Abstract

Research has shown the negative consequences associated with children's exposure to background television. Despite this evidence, researchers do not have reliable estimates of the prevalence of background television in American homes. This study sought to address this gap by providing the first nationally representative estimates of exposure. American parents (N = 1454) were surveyed to determine the amount of background television that their children (ages 8 months to 8 years) are exposed to as well as isolate demographic factors associated with this exposure. We also investigated how certain home media practices are linked to exposure. Results indicate that the average American child is exposed to 232.2 minutes of background television on a given day. Younger children and African American children are exposed to more background television. Lastly, leaving the television on even when no one is viewing and children's bedroom television ownership are associated with increased background television exposure.

Background Television in the Homes of American Children

Television's role in shaping children's development has long been a focus for researchers, child advocates, pediatricians and policy makers. Research on children and television has typically investigated the amount of direct exposure the average child experiences (i.e., the time that children watch television as their primary activity). Foreground exposure estimates indicate that the average American child between birth and six watches approximately 80 minutes of television on a typical day (Rideout & Hamel, 2006). Research on the outcomes of direct exposure reveals that the effects of television are content-based. Developmentally inappropriate content featuring violent (C. A. Anderson & Bushman, 2001; Huesmann, Moise-Titus, Podolski, & Eron, 2003) or sexualized content (Brown et al., 2005) is associated with negative outcomes while prosocial (Mares & Woodard, 2005) and educational content (D. R. Anderson, Huston, Schmitt, Linebarger, & Wright, 2001) is associated with positive effects.

Recent research suggests that researchers and practitioners would also be wise to consider the effect that background television exposure (i.e., times when the television is on in the immediate vicinity of the child but he/she is attending to another activity) has on young audiences. Increased exposure to background television has been linked to lower sustained attention during playtime (Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008), fewer and lower-quality parent-child interactions (Kirkorian, Pempek, Murphy, Schmidt, & Anderson, 2009), and reduced performance on cognitive tasks (Armstrong & Chung, 2000; Armstrong & Greenberg, 1990). Despite this recent focus on the effects of background television exposure, researchers do not have reliable estimates of its prevalence in American homes. This research addresses this gap by providing estimates from a nationally representative survey of American families. Demographic correlates of background television exposure are explored with these

families. Additionally, this study evaluates whether and how certain home media practices previously linked to increased foreground television exposure are associated with children's background television exposure (Vandewater et al., 2005). By understanding how home media practices correlate with background television exposure, we are able to offer potential avenues for reducing young children's exposure.

Conceptualizing Background Television

When investigating background television, it is important to understand how background television is being operationalized. Previous work has often focused on more ambient types of television exposure in the home. For example, some research has relied on ordinal responses to the question 'how often is the television on in the home, even when no one is watching it' to measure background television exposure (Rideout, Vandewater, & Wartella, 2003; Vandewater et al., 2005). Unfortunately, this measure of background exposure does not offer a way to obtain ratio-level exposure estimates (e.g., 30 minutes, 2 hours) nor does this measure differentiate between homes where there is a great deal of direct foreground viewing and homes where the television is on as background noise.

In the current study, we defined background exposure as the amount of time (ratio-level) that the television was on in the immediate vicinity of the child while the child was engaged in another activity. For example, if the parent reported that the child's primary activity was playing with a sibling or reading, we asked if there was a television on in close proximity to the child. One benefit of this measurement approach is that it allows for a direct quantification of children's background exposure. It also maps onto how background television has been operationalized in experimental studies with both adults (e.g., (Armstrong & Chung, 2000; Armstrong & Greenberg, 1990) and children (e.g., (Schmidt et al., 2008) (Kirkorian et al., 2009).

