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Amount, content and context of infant media exposure: A parental questionnaire and diary analysis

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Abstract

Recent research has indicated that there are long-term consequences of early media exposure. The present study examined the amount, content, and context of television exposure across the infancy period in the United States. Parents of 308 infants aged 6 to 18 months completed questionnaires detailing parental attitudes regarding their children's television use and 24-hour television diaries to provide an accurate measurement of household television usage. Television exposure during infancy varied as a function of infant age, sibling status, socioeconomic status and parental attitudes toward television. Regression analyses indicated that parental attitudes were not associated with the amount of television exposure, but were associated with the content of television exposure. These findings indicate that television exposure changes rapidly across infancy and is associated with parental attitudes.

Keywords

Infant; parent restrictions; television exposure; content

Parents in the United States provide a variety of reasons for allowing their young children to watch television—television has value as a "babysitter", enabling parents to get chores done; it quiets their children down; and it has educational value (Rideout & Hamel, 2006; Rideout, Wartella, & Vandewater, 2003; Zimmerman, Christakis, & Meltzoff, 2007a)—29% of parents report that the "most-important reason" for their child watching television was the belief that television is educational or good for the child's brain. Four out of every five parents surveyed in one study are "comfortable or very comfortable" with their infants watching television, and are satisfied with the educational videos their infants watch (Weber & Singer, 2004). Specifically, parents list vocabulary expansion (particularly in a foreign language), exposure to a variety of different experiences, and exposure to diversity as positive benefits of television exposure (Rideout & Hamel, 2006). That is, parents typically perceive viewing time with child-directed programming as having educational value. Moreover, a growing number of infant-directed programs are being developed and targeted specifically at young infants (e.g., *Baby Einstein, Brainy Baby*), with sales of *Baby Einstein* videos alone being estimated at $200 million in 2005 (Bronson & Merryman, 2006; Christakis & Garrison, 2005). These products are accompanied by a number of implicit and explicit educational claims (Garrison & Christakis, 2005). Although, studies have shown that television shows produced with children's development in mind can have positive effects for the cognitive and prosocial development of preschoolers (Anderson, Bryant, Wilder, Santomero, Williams & Crawley, 2000), the American Academy of Pediatrics (AAP, 1999) recommends that children under two years old should not watch any television.

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Due to the rapidly changing media climate, cultural differences, and to wording of survey questions, however, it has been difficult to quantify both the content and amount of infant television exposure (e.g., Anderson, Field, Collins, Lorch & Nathan, 1985; Certain & Kahn, 2002; Christakis, Zimmerman, DiGiuseppe & McCarty, 2004; Mendelsohn et al., 2008; Rideout, et al., 2003; Stanger, 1997; Zimmerman, et al., 2007a). For example, higher rates of television exposure have been reported in the United States (e.g. Mendelsohn et al., 2008; Zimmerman et al., 2007a) than in Denmark (Obel et al., 2006) but usage patterns are similar to the United States in Australia (Skouteris & McHardy, 2009). Much of the research examining television usage during early childhood has been conducted in the United States. Researchers have also reported that early viewing has risen dramatically. Using data collected during the early 1990s, Certain and Kahn reported that 17% of 0- to 1-year-olds and 48% of 1- to 2-year-olds watch television. More recently, researchers have reported that by 3 months, 40% of infants regularly watch television and DVDs and by 24 months the number rises to 90% (Zimmerman et al., 2007a). Those 6- to 24-month olds exposed to television, regularly spend one to two hours per day "watching tv" (Mendelsohn et al., 2008; Rideout & Hamel, 2006) which accounts for approximately 10–15% of infant awake time. Thompson and Christakis (2005) found that higher levels of television exposure among infants and toddlers was associated with an increased risk of having an irregular sleep schedule.

Anderson and Pempek (2005) argue that the increase in parental reports of young children television viewing coincided with the availability of programming directed to infants. Anderson and Pempek, (2005) caution, that in the past parents may have misinterpreted questions such as "How much time would you say your child spends watching television on a typical weekday?" (Certain & Kahn, 2002), regarding what it meant for infants to watch television. In particular parents may have failed to report exposure to adult-directed television (i.e., television that is not directed towards children). Not including exposure to adult-directed television may have resulted in underreported exposure and age of earliest exposure to television. Mendelsohn and colleagues (2008) therefore decided to use exposure to television, defined as when the baby was in the room and awake, as their primary measure of television exposure. They found that parents reported that infants were actively "watching" the programs for approximately half the time that infants were awake and in the room and the television was on.

