 5 on average) media use. Using video cameras, they recorded all children's viewing in ~100 families for a 10-day period while the children's parents also completed a viewing diary. The correlation between the 2 methods was high (.84), indicating that time diaries that are filled out by parents provided fairly accurate representations of children's weekly viewing. Thus, time diaries have been shown to be a highly reliable and valid method for large-scale surveys to chart the way individuals spend their time when observing individuals over 24-hour periods is neither logistically nor financially feasible.

Children's Time Use

The goal of this article is to examine the commonly held notion that television viewing takes time away from other activities that are healthier or developmentally important for children. Analyses focus on 5 such activities: (1) interacting with parents and siblings, (2) reading or being read to, (3) doing homework, (4) engaging in creative play, and (5) engaging in active play.

All time-use variables were constructed by summing the total number of minutes spent in each activity on the weekday and the weekend independently. Duration totals include reports of activities as either primary or secondary but do not include concurrent use of media and any of the other activities (ie, when one was reported as a primary activity and the other as a secondary activity). Thus, for example, time spent doing homework in front of the television was counted in neither the television time nor homework time variables. This prevented overlap between independent and dependent variables in the analyses. Means and SDs for time spent in all activities examined here are presented in Table 1.

Time Spent With Television

Time spent watching television was the sum of the minutes of television viewing as either a primary or a secondary activity on the weekday or weekend day, with no concurrent displacement activities reported.

Time With Family Members

The focus of many critiques of television is that it interferes with the time that children spend interacting with their families. Using the time-use diaries, we were able to examine the relationship between television viewing and the time that children spend with their parents and siblings in other activities (not viewing television). Because television viewing may also act as a venue for social interactions, we explored the relationships between children's co-viewing with their parents and siblings and the amount of time that they spent with their parents and siblings in other, nonmedia use activities.

Time With Parents

When the child's mother, father, step-mother, and/or step-father was reported as participating directly with the child in an activity, the event was considered as having occurred with the child's parents. The amount of time that children spent with 1 or both parents in all activities except watching television was the primary dependent variable in these analyses. When the primary or secondary activity was television and a parent was participating, the activity was considered co-viewing with parents.

Time With Siblings

Among children who had a sibling ($n = 1094$), when an activity occurred with a child's brother, sister, step-

TABLE 1 Means and SDs for Minutes Spent in Activities and With Family Members

	Weekday Minutes								Weekend Minutes							
	Ages 0–2		Ages 3–5		Ages 6–8		Ages 9–12		Ages 0–2		Ages 3–5		Ages 6–8		Ages 9–12	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Criteria																
Time with parents ^a	309.21	156.40	223.17	148.75	129.15	103.95	101.79	99.75	390.74	181.38	336.67	185.47	246.77	176.27	221.77	195.57
Time with siblings ^a	201.88	172.88	235.21	183.55	168.71	130.05	142.00	123.60	299.20	194.51	350.23	187.59	330.40	192.78	278.52	201.57
Reading ^b	15.09	27.65	16.06	23.76	11.03	19.64	10.73	23.48	14.84	28.57	14.66	23.75	16.48	32.73	18.42	45.02
Homework ^b	–	–	5.69	22.58	21.08	31.45	39.49	47.94	–	–	1.05	6.39	4.11	16.01	13.05	46.58
Creative play ^b	259.90	158.64	185.72	142.87	93.85	92.68	53.21	70.37	263.85	139.20	229.03	148.24	168.37	136.14	128.44	128.76
Active play ^b	49.78	68.21	50.77	81.38	40.37	65.73	26.05	49.24	65.87	87.08	77.34	90.24	87.85	118.10	69.48	95.69
Predictors																
Viewing without parents ^c	33.61	57.17	65.29	73.98	64.76	75.62	69.88	76.63	25.81	49.66	67.19	80.77	94.27	98.39	113.12	120.39
Viewing with parent(s) ^d	44.42	61.32	78.53	78.92	68.88	72.66	75.80	77.88	16.99	35.73	53.42	62.27	67.11	82.43	76.73	99.71
Viewing without siblings	18.12	42.62	20.18	41.79	20.31	58.88	14.85	38.25	5.71	24.48	25.94	61.36	19.17	42.98	31.67	63.84
Viewing with sibling(s)	38.29	59.63	81.39	85.23	73.41	66.46	79.41	78.66	48.57	63.46	93.07	80.74	130.73	123.30	122.88	108.96
Television viewing ^e	55.03	72.40	96.05	86.28	89.96	85.57	99.41	85.83	54.62	69.61	111.54	91.78	151.24	120.48	163.51	135.92

Dashes indicate <10% of the sample reported the activity.