Background Television and the Developing Child

The research base on the effects of background television has shown that background television exposure negatively affects performance on a range of academic and cognitive tasks. In a series of studies, Armstrong and colleagues tested the effect of background television on college students' performance on various cognitive tasks. The researchers found that the presence of background television resulted in decreased performance on reading comprehension tasks, cognitive flexibility tasks, memory tasks, and non-verbal problem solving tasks. The effects, however, were only present when the tasks were considered 'difficult' (Armstrong, 1993; Armstrong, Boiarsky, & Mares, 1991; Armstrong & Chung, 2000; Armstrong & Greenberg, 1990). Other research suggests that background television effects are personality-dependent, with introverted adults having more difficulty with background television presence during task performance than extroverted adults (Furnham, Gunter, & Peterson, 1994).

Studies looking at the influence of background television on young children are quite sparse. To date, there have only been a handful of studies that have tried to link background television exposure to cognitive or academic outcomes. Vandewater et al.(2005) used a nationally representative sample of children between the ages of 6 months and 6 years to test whether children in heavy media use households (i.e., households that were ostensibly also higher exposure homes for background television) were less likely to read and whether they had more difficulty with reading. Results showed that children in heavy media households were less likely to read in their free time (for the children 3 and older) and had greater rates of illiteracy.

There is also evidence to suggest that the disruptive effects associated with background television appear to negatively impact parent-child interactions. In one study, young children and their parents were first asked to play with one another while a television was left on in the

background. Following this, they were asked to play while the television was turned off. In those instances when the television was left on, the play between parent and child was less elaborate and less frequent. The researchers concluded that background television significantly affects the quality of parent-child interactions because both parents and children are distracted by the television during interactions, subsequently leading to less effective family communication (Kirkorian et al., 2009).

Lastly, there is evidence to suggest that background television exposure is disruptive for very young children. Schmidt et al. (2008) found that, when a child is engaged in primarily non-viewing activities, background television hinders the child's attention and ability to carry out the primary task. This research supports other findings which have shown that children will orient towards the television when there are unusual noises or unexpected sound effects (Reeves, Thorson, & Schleuder, 1986; Richards & Cronise, 2000).

The Current Study

While the research linking background exposure to negative cognitive outcomes is accumulating some measure of empirical backing, the purpose of the current study was to establish estimates regarding the pervasiveness of background television exposure for children. Using data from a nationally representative survey of 1,454 American parents with at least one child between the ages of 8 months and 8 years, we sought to determine how much background television children are exposed to on an average day via a 24-hour time diary along a number of demographic indicators. We further tested these demographic indicators simultaneously using multiple regression analysis to determine which of these demographic variables were the most robust predictors of background exposure. Lastly, we examined whether certain home media

practices which have been linked to heavy foreground exposure were also linked to background exposure (Vandewater et al., 2005)

Methods

Participants

After receiving approval from the Institutional Review Board at NAME REMOVED FOR REVIEW, a private survey firm specializing in telephone surveys administered the survey. The survey firm collected a representative sample of 1,454 English speaking American households containing at least one person age 18 and older who was the primary caregiver for a child between the ages of eight months and seven years (any child who had not yet turned eight was eligible).

Design

A rolling cross-sectional survey using a disproportionate stratified random digit dialing procedure was used to collect the sample. Administration occurred between January 2009 and March 2009 by trained interviewers. Interviews were stratified to increase the incidence of households with children younger than eight as well as to provide oversamples of low income and American Indian households. The response rate (39.1%) was similar to other nationally representative surveys that have assessed media use among young children (Rideout et al., 2003; Vandewater et al., 2007). Survey data were weighted to adjust for the fact that not all survey respondents were selected with the same probability and to account for gaps in coverage and non-response 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 post-stratified along several dimensions obtained from the 2009 national estimates of the Census' American Community Survey (see Table 1).

