

Background Television in the Homes of US Children

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television, children, media, child development, survey

ABBREVIATIONS

TV—television

US—United States

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WHAT'S KNOWN ON THIS SUBJECT: Exposure to background television (ie, times when the television is on but the child is attending to another activity) is negatively associated with children's cognitive functioning and social play.



WHAT THIS STUDY ADDS: US children (8 months to 8 years) are exposed to nearly 4 hours of background television on a typical day. Younger children and African American children are exposed to more background television. Family behaviors associated with background television are offered.

abstract



OBJECTIVE: US parents were surveyed to determine the amount of background television that their children are exposed to as well as to isolate demographic factors associated with increased exposure to background television. After this, we ask how certain home media practices are linked to children's background television exposure.

METHODS: US parents/caregivers ($N = 1454$) with 1 child between the ages of 8 months and 8 years participated in this study. A nationally representative telephone survey was conducted. Parents were asked to report on their child's exposure to background television via a 24-hour time diary. Parents were also asked to report relevant home media behaviors related to their child: bedroom television ownership, number of televisions in the home, and how often a television was on in the home.

RESULTS: The average US child was exposed to 232.2 minutes of background television on a typical day. With the use of multiple regression analysis, we found that younger children and African American children were exposed to more background television. Leaving the television on while no one is viewing and children's bedroom television ownership were associated with increased background television exposure.

CONCLUSIONS: Although recent research has shown the negative consequences associated with background television, this study provides the first nationally representative estimates of that exposure. The amount of exposure for the average child is startling. This study offers practitioners potential pathways to reduce exposure. *Pediatrics* 2012;130:839–846

Television's role in shaping children's development has long been a focus for researchers and pediatricians. Research on children and television has typically investigated the amount of direct (ie, foreground) exposure the average child experiences. Foreground exposure estimates indicate that the average US child between birth and 6 watches ~80 minutes of television on a typical day.¹ Research on the outcomes of direct exposure reveals that the effects of television are content based. Developmentally inappropriate television featuring violent^{2,3} or sexualized content⁴ is associated with negative outcomes, whereas prosocial⁵ and educational content⁶ is associated with positive effects.

Recent research suggests that researchers and practitioners would be wise to consider the effect that background television exposure (ie, times when the television is on in the immediate vicinity of the child, but he/she is participating in other activities) has on children. Background television exposure has been linked to lower sustained attention during playtime,⁷ lower-quality parent-child interactions,⁸ and reduced performance on cognitive tasks.^{9,10} Despite these concerning findings, researchers do not have reliable estimates of the prevalence of background television exposure in US homes. This research addresses this gap by providing estimates from a nationally representative survey of US families. Demographic correlates of background television exposure are explored with these families. We then investigate whether and how select home media practices, previously linked to increased foreground exposure,¹¹ are associated with children's background exposure. By understanding how home media practices correlate with background exposure, we are able to offer potential avenues for reducing children's exposure.

METHODS

Participants

After receiving approval from the sponsoring institution's institutional review board, a company specializing in telephone surveys administered the survey. The company collected a representative sample of 1454 English-speaking US households with at least 1 adult who was the primary caregiver for a child between 8 months and 8 years (maximum age = 96 months).

Design

A cross-sectional survey that used a disproportionate stratified random digit dialing procedure was used. Administration occurred between January and March 2009. Interviews were stratified to increase the incidence of households with children younger than 8 years of age. In households where the adult was the primary caregiver for more than 1 child between 8 months and 8 years of age, the target child was selected by randomly asking the respondent to answer questions about either the child with the most recent or the next birthday. The response rate (39.1%) was similar to other nationally representative survey research that has assessed media use among young children.¹²

Data were weighted to adjust for the fact that not all respondents were selected with the same probability and to account for gaps in coverage and nonresponse biases. Design weights were used to compensate for the known biases from telephone interviewing, in general, and the unique sample design of the survey, specifically. The resulting design weights were poststratified along several dimensions obtained from the 2009 national estimates of the Census' American Community Survey (see Table 1).