^a In all other activities except television viewing.

^b With no concurrent television viewing.

^c Without either parent present.

^d With either parent present.

^e With no concurrent activities.

brother, or step-sister participating, it was considered time spent with siblings. The amount of time that children spent with siblings in all activities except watching television was the primary dependent variable in these analyses. When the primary or secondary activity was television and a sibling was participating, the activity was considered co-viewing with siblings.

Time Spent Reading

Because the age range of the sample includes very young children, this variable included minutes of either reading or being read to for the following types of print media: books, magazines, newspapers, and letters.

Time Spent Doing Homework

This included non-computer-related homework, studying, reading, and conducting research related to class work.

Time Spent in Creative Play

This included the usual childhood creative pastimes, such as drawing, coloring, playing a musical instrument, playing pretend or dress-up, playing card games or board games, and playing with toys. It also included all types of arts and crafts.

Time Spent in Active Play

Because our intention in this study was to capture the relationship between children's television viewing and the way they choose to spend their discretionary time, we included all unorganized sports activities (eg, soccer, kickball, basketball, swimming, karate) but not time spent in organized meets/competitions and practices for

such sports. Also included were other active outdoor activities such as playing catch, walking for pleasure, hiking, fishing, camping, and general playground activities.

Covariates

Children use media in rich social contexts, including the family and neighborhood. Many factors affect the structure of children's time, including the time they spend watching television, as well as the time they spend with their parents. Depending on the analyses being conducted, the following variables were entered as covariates in the regression analyses.

Socioeconomic and Demographic Characteristics

All models controlled for basic socioeconomic and demographic characteristics. These included family income-to-needs ratio (computed by dividing family income by the 1997 poverty threshold provided by the Census Bureau appropriate for family size; mean: 3.04; SD: 3.50); number of years of education completed by the head of the household (mean: 12.90; SD: 2.62); and child gender (881 boys and 831 girls) and child ethnicity (924 white and 788 nonwhite), with boys and nonwhite children as the reference group. In models that predicted time spent with family only, we also controlled for whether the child was the first-born child in the family ($n = 887$) or not ($n = 825$).

Mother's Average Weekly Work Hours

Because the amount of time that mothers spend working can influence the amount of time that they are available to spend with their child, including using print media

and watching television, we controlled for mother's average weekly work hours (mean: 20.78; SD: 19.66) in all models.

Neighborhood Safety

Because the safety of a child's neighborhood may affect the amount of time he or she spends indoors, neighborhood safety was included as a covariate in all models. This measure was constructed by averaging primary caregiver responses to a total of 8 items, with higher scores indicating perceptions of less neighborhood safety (mean: 1.6; SD: 0.63; $\alpha = .94$). Item examples include the following: How safe is it to walk around alone in your neighborhood after dark? (1 = completely safe, 4 = extremely dangerous). How likely is it that a neighbor would do something if (1) Someone was breaking into your home in plain sight? (2) Someone was trying to sell drugs to your children in plain sight? (3) There was a fight in front of your house and someone was being beaten? (1 = Very likely, 4 = Very unlikely, for each).

Time Spent in Child Care or at School

Because the amount of time that children spend in child care settings or at school affects the amount of time that they have to spend in discretionary activities, time spent in child care or at school was controlled for (weekday minutes, mean: 298.56; SD: 225.43; weekend minutes, mean: 2.88; SD: 27.19).

Analysis Plan

Analyses were conducted using Stata 8.0. Hierarchical ordinary least squares (OLS) multiple regressions were performed separately by weekdays and weekend days and for children in 4 age categories: 0 to 2 ($n = 350$), 3 to 5 ($n = 372$), 6 to 8 ($n = 380$), and 9 to 12 ($n = 610$). Six sets of analyses were performed using the following as criterion variables: (1) time spent with parents, (2) time spent with siblings (for those with a sibling), (3) time spent reading, (4) time spent doing homework, (5) time spent in creative play, and (6) time spent in active play. When "time spent with parents" was used as the dependent variable, the predictor variables of interest were "time spent watching television without parents present" and "time spent co-viewing with parents." Similarly, when "time spent with siblings" was the dependent variable, the key predictor variables were "time spent watching television without siblings present" and "time spent co-viewing with siblings." These analyses included only children with a sibling participant in the sample ($n = 1094$). For all other activities, the predictor variable of interest was "time spent watching television with no concurrent activities" (ie, reading, homework, creative play, or active play).