Procedure

After eligibility screening was completed and informed consent was received, parents were asked a series of questions regarding demographics, the target child's media use, the home media environment, parenting practices, the target child's language/ literacy abilities, and completed a 24-hour time diary. On average, participants required 50 minutes to complete the survey. Participants who completed the survey using a landline (about 96%) were compensated $25.00 while participants completing the survey using a cell phone were compensated $50.00. Participants were also provided with contact information for the study coordinator as well as for the Institutional Review Board. All interviews were conducted in English

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, M.D., J.D.)); child's age (in months); family income status (i.e., income–to-needs ratio whereby the family income is divided by the poverty threshold associated with family size (The NICHD Early Child Care Research Network, 1997), 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: 2-parent or more 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), the 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. A 24-hour time diary was administered to all respondents. It was adapted from the time diary used within the Child Development Supplement to the Panel Study of Income Dynamics and designed to capture all of the target child's activities during the previous typical day. For each primary activity reported by the parent (with the exception of watching television), parents were asked "was there a TV on in the background while CHILD [insert activity]?" 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. Because of non-normal distributions related to background exposure, the variable was transformed using a root transformation in order to approximate a normal distribution (non-transformed values are presented).

Analytic Approach

Analysis of variance models were computed to explore whether demographic variables including child gender, child ethnicity, child race, child age, family structure, and family income were associated with differing levels of background TV (corrections were made to significance levels for multiple comparisons; Jaccard, 1998). Following this, we used multiple regression analysis to predict background television exposure from these demographic variables (the income-needs ratio was used as continuous variable rather than categorical in the regression analysis). Home media practices (bedroom television ownership, number of televisions in home, and frequency of television being on in home) were then added to examine relations between them and background television exposure controlling for the demographic variables. We used the survey weight correction in STATA to eliminate problems arising from incorrect standard error estimations (Winship & Radbill, 1994).

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, six families did not indicate whether they or their child was Latino and five families did not report whether other adults lived in the home. Overall, children between 8 months and 8 years were exposed to an average of 232.3 minutes per day of background television (95% CI [208.6, 256.1]).

The first set of tests explored differences in background TV exposure by demographic variables (see Table 2). Results illustrate that as children get older, they are exposed to less background TV, $F(3,1451) = 14.40$, $p < .001$. Children under 24 months were exposed to an average of 5.5 hours of background TV per day, while the oldest children (6 to 8 years) were exposed to less than half that amount, 2 ¾ hours. Children living in single parent homes were exposed to more than 5 hours of background TV per day versus about 3.5 hours for children living in multi-parent homes, $F(1,1449) = 4.41$, $p < .05$. Family income was inversely linked to background TV exposure, $F(4,1408) = 6.15$, $p < .001$. 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. Lastly, the test for differences in background exposure for children of varying races was marginally significant, $F(5,1449) = 1.98$, $p < .10$. Pairwise comparisons reveal only one difference across all racial groups. African American children were exposed to marginally more background television than White children (5.5 hours vs. 3.5 hours). Neither gender ($F(1,1453) = 0.43$, $p = 0.51$) nor child ethnicity ($F(1,1448) = 1.23$, $p = 0.27$) were associated with background television exposure.

To ascertain which demographic variables remained important correlates when controlling for other demographic correlates, we submitted all variables to an OLS regression

predicting background TV exposure (see Table 3). The overall model was statistically significant, $F(11, 1394) = 7.93$, $p < .001$, $R^2 = .11$. When controlling for all other demographic variables, exposure to background television was highest for younger children and African American children. There was also a marginally significant effect for family income, with greater exposure in lower-income homes.

Our final analysis explored whether certain media practices in the home were linked to background television 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 a significant amount of variance in the model, $\Delta F(3,1391) = 43.55$, $p < .001$, $\Delta R^2 = .22$. The presence of a television in the child's bedroom and the increased incidence of keeping a television on in the home even when no one was watching predicted significantly greater exposure to background TV (see Table 4).

Discussion

This paper 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; although recent studies suggest that media researchers, pediatricians and child advocates should be concerned about the impact it has on children's development and well-being (Armstrong & Chung, 2000; Armstrong & Greenberg, 1990; Kirkorian et al., 2009; Schmidt et al., 2008). For example, research with toddlers has demonstrated that background television exposure interferes with parent-child interactions while simultaneously disrupting the cognitive complexity of play behavior (Kirkorian et al., 2009; Schmidt et al., 2008). These results indicate that children are exposed to a

tremendous amount of background TV. The average American child under 8 years is exposed to just under four hours (232.2 minutes) of background television on a typical day. This level of exposure easily dwarfs foreground television exposure as estimates indicate that the average American child is exposed to approximately 80 minutes of television on a typical day (Rideout & Hamel, 2006). For every minute of television to which children are directly exposed, there are an additional 3 minutes of indirect exposure, making background exposure a much greater proportion of time in a young child's day.