Procedure

After eligibility screening and informed consent, parents were asked a series

of questions including household demographics, the target child's media use, and the home media environment. They also completed a 24-hour time diary designed to capture either a typical weekend day ($n = 698$) or a typical weekday ($n = 756$). On average, participants required 50 minutes to complete the survey with the majority completing the survey via landline (about 96%). Participants were provided with contact information for the study coordinator and the institutional review board.

Measures

Demographic Factors

Respondents reported on a number of demographic variables including child's race (white, African American, Asian, Hispanic, mixed, and other); child's Latino/a ethnicity (0: no, 1: yes); caregiver education (22-point scale designed to approximate the years of formal education for caregivers ranged from 0 [did not go to school] to 22 [PhD, MD, JD]); child's age (in months); family income status (ie, income-to-needs ratio whereby the family income is divided by the poverty threshold associated with family size¹³: 1, income/needs ratio under 1; 2, income/needs ratio between 1 and 2; 3, income/needs ratio between 2 and 3; 4, income/needs ratio between 3 and 4; 5, income/needs ratio over 4); family structure (0, multiparent family; 1, 1-parent family); and child gender (0, girl; 1, boy).

Home Media Practices

The home media practices included whether the child had a television in his/her bedroom (0, no; 1, yes), number of televisions in the home, and how often the television is on even when no one was watching it (0, never; 5, always).

Background Television Exposure

To date, there is no consensus among researchers as to how background

TABLE 1 Sample Breakdown by Demographic Categories

Demographic Category	% or M (95% CI)
Gender	
Female	48.1
Male	51.9
Latino status	
Yes	22.2
No	77.4
No response	0.4
Race	
White	71.1
African American	14.0
Mixed	6.1
Hispanic	3.4
Asian American	2.7
Other	2.7
Age	
8 mo to 2 y	19.1
2–4 y	28.1
4–6 y	26.5
6–8 y	26.3
Family structure	
Single-parent home	17.8
Multiple-parent home	81.9
No response	0.3
Family income (income-to-needs ratio)	
Average income-to-needs ratio	3.87 (3.48–4.25)
<1.0	12.8
1.0–1.99	19.4
2.0–2.99	18.8
3.0–3.99	11.7
≥4.0	34.4
No response	2.9
Average caregiver education	14.32 (14.07–14.58)
High school degree or less (12 y or fewer)	31.2
Some college to college graduate (12+ to 16 y)	48.6
Postgraduate education (16+ y)	20.2

CI, confidence interval; M, mean.

television exposure should be measured. In some research,¹² a single survey question (“how often is the television on even when no one is watching?”) with the use of a Likert response option has been used. In other work, researchers^{7–10} have operationalized background television exposure by assessing the proximity of the television to the research subject while the subject was engaged in an alternative activity. For this research, we wanted to obtain a more accurate

temporal account of background exposure than a single survey question could provide as well as ensure that our measure was broad enough to include different forms of background exposure. To do this, a 24-hour time diary was administered. Time diaries are among the best methodologies for capturing those activities that are typically completed on a daily basis¹⁴ and have demonstrated reliability and validity.¹⁵ The diary was adapted from the one used within the Child Development Supplement to the Panel Survey of Income Dynamics and designed to capture all of the target child’s activities during the previous typical day.

For the time diary, the interviewer began with: “I would like you to think about what your child did yesterday [or other typical day if parent indicated different day as typical]. I’m going to fill out a time diary to detail your child’s entire 24-hour day. For some of the activities that you mention, I will ask related follow up questions. We would like you to include activities such as grooming, eating, sleeping, and traveling from place to place.” The interviewer then asked the first question, “Let’s start with 12:01 AM on [insert day]. What was your child doing? And what time did it end?” Up to 2 activities could be reported for any given time slot. The interviewer continued until the respondent indicated that the child went to sleep for the evening.

For each activity (with the exception of when the child was not in the same location as the parent, or when the child’s primary activity was watching television), parents were asked “was there a TV on in the background while CHILD [insert activity]” (see Supplemental Table 5 for information about the primary activities occurring during background television exposure). Given the cost and time constraints of capturing background television content, we

omitted measurement of background television content. The durations of time when the parent reported that there was a television on in the background were summed to create a total estimate of background television exposure (in minutes) for a typical day.