Covariates were entered before the predictor variable of interest. All analyses were weighted using recalibrated sampling weights to yield nationally representative co-

efficient estimates. Because of the existence of sibling pairs in the data, standard errors were corrected for nonindependence.

RESULTS

Television Viewing and Time Spent With Parents and Siblings

Results of the OLS regression analyses for the relationship between time spent watching television and time spent interacting with parents and siblings are presented in Table 2.

Time Spent With Parents

Regardless of children's age, time spent watching television without a parent present was negatively related to time spent with parents in other activities (Table 2). With 1 exception (6- to 8-year-olds on the weekday), the time that children spent watching television with their parents was also negatively related to spending time with parents in other activities.

Time Spent With Siblings

There was also a negative relationship between television viewing and the time that children spend with their siblings. The more time that children spent watching television without a sibling, the less time they spent with their siblings in other activities (Table 2). Overall, the pattern of results was similar for the relationship between watching television with a sibling present and time spent with siblings in other activities. This relationship was generally negative, with 1 notable exception. Specifically, for very young children (aged 0–2), time spent watching television with a sibling was positively related to time spent interacting with siblings.

Effect Sizes

The unstandardized coefficients from the regressions can be interpreted in terms of the amount of time that children spend with their family according to how much television they view. Specifically, for every hour of television that children view on a weekday (without their parents present), they spend less time with their parents: 0- to 2-year-olds, 52 minutes; 3- to 5-year-olds, 45 minutes; 6- to 8-year-olds, 15 minutes; 9- to 12-year-olds, 23 minutes. For every hour of television that children view on a weekend day (without their parents present), they spend less time with their parents: 0- to 2-year-olds, 49 minutes; 3- to 5-year-olds, 29 minutes; 6- to 8-year-olds, 25 minutes; 9- to 12-year-olds, 37 minutes.

In terms of siblings, for every hour of television that children view on a weekday (without their siblings present), they spend less time with their siblings: 0- to 2-year-olds, 1 hour and 5 minutes; 3- to 5-year-olds, 1 hour and 34 minutes; 6- to 8-year-olds, 53 minutes; 9- to 12-year-olds, 41 minutes. For every hour of television that children view on a weekend day (without their

TABLE 2 Regression Analyses Predicting Time Spent With Parents and Siblings in Nonmedia Activities

	Age Groups	Weekday			Weekend		
		B	SE	R ²	B	SE	R ²
Time spent with parents: predictors							
TV viewing without parents present	0-2	-.86 ^a	.13	.28 ^a	-.81 ^a	.30	.18 ^a
	3-5	-.75 ^a	.13	.23 ^a	-.49 ^a	.14	.12 ^a
	6-8	-.25 ^a	.10	.12 ^b	-.41 ^b	.08	.25 ^a
	9-12	-.38 ^a	.06	.18 ^a	-.61 ^a	.08	.20 ^a
TV viewing with parents	0-2	-.51 ^a	.15	.23 ^a	-.79 ^c	.47	.16 ^a
	3-5	-.28 ^d	.12	.13 ^a	-.36 ^d	.18	.10 ^b
	6-8	-.03	.09	.09	-.35 ^b	.11	.21 ^a
	9-12	-.20 ^b	.06	.12 ^a	-.43 ^a	.10	.11 ^a
Time spent with siblings: predictors							
TV viewing without siblings present	0-2	-1.05 ^a	.32	.19 ^d	-.52	.35	.14 ^d
	3-5	-1.56 ^a	.29	.21 ^a	-.99 ^a	.30	.16 ^a
	6-8	-.89 ^a	.25	.26 ^b	-1.15 ^a	.30	.11 ^a
	9-12	-.68 ^b	.20	.14 ^d	-1.12 ^a	.17	.19 ^a
TV viewing with siblings	0-2	.74 ^b	.26	.19 ^b	-.14	.31	.14 ^b
	3-5	-.36 ^c	.19	.13 ^d	-.44 ^d	.20	.12 ^a
	6-8	-.51 ^b	.17	.26 ^d	-.34 ^d	.14	.08 ^b
	9-12	-.30 ^d	.12	.13 ^d	.04	.15	.05

Controlling for family income-to-needs ratio, education of household head, maternal average weekly work hours, child gender (0 = boy, 1 = girl), child ethnicity (0 = white, 1 = nonwhite), firstborn (0 = not firstborn, 1 = firstborn).