Demographic Correlates of Background Television Exposure

Our results indicate that background TV exposure is differentially predicted by certain demographic factors. 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 over 5 ½ hours of background television on a typical day. This is particularly startling when considering how much attention is paid to reducing direct exposure for children in this age group (American Academy of Pediatrics Committee on Public Education, 2001). Efforts would be better served by targeting indirect exposure given that indirect exposure comprises 85% of the total time (i.e., background plus foreground TV) to which infants and toddlers are exposed to television.

At present, no specific research has investigated the reasons why background TV exposure is so high for infants and toddlers. One explanation may be that parents do not count background exposure as *exposure*. It has only been within the last few years that media researchers have begun looking at the phenomenon, both in trying to understand how much children are exposed to (Vandewater et al., 2005) and the consequences associated with exposure (Kirkorian et al., 2009). Parents of the youngest children in our study may believe that their child

cannot understand the onscreen content or is not affected by it. Consequently, having the TV on while their infant is in the room is not particularly concerning. For example, a recent study with low-income parents of infants and toddlers using informal interviews revealed that parents find turning off background television to be difficult and unnecessary (Citation removed for blind review). These parents reported that since their child was not paying attention to the TV and since there were no apparent ill effects when it was on in the background, they did not see a need to reduce background TV exposure.

In addition to young children, we also found that African American children, children from low income families, and children living in single-parent households were exposed to increased levels of background television. This is particularly concerning as past research has shown that children from these demographic groups are typically at risk for other social and cognitive problems (Huston & Bentley, 2010). In previous research, African American and poor children as well as children living in single parent homes were more likely to live in homes where traditional foreground television exposure played a greater role during the day (Gentile & Walsh, 2002; Lee, Bartolic, & Vandewater, 2009; Rideout & Hamel, 2006). While increased levels of background TV exposure for these groups is less surprising, the results are no less concerning given that children who are heavy users of foreground TV evidence significant cognitive and achievement problems and higher rates of obesity (Hancox, Milne, & Poulton, 2005; Zimmerman & Bell, 2010; Zimmerman & Christakis, 2007).

Family income and family structure became marginal (income) or non-significant (family structure) 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. Our study

and other research confirm that African-American children are more likely to live in low-income and single-parent homes (Douglas-Hall, Chau, & Koball, 2006; U.S. Census Bureau, 2006). Maintaining the significant relation between race and exposure after covarying income and family structure suggests that child's race was a primary driver in the observed relationships. Similar conclusions have been reached in other studies where both race and income were included as predictors of the amount of foreground TV exposure. In these studies, African American families from all backgrounds watched significantly more TV than their non-African American peers (Bickham et al., 2003; Lee et al., 2009; Rideout & Hamel, 2006; Rideout, Lauricella, & Wartella, 2011). These findings also suggest that, while exposure to background TV is pervasive across a variety of demographic variables, special attention should be paid to designing intervention messages focused on background TV exposure reduction that resonate with African American families.

Behaviors Associated with Background Television Exposure

The extant literature combined with the exposure estimates presented here suggests that (1) practitioners would be well-advised to highlight the potential consequences of background television when working with parents, and that (2) media scholars should pay careful attention to the role of background television in children's lives. This is particularly true for those who work with parents of very young children and African American families. To that end, our study also provides practitioners information they might give families on ways to reduce children's background television at home and provides media scholars working on the issue of television exposure reduction areas to target. Specifically, we find that bedroom television ownership and, unsurprisingly, keeping the television on while no one is watching are both associated with increased background television exposure.