Analytic Approach

Analysis of variance models were computed to explore whether demographic variables were associated with differing levels of background exposure (corrections were made to significance levels for multiple comparisons¹⁶). We used multiple regression analysis to predict background television exposure from these demographic variables (the income-needs ratio and caregiver education variables were used as continuous variable rather than categorical in the regression analysis). Home media practices were then added to examine relations between them and background television exposure controlling for the demographic variables. The survey weight correction in Stata was used for all analyses to eliminate problems arising from incorrect SE estimations.¹⁷

RESULTS

Table 1 presents descriptive statistics for the sample across demographic variables. There were some incidences of missing data in the sample. Forty-two participants provided insufficient data to assess income status, 6 families did not indicate whether they or their child was Latino, and 5 families did not report whether other parents lived in the home.

Table 2 presents background television exposure by demographic variables. Overall, children between 8 months and 8 years were exposed to an average of 232.3 minutes of background television on a typical day (95% confidence interval [208.6–256.1]). As children get older, they are exposed to less

background television (TV), $F(3,1451) = 9.67, P < .001$. Children under 24 months were exposed to an average of 5.5 hours of background TV per day, while the oldest children (6–8 years) were exposed to less than half that amount, 2 3/4 hours. Children living in single-parent homes were exposed to >5 hours of background TV per day versus about 3.5 hours for children living in multiparent homes, $F(1,1449) = 4.70, P < .05$. Family income was inversely linked to background exposure, $F(4,1408) = 6.74, P < .001$. Children from the poorest families were exposed to nearly 6 hours of background TV on a typical day versus 3.5 hours for children whose income-to-needs ratio was above the poverty threshold. Moreover, as parent education increased, background TV exposure decreased, $F(2,1452) = 17.89, P < .001$. Children of caregivers with the greatest amount of formal education were exposed to <2.5 hours of background TV, whereas children of parents with high school diplomas or less were exposed to >5 hours on a typical day. Last, the test for differences in background exposure for children of varying races was significant, $F(5,1449) = 2.31, P < .05$. Pairwise comparisons revealed only 1 difference across all racial groups. African American children were exposed to marginally more background TV than white children (5.5 hours versus 3.5 hours). Neither gender ($F(1,1453) = 0.04, P = .84$) nor child ethnicity ($F(1,1448) = 0.18, P = .67$) were associated with background television exposure.

All demographic variables were then submitted to an ordinary least squares regression predicting background TV exposure (see Table 3). The overall model was statistically significant, $F(11,1394) = 5.37, P < .001, R^2 = 0.11$. When controlling for all other demographic variables, exposure to background TV was highest for younger children, African American children,

TABLE 2 Background Television Exposure in Minutes by Demographic Category

Demographic Category	M	(95% CI)
All	232.3	(208.6–256.1)
Gender		
Female	234.9	(202.4–267.4)
Male	229.9	(195.5–264.4)
Latino status		
Yes	243.4	(184.7–302.1)
No	229.6	(204.0–255.2)
Race		
White	217.5 [@]	(190.2–244.8)
African American	338.1 [#]	(256.4–419.9)
Mixed	237.4	(159.0–315.9)
Hispanic	179.6	(107.9–251.2)
Asian American	147.6	(48.8–246.5)
Other	214.1	(140.3–288.0)
Age		
8 mo to 2 y	332.4 ^a	(277.2–387.6)
2–4 y	261.5 ^c	(210.8–312.1)
4–6 y	198.2 ^b	(156.0–240.5)
6–8 y	163.0 ^{b,d}	(126.6–199.2)
Family structure		
Single-parent home	305.1 ^a	(228.4–381.7)
Multiple-parent home	216.6 ^b	(193.3–239.8)
Family income (income-to-needs ratio)		
< 1.0	355.7 ^a	(282.6–428.7)
1.0–1.99	274.4	(214.0–334.8)
2.0–2.99	238.3	(184.7–291.9)
3.0–3.99	165.2 ^b	(123.5–207.0)
≥4.0	181.8 ^b	(143.0–220.5)
Caregiver education		
High school degree or less	313.0 ^a	(259.8–366.1)
Some college to college graduate	218.8 ^b	(186.6–251.1)
Postgraduate education	140.5 ^c	(112.8–168.3)

Means with differing pairs of letters [(a,b) and (c,d)] are significantly different at $P < .05$. Means with differing pairs of symbols (@,#) are marginally different at $P < .10$. CI, confidence interval; M, mean.

and children of parents with less formal education.