^a $p < .001$.

^b $p < .01$.

^c $p < .10$.

^d $p < .05$.

siblings present), they spend less time with their siblings: 0- to 2-year-olds, 31 minutes; 3- to 5-year-olds, 59 minutes; 6- to 8-year-olds, 1 hour and 9 minutes; 9- to 12-year-olds, 1 hour and 7 minutes.

The magnitude of these relationships can be compared easily across age groups by transforming the effects into percentages. Figure 1 presents the percentage decrease in each social activity that corresponds to 1 hour of television viewing. For example, an average 9- to 12-year-old spends ~102 minutes on a weekday with his or her parents (Table 1). Watching 1 hour of television corresponds to a reduction in this time of 23 minutes, or ~22%. It can be seen in Figure 1 that the negative relationship between time spent watching television and time spent with parents or siblings is fairly large. In general, for both parents and siblings, the effects are larger during the week than on the weekend. However, an interesting weekend pattern is apparent whereby the effect sizes become increasingly larger by age. Thus, among the 9- to 12-year-olds, time spent watching television without parents or siblings present is displacing almost as much or as much of their time on the weekends as it does during the week. This finding might be exceptionally important considering that 9- to 12-year-olds spend the least amount of time with their parents.

Television Viewing and Time Spent in Other, Developmentally Appropriate Activities

Results of the OLS regression analyses for the relationship between time spent watching television and time

spent reading, doing homework, in creative play, and in active play, respectively, are presented in Table 3.

Time Spent Reading or Being Read to

There were no significant relationships between time spent watching television and time spent reading or being read to.

Time Spent Doing Homework

Time spent watching television was related to slight decreases in time spent doing homework: for every hour of television that children watch on a weekday, 6- to 8-year-olds spend 3 minutes less doing homework and 9- to 12-year-olds spend 7 minutes less. Because 6- to 8-year-olds spent an average of 21 minutes and 9- to 12-year-olds spent an average of 39 minutes doing homework during weekdays, this indicates a decrease of 14% for 6- to 8-year-olds and 18% for 9- to 12-year-olds.

Time Spent in Creative Play

Overall, the regression analyses show a negative relationship between television viewing and time spent engaged in creative play. An hour of television viewing among 0- to 2-year olds was linked to a 9% reduction in play during the week and an 11% reduction during the weekend. For 3- to 5-year olds, the corresponding effects were a 9% reduction on the weekday and 11% on the weekend day. These decreases were about the same in magnitude for 6-8 year-olds (8%) and 9-12 year-olds (9%) on the weekend, although these two older groups