The presence of a television in a child's bedroom has already been linked to a number of negative outcomes including academic underperformance (Borzekowski & Robinson, 2005; Gentile & Walsh, 2002), difficulty regulating sleep (Owens et al., 1999), and higher obesity rates (Dennison, Erb, & Jenkins, 2002). Linking bedroom television ownership to increased background television exposure ($\beta = .12$) 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 in our regression analysis was whether parents reported that the television was continually left on ($\beta = .36$). Although it may seem somewhat tautological to suggest that turning off the television set will lead to decreases in children's background television exposure, it is a clear and simple behavior that families to follow. Considering the rates of background television exposure that we found in American families, combined with the concerning associations that other researchers have found linking background television to both cognitive and social outcomes, any effort to decrease background exposure seems worthwhile.

Limitations

There are three limitations associated with our study. First, we were limited to households where at least one adult was a fluent English speaker. Thus, approximately 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 translating the measures and training interviewers to conduct the survey in other languages. Future research should make an effort to illuminate how children raised in non-English households are similar/different from English speaking homes. Second,

data was based on the response of one parent. While some large sample studies (e.g. Child Development Supplement for the PSID) have worked to incorporate 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" and thus would be best suited to answering questions about the child. Finally, we must acknowledge that our measurement of background television exposure is not the gold standard for measurement as it relied upon parent report of the previous day. Ideally, we would have liked to get a direct measurement of background exposure via home recording or a similar methodology, but we believe that the national representativeness of this data offers some key insights into how large a role background television exposure plays in American children's lives.

Conclusion

Research on background television exposure suggests that its prevalence in young children's everyday life is concerning and warrants further study. 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 per day. Even more concerning is that children under two and African American children are exposed to 42% and 45% more background TV, respectively, than the average child. These dramatic exposure levels are likely a function of parents' lack of knowledge about what background TV exposure is and parents' underestimates of any potential consequences of such exposure. Interventions that are supported by public policy advocates and media researchers are needed. 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 (e.g., bedtime, mealtime; Jordan, Hersey, McDivitt, & Heitzler, 2006).

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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 months to 2 years	19.1
2 years to 4 years	28.1
4 years to 6 years	26.5
6 years to 8 years	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-needs ratio	3.87 (3.48- 4.25)
Less than 1.0	12.8
1.0 to 1.99	19.4
2.0 to 2.99	18.8
3.0 to 3.99	11.7
4.0 or greater	34.4
No response	2.9
Average caregiver education	14.32 (14.07-14.58)

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 months to 2 years	332.4_{a}	(277.2-387.6)
2 years to 4 years	261.5_{c}	(210.8-312.1)
4 years to 6 years	198.2_{b}	(156.0-240.5)
6 years to 8 years	$163.0_{b,d}$	(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)		
Less than 1.0	355.7_{a}	(282.6-428.7)

1.0 to 1.99	274.4	(214.0-334.8)
2.0 to 2.99	238.3	(184.7-291.9)
3.0 to 3.99	165.2_{b}	(123.5-207.0)
4.0 or greater	181.8_{b}	(143.0-220.5)

Note: 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 $p < .10$.

Table 3

OLS Regression Predicting Background Television Exposure

Variables	B	SE	β
Constant	4.673	0.432	
Child gender (Female = 1)	-0.194	0.119	-.069
Child age (in months)	-0.013	0.002	-.240***
Child ethnicity (Latino = 1)	0.085	0.184	.025
Single-parent home	0.175	0.184	.047
Child race: African American	0.440	0.174	.106*
Child race: Asian American	-0.131	0.354	-.015
Child race: Hispanic	-0.135	0.288	-.018
Child race: Mixed	0.067	0.300	.012
Child race: Other	0.065	0.182	.007
Family income	-0.029	0.017	-.083+
Caregiver education	-0.045	0.028	-.093

$^{+}p < .10$; $^{*}p < .05$; $^{***}p < .001$Table 4

OLS Regression Testing Influence of Home Media Behaviors on Background Television Exposure

Variables	B	SE	β
Bedroom television	0.352	0.122	.122**
# of televisions in home	0.057	0.048	.050
How often television is on	0.350	0.041	.358***

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

**p < .01; ***p < .001