Our final analysis explored whether certain media practices in the home were linked to background exposure while controlling for the demographic variables. These practices were the number of televisions in the home, the presence of a television in the child's bedroom, and the frequency that televisions were left on in the home even when no one was watching. The addition of these variables accounted for significant variance in the model, $\Delta F(3,1388) = 73.58, P < .001, \Delta R^2 = 0.22$. The presence of a television in the child's bedroom and the increased incidence of keeping a television on in the home predicted significantly greater exposure to background TV (see Table 4).

DISCUSSION

This article catalogs the amount of background television young children in the United States are exposed to on a typical day. Background exposure has not garnered the same research attention that foreground television exposure traditionally has, with only a handful of studies examining this phenomenon. Recent studies suggest that researchers and practitioners should be concerned about the impact it has on children's development and well-being.^{7–10} Our results indicate that children are exposed to a tremendous amount of background TV. The average US child <8 years is exposed to just <4 hours (232.2 minutes) of background television on a typical day. This level of exposure easily dwarfs foreground

TABLE 3 Ordinary Least Squares Regression Predicting Background Television Exposure

Variables	B	SE	β
Constant	549.41	76.61	
Child gender (female = 1)	-26.89	23.09	-0.049
Child age (in months)	-2.25	0.42	-0.207 ^a
Child ethnicity (Latino = 1)	7.96	34.83	0.012
Single-parent home	33.74	42.41	0.046
Child race			
African American	100.69	41.19	0.124 ^b
Asian American	7.14	47.02	0.004
Hispanic	-75.51	43.90	-0.050 ^c
Mixed	7.33	45.26	0.006
Other	-15.17	39.10	-0.009
Family income	-4.68	3.09	-0.068
Caregiver education	-13.13	4.45	-0.137 ^d

^a $P < .001$.^b $P < .05$.^c $P < .10$.^d $P < .01$.

television exposure as estimates indicate that the average US child is exposed to ~80 minutes of television on a typical day, or ~3 minutes of background exposure for every minute of foreground exposure.¹⁸

Demographic Correlates of Background Television Exposure

Child's age is the most robust correlate of background television exposure with the youngest children (those children between 8 and 24 months) in our sample exposed to >5.5 hours of background television on a typical day. This is particularly startling when considering how much attention is paid to reducing direct exposure for

TABLE 4 Ordinary Least Squares Regression Testing Influence of Home Media Behaviors on Background Television Exposure

Variables	B	SE	β
Bedroom television	60.58	29.30	0.107 ^a
No. of televisions in home	-5.71	9.12	0.050
How often television is on	62.27	9.19	0.325 ^b

Model controlled for child gender, child age, child ethnicity, family composition, child race, family income, and caregiver education.

^a $P < .05$.^b $P < .001$.

children in this age group. For example, the American Academy of Pediatrics¹⁹ renewed their recommendation that children <2 years of age should not be exposed to any televised content. Based on the findings of this study, it seems that efforts might be better served by targeting infants' and toddlers' indirect exposure given that indirect exposure makes up a considerable segment of the child's day.

At present, no specific research has investigated the reasons why background TV exposure is so high for infants/toddlers. It may be that parents of these children are looking for extra stimulation when home with their young children.²⁰ Spending time alone with a nonverbal or preverbal child can be isolating, and, as a result, parents may be turning the television on to fill their home with additional stimulation. It may also be that parents do not count background exposure as exposure. It has only been within the past few years that media researchers have begun looking at the phenomenon, both in trying to understand how much children are exposed to¹¹ and the consequences associated with exposure.⁸ Parents of the youngest children in our study may believe that their child cannot understand the onscreen content or is not affected by it (D.L.L., R. Barr PhD, unpublished raw data). Research is needed to identify whether these or other alternative reasons predict infants' and toddlers' heightened exposure to background television. Identifying these reasons will provide useful information for the development of background television reduction interventions.