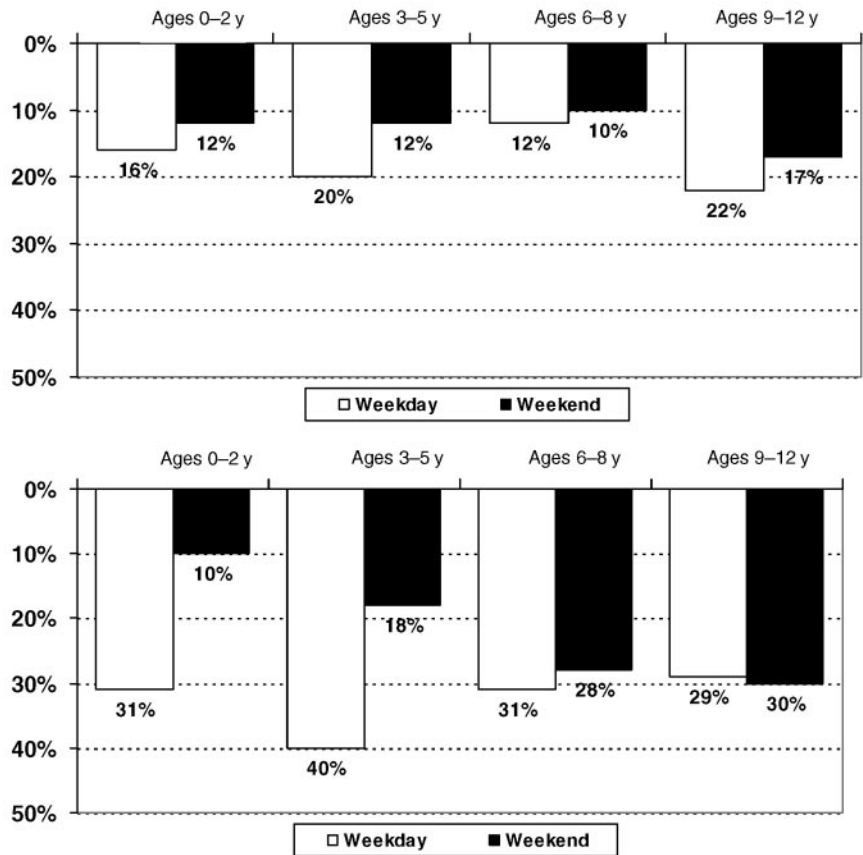


FIGURE 1
Effect sizes: percentage decrease in the number of minutes spent in other activities for every hour of television viewing without parents or siblings, respectively.

TABLE 3 Regression Analyses Predicting Time Spent Reading, Doing Homework, Engaging in Creative Play, and Engaging in Active Play: Television Viewing as Predictor With No Concurrent Criterion Activities

Age Groups	Weekday			Weekend		
	B	SE	R ²	B	SE	R ²
Time spent reading						
0-2	-.01	.03	.09	.01	.02	.05
3-5	-.05	.02	.07	-.02	.01	.05
6-8	-.02	.01	.07	-.04	.01	.06 ^a
9-12	-.03	.01	.08 ^b	-.02	.01	.04 ^c
Time spent doing homework						
0-2	-	-	-	-	-	-
3-5	.01	.01	.05	.01	.01	.03
6-8	-.05 ^a	.02	.09 ^c	.01	.01	.02
9-12	-.12 ^a	.02	.09 ^b	-.02	.01	.03
Time spent in creative play						
0-2	-.39 ^b	.11	.12 ^b	-.48 ^b	.12	.10 ^b
3-5	-.21 ^c	.08	.20 ^b	-.32 ^b	.09	.06 ^c
6-8	-.09	.06	.18 ^b	-.22 ^b	.06	.09 ^c
9-12	-.09 ^a	.04	.07 ^c	-.21 ^b	.04	.08 ^c
Time spent in active play						
0-2	-.08	.05	.04 ^a	-.05	.06	.05 ^a
3-5	-.04	.05	.12 ^b	-.01	.05	.01
6-8	-.13	.06	.17 ^a	-.03	.05	.06 ^a
9-12	-.05	.02	.05 ^a	-.07 ^c	.03	.04 ^a

Controlling for family income-to-needs ratio, education of household head, maternal average weekly work hours, child gender (0 = boy, 1 = girl), and child ethnicity (0 = white, 1 = nonwhite).

^aP < .05.

^bP < .001.

^cP < .01.

of children spent much less time in creative play than did younger children.

Time Spent in Active Play

There were no significant relationships between time spent watching television and time spent in active play, with 1 exception. The more time that 9- to 12-year-olds spent watching television on the weekend, the less time they spent in active play. The size of the coefficient indicates a 4-minute (or 5%) decrease in active play for every hour spent viewing. Although significant, the substantive meaning of this coefficient seems suspect, in part because it is the sole significant coefficient in this analysis and in part because the large sample size renders our ability to find differences (ie, statistical power) very great, even when such differences are small in terms of magnitude.

DISCUSSION

Children's Television Viewing and Family Interaction

In 1999, the AAP recommended eliminating or limiting screen time of very young children, largely on the basis of the assumption that time spent using screen media would interfere with time spent interacting with parents, which is crucial for young children's development.² At the time when this recommendation was made, little empirical evidence existed to support this assumption, mainly because it had yet to be examined. The results of this study are among the first to provide strong empirical support for the assumptions made by the AAP in their screen time recommendations. We found that the more time that children spent viewing television without parents and siblings present, the less time they spent interacting with parents or siblings, respectively.

It is interesting that though the AAP targeted very young children (0- to 2-year-olds), our results indicated that television viewing is equally consequential for the time that older children spend with their parents. It may well be that the developmental consequences of decreased social interaction is dire for very young children, yet because older children (between the ages of 6 and 12) spent relatively less time with their parents and siblings than did the younger children, it is possible that the consequences of viewing may have important developmental ramifications for them as well. The AAP recommendation specifically notes that parental interaction is necessary for proper neurologic development among very young children. Although neurologic development is probably less of a concern for older children, different aspects of well-being are known to be related to parental interaction. For example, evidence suggests that positive interactions with parents is negatively related to engaging in problem behavior among early-adolescent children.^{14,15}

Children's Television Viewing and Reading

We found no evidence that electronic media use was related to time spent reading or being read to for children between the ages of 0 and 12. Of course, for a time trade-off to occur, there needs to be time spent to trade. The descriptive analyses indicated that children spent very little time reading or being read to. On a weekday, the 2 youngest groups spent ~15 minutes reading, whereas the 2 older groups averaged only 10 to 11 minutes reading. These averages were roughly the same on the weekend day for the 2 youngest groups, although they increased slightly (to ~17 minutes) for the 2 oldest groups.

Our findings are in line with other empirical evidence in this area. Despite the popular belief that television viewing has contributed to the general lack of reading among the American public, there exists surprisingly little empirical evidence to support this notion. Examinations of time spent reading before and after the advent of television suggests that the time that children spend reading has remained relatively stable through the years.¹⁶ A major study that compared 10 communities with or without television revealed that television viewing had the greatest impact on other media use, such as comic reading, listening to the radio, and going to the movies.¹⁷ Television viewing had little influence on the time that children spent reading books or doing homework, even during its early introductory stages. Unfortunately, it seems that children spent little time reading before the advent of television, and they spend little time reading now.¹⁶

Leisure reading is embedded in a complex context that includes the home environment, parent and teacher nurturance, the child's own intelligence and motivation, and reciprocal interactions among these factors.¹⁶ It may well be that American children are not reading enough, but to believe that increases in reading can be achieved by unplugging the television seems to be an unsubstantiated oversimplification.¹⁸

Children's Television Viewing and Homework

There was some evidence that television use is negatively related to time spent doing homework. Among 6- to 8- and 9- to 12-year-olds, television viewing on weekdays was negatively related to time spent doing homework. Because children did not spend much time doing homework, these relationships were fairly large. Among 6- to 8-year-olds, the found decrease of 3 minutes of homework time for every hour of television viewed amounted to a decrease of 14% in the average amount of time that they spent on homework, whereas among 9- to 12 year-olds, the found decrease of 7 minutes of homework time for every hour of television amounted to an 18% decrease in the average amount of time that they spent doing homework during the week. These results suggest that families would do well to bar (or at

least severely limit) television viewing among school-aged children on school nights.

Children's Television Viewing and Creative Play

Besides social interaction, television viewing showed the largest negative relationship with the time that children spent in creative play. This was especially true for the 2 younger age groups in our sample but was also true for children of all ages on the weekend. Recall that these activities are mainly activities that one does inside, including board games, pretend play, arts and crafts, etc. One interpretation of this finding is that the ease of television viewing as an activity may in some sense "trump" these other inside activities, which require some preparation time. By this, we mean that to play a board game, for example, one first has to decide on the board game, find it, and set it up. In addition, at the end of the activity (or at least at some point in the future), one has to clean it up or put it away. This is not true for television viewing, which requires simply that one turn it on to begin and turn it off to end (no set up or clean up required).

Television has long been charged with deleterious effects on children's creativity. Although these data cannot address whether time spent in creative play enhances children's creativity, they do indicate that children trade off time spent in creative play for television viewing. In this vein, our findings are in line with experimental research examining the impact of television on children's creativity in rural Canada. Specifically, Williams¹⁹ and her colleagues found that children who lived in a community with no television initially had higher scores on a measure of creativity than children with access to either a single television channel or multiple channels. Once television was introduced, however, the creativity scores of these children dropped to levels similar to those of children with television.

Children's Television Viewing and Active Play

We found no evidence that television viewing and time spent in active play were related, either negatively or positively. Moreover, unlike time spent reading, children spent enough time in active play for some relationship to exist. Although it may be tempting to dismiss these findings as an aberration, a number of studies have failed to find a relationship between children's physical activity and their television use. Using large epidemiologic samples, Robinson and Killen²⁰ reported no relationship between physical activity and television viewing. Similarly, Robinson et al²¹ and DuRant et al²² both reported a negative but weak association between television viewing and physical activity. Even Robinson's²³ randomized, controlled experiment showing reductions in children's adiposity with reductions in television viewing did not find commensurate changes in physical activity. Thus, although these findings are, to date, the

strongest evidence available supporting the notion that reducing television time can reduce adiposity in children, the mechanism linking television viewing with childhood obesity remains open to interpretation.