In addition to young children, we also found that African American children, children from low-income families, children living in single-parent households, and children of parents with less formal education were exposed to increased levels of background television. This is concerning because past

research has shown that children from these demographic groups are typically at risk for other social and cognitive problems.²¹ For example, African American children and children from low-income households are more likely to struggle with self-regulation²² and have higher rates of obesity.^{23,24} These children are also more likely to live in homes where traditional foreground television exposure plays a greater role during the day.^{1,25,26}

Family income and family structure were both nonsignificant predictors of background television when all demographic correlates were included in the regression analyses. The change in significance for both family income and family structure is likely attributable to the intercorrelations between these variables and child race and/or caregiver education. Our study and other research confirm that African American children and children of parents with less education are more likely to live in low-income and single-parent homes.^{27,28} Maintaining the significant relation between race, education, and exposure after covarying income and family structure suggests that child's race and caregiver education are the primary drivers in the observed relationships. Similar conclusions have been reached in other studies where either race or education were included as predictors of home media behaviors. For example, a number of studies investigating African American families have revealed that children in these homes view more TV than their non-African American peers,^{1,26,29,30} whereas studies looking at bedroom television ownership have shown that lower parent education is a strong predictor of ownership.* These findings suggest that attention should be paid to designing intervention messages

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focused on background TV exposure reduction that resonate with African American families as well as parents with less formal education.

Behaviors Associated With Background Television Exposure

Although the research base concerning background television exposure needs to grow both in terms of understanding exposure and outcomes related to exposure, the current state of the literature combined with the exposure estimates presented here suggest that medical practitioners would be well advised to discuss with parents the potential consequences of background television exposure. To that end, our study also provides medical professionals and practitioners information they might give families on ways to reduce children's background television at home. Specifically, we find that bedroom television ownership and, unsurprisingly, keeping the television on while no one is watching are both associated with increased background exposure.

The presence of a television in a child's bedroom has already been linked to a number of negative outcomes including academic underperformance,^{25,31} difficulty regulating sleep,³² and higher obesity rates.³³ Linking bedroom television ownership to increased background television exposure further underscores the continued need for parental recommendations that advocate the removal of the television from children's bedrooms.

Perhaps a more substantial way to help reduce background exposure would be to advise parents to turn the television off when it is not being watched. The strongest predictor of background television exposure was whether parents reported that the television was continually left on. Although it may seem tautological to suggest this, it is a simple behavior that pediatricians and

public policy advocates can encourage families to follow.

Last, although not evaluated in this study, a potential avenue for reducing background television exposure may be to remind parents to be mindful of their own viewing. This may be particularly effective for parents of the youngest children who may not see their own direct exposure as having an impact on young children or may be using the television for companionship.²⁰ Although more research is needed on how parental television viewing correlates with children's background television exposure, medical practitioners may wish to remind parents how their own media exposure can affect their children. Considering the rates of background television exposure that we found along with the negative associations that other researchers have found between background television and cognitive and social outcomes, any effort to decrease background exposure seems worthwhile.

Limitations

There are 3 important limitations associated with our study. First, we were limited to households where at least 1 adult was a fluent English speaker. Thus, ~2% of all homes in our targeted sample were ineligible to participate (S. Sherr, personal communication, January 21, 2009). The decision to exclude non-English-speaking homes was driven by the prohibitive costs associated with translations and interview training. Second, data were based on the response of 1 parent. Although some large-sample studies have used multiple voices as a means of triangulation and verification, this is quite costly and was not a feasible option for this survey. We attempted to alleviate this concern by ensuring that the interviewee was the individual who spent "most of the time directly caring for the child." Given that the

responding parent was reporting only what he/she could accurately report and that these estimates reflect home exposure only, it is likely that our estimates presented here underestimate the total amount of time young children are exposed to background television.