These findings have important implications for the notion that television viewing has contributed to the obesity epidemic among American children via its impact on physical activity. Although it is true that children of all ages spent far less time in active play than in other types of activities (except reading and homework) and that the older children spent less time in active play than the younger children (similar to the findings of others), our findings do not support the notion that active play time is negatively related to television viewing.

Given the dire problem of childhood overweight in this country, it seems reasonable to assume that American children are not active enough. The question at hand is whether television is playing a role in this or not. These findings can be added to others suggesting that, perhaps, reduction of physical activity is not 1 of the mechanisms by which television is contributing to childhood obesity.

Television viewing may be contributing to childhood overweight in other important ways. Two possibilities include increased caloric consumption through eating while watching television or the influence of televised advertising. More than 60% of televised advertising to children is food related.²⁴ There is a plethora of evidence that such advertising works, and it works well: food advertising is related to increased requests by children to parents for such products, as well as increased parental purchase of such products.²⁵⁻²⁷ It may be that television is implicated in the childhood obesity epidemic in the United States. If this is true, then it behooves public health scholars to understand the ways in which it is implicated, as well as the ways in which it is not.

Limitations

The notion of time trade-off or displacement as it applies to television viewing rests on 2 fundamental assumptions: (1) that the relationship between time spent in 2 different activities is essentially zero-sum (thus time spent viewing television means less time available for another activity) and (2) that children would be engaged in more appropriate (eg, social interaction, educational, physically active) activities if they were not watching television. However, the cross-sectional nature of most studies on displacement make establishing causal influences impossible.¹⁶ This limitation exists in these data as well. The findings reported here are relevant to the magnitude and the direction of the relationship between television viewing and time spent in other activities, but they cannot untangle direction of effects. Thus, for example, we cannot assume that if children were not watching television they would be spending more time interacting with their parents or siblings or that they

would be spending more time doing homework or more time in creative play. Although these assumptions seem likely, they remain to be verified. However, it is also possible that the relationship between television viewing and social interaction may simply be a “marker” of an overall family style or of the nature of certain parent–child relationships, such that even if the television were off, family members would find other activities to perform separately. Again, this possibility warrants additional examination.

In addition, we note that one must be careful not to assume that all time spent with parents will be “good time.” There is a large body of evidence indicating that when parents are under stress, their interactions with their children are not always optimal.^{15,28} In fact, in other analyses, we have found evidence that when parents are under stress, they might be better off putting their children in front of the television to watch high-quality educational programming than interacting with them.²⁹ Although perhaps unfortunate, this is simply a reality of family life in America today.

CONCLUSIONS

Lamenting about the amount of time that American children “waste” watching television is so common that it almost rates as a national pastime. Pundits, policy makers, politicians, teachers, and parents all have bemoaned that the time that children spend watching television comes at the cost of what is widely viewed as time better spent. Among other things, television viewing has been charged with interfering with the time that children spend interacting with parents and siblings, reading, doing homework, engaging in creative play, and engaging in physically active play. There is an annual “national turn-off-the television week,” and parenting books with “TV Free” in their titles abound.^{30–32}

On the one hand, it seems that at least some of the vilification of television is deserved. For example, a large body of research has converged on findings that viewing television violence affects both short-term and long-term aggressive behavior.^{33–35} Along these lines, our results suggest that the AAP was right to be concerned that time spent viewing would be negatively related to the time that children spend interacting with their parents. We found a consistent pattern of fairly large negative relationships among television viewing and time spent interacting with both parents and siblings. Clearly, then, some of the concerns regarding the impact of television viewing on children are justified. On the other hand, some of the concerns and assumptions regarding television have received little empirical support. We found little evidence that time spent watching television is negatively related to time spent reading or time spent in active play.

Our own view is that, much like automobile use, television use has become part of the fabric of daily life

in America. Moreover, it seems doubtful that this will change anytime in the near future. Thus, it behooves public health scholars to examine and document carefully the ways in which television may have deleterious effects on daily life and health, as well as the ways in which it has little or no effect.

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Time Well Spent? Relating Television Use to Children's Free-Time Activities

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