The third limitation centers on our primary dependent measure. This is the first study that has sought to quantify the amount of background television US children are exposed to and represents an important first step; yet more work needs to be done to improve our understanding and measurement of background television. As scholars interested in foreground exposure have noted, measuring media exposure is a difficult endeavor with many issues to consider.³⁴ Our measure of background television exposure was adapted from an existing, validated measure of foreground media exposure and extensively piloted. However, no formal tests of the instrument's reliability or validity were conducted. Studies that seek to validate this approach or provide alternative measurement approaches would be valuable. For example, direct observations of children will likely be a useful way to further document background television exposure as well as provide exploration of background television content.

CONCLUSIONS

Research on background television exposure suggests that its prevalence in young children's everyday life is concerning and warrants further study. Future research should investigate whether and how differing content types of background television affect children. One study has taken the first step to ascertain the role of background television content with infants,³⁵ but additional work is needed. Researchers should also make an effort to identify how children's age may moderate the

relationships between background television exposure and measured outcomes. Previous research has demonstrated that background television exposure has a negative effect on infants/toddlers^{7,8} as well as adolescents,^{36,37} but the effect of background television on children between these 2 age groups is unclear. Last, and perhaps most critically, researchers must come to a consensus about how background television exposure is operationalized and measured. We operationalized background exposure in the same manner that has been used in

previous experimental research^{8,36,37} (ie, that a television was on in the vicinity of the child) but there are important questions regarding the extent to which content should be considered in our conceptualization, what is meant by "vicinity" (eg, the same room, the general household), and if the salience of the exposure is important.

The work presented here establishes the pervasiveness of background TV; that is, the average child between 8 months and 8 years of age is exposed to nearly 4 hours of background television

on a typical day. Even more concerning is that children <2 years of age and African American children are exposed to 42% and 45% more background TV, respectively, than the average child. Attempts to reduce background TV exposure can start with both knowledge about what it is and simple recommendation for behavior change such as turning off the TV when no one is watching or taking smaller steps to reduce exposure by turning off background TV at key points during the child's day (eg, bedtime, mealtime).³⁸

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RED IS DEAD: *The tomato in the supermarket looked too perfect: round to oval, symmetric, bright red, and firm. While a little suspicious, I bought a few in anticipation of making a tomato and mozzarella salad. Practically nothing beats the taste of fresh buffalo mozzarella on top of a thick slice of a fresh tomato lightly sprinkled with salt, pepper, and good olive oil. Alas, my suspicions were not unfounded. The mozzarella was superb, but I could hardly taste the tomato. I knew that tomatoes are often picked green and then shipped across the country in refrigerated trucks—both of which destroy the flavors of a tomato. Still, why did this tomato (and so many others) look so good yet remain tasteless. As reported in The New York Times (Science: June 28, 2012), a gene mutation is the culprit. Evidently, a chance genetic mutation 70 years ago led to inactivation of one of the genes involved in ripening. One effect of the mutation is that the tomatoes turned uniformly red when ripened. Consumers and growers alike like uniformly red tomatoes so the mutated gene was bred into almost all commercial tomato plants. Not until recently did investigators learn of another consequence: the mutation inactivated genes critical to the production of sugars and carotenoids, both of which are important to developing flavorful tomatoes. In a nifty piece of genetic engineering, researchers were able to create tomatoes that kept the uniform ripening induced by the original genetic mutation intact but also turned on the disabled genes involved in sugar and carotenoid production. The resultant tomatoes turned a dark green color before ripening and had 20 to 30 percent more sugars and carotenoids. Unfortunately, researchers could not claim the tomatoes tasted better. Because the Department of Agriculture forbids consumption of experimental foods, nobody was allowed to taste the tomatoes. Such genetically modified tomatoes are unlikely to be seen on food shelves any time soon. For consumers desiring good tasting tomatoes, the best current option is to buy heirloom tomatoes. Many of these very old strains do not have the genetic mutation causing uniform ripening and so are quite flavorful indeed.*

Noted by WVR, MD

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