Negative associations with heavy television exposure during infancy

Children in the first two years of life may be particularly vulnerable in terms of harmful effects of television exposure for a number of reasons. They have little input regarding their own media exposure. They choose neither the amount nor the content of exposure on a daily basis. Rather, parents and older siblings make these choices. If parents choose to view adult-directed programs, such as a sitcom, while their infants are in the room, infants will be exposed to this content regardless of whether they attend to this program or not. Such adult-directed television exposure may reduce the quantity and quality of parental interactions and infant play behavior. Schmidt, Pempek, Kirkorian, Lund, and Anderson (2008) examined looking time and infant play behavior during an adult-directed game show. Infants' quality and quantity of play with toys was significantly worse when adult-directed television was on as compared to a time period in which the television was off. Children only attended to the game show 5% of the time, but solitary play episodes were shorter, less complex, and included less focused attention when the television was on than when it was not on. Furthermore, adult-directed television also reduces the quality and quantity of parent-child interactions, with parents responding passively rather than actively to their 1- to 3-year-olds' requests when an adult-directed television program was being played when compared to no television program being played (Kirkorian, Pempek, Murphy, Schmidt, & Anderson, 2009). These findings are significant because parent-child interaction and play is critical for subsequent social and cognitive

development (see Singer & Singer, 2001). This argument is supported by Tomopoulos and colleagues (in press) who reported that higher exposure to adult-directed television at 6 months was associated with poorer language outcomes at 14-months for children living in low income minority families.

Furthermore, exposure to high levels of television may be associated with poorer executive functioning. Researchers have associated heavy exposure to television during early childhood with poor school performance, increased bullying, attention problems, and sleep problems during childhood and adolescence (Christakis et al., 2004; Lanhuis et al., 2007; Thakkar, Garrison & Christakis, 2006; Thompson & Christakis, 2005; Zimmerman, Glew, Christakis, & Katon, 2005; Zimmerman, Christakis, & Meltzoff, 2007b; Zimmerman & Christakis, 2005, 2007). Negative associations endure even when demographic factors including socio-economic status, ethnicity, maternal risk factors, and prematurity are controlled in the statistical models. In contrast, infants' television exposure was not associated with behavior problems during the preschool years in a sample of Danish children who were exposed to lower overall levels of television (Obel et al., 2004; but see Miller et al., 2007). Most recently, researchers compared infant exposure to child-directed and adult-directed programming and reported that exposure to adult-directed or violent programming during infancy was associated with parental reports of poorer executive functioning, but exposure to similar levels of child-directed programming was not (Barr, Lauricella, Zack & Calvert, 2010; Zimmerman & Christakis, 2007).

Other research indicates that content is also crucial in terms of associations with language development. In a longitudinal study of 6- to 30-month-olds, Linebarger and Walker (2005) found that certain television shows (*Blue's Clues* and *Dora the Explorer*) were associated with greater language production, while others (*Barney* and *the Teletubbies*) were negatively related to vocabulary acquisition. Furthermore, smaller receptive vocabulary was associated with viewing more than one hour per day of infant-directed videos, such as *Baby Einstein* series or *Brainy Baby* series (Zimmerman et al., 2007b). The long-term effects of exposure to infant-directed programming remain unknown.

Restrictions on Television Use

Parents of preschoolers and school-aged children tend to enforce rules regarding television use (Rideout, et al 2003; Stanger 1997; Vandewater, Park, Huang & Wartella, 2005). Two-thirds of parents with children aged 0–17 implemented rules regarding television use aiming to restrict both the content and amount of television exposure (Stanger, 1997; Vandewater et al., 2005). Parents who reported that they strongly enforced time rules regarding television use also reported lower levels of television viewing for children aged 0–6 years (Rideout, et al, 2003; Vandewater et al., 2005). Parents with program content rules reported more positive attitudes towards television and higher levels of coviewing (Vandewater et al., 2005). Although rules are not enforceable for parents with infants, early attitudes about television may influence the amount and the content of television exposure for infants.

The present study

Early exposure to television is complex and involves both deliberate viewing of child-directed programming and indirect exposure to adult-directed television. Even though infants do not actively view adult-directed television, they are merely exposed to it, there is growing body of evidence that such mere exposure may be detrimental (Barr et al., 2010; Tomopoulos et al., in press; Schmidt et al., 2008). Parent questionnaires are unable to accurately determine adult-directed exposure because of the possible misinterpretation of the wording of questions such as, "how much television is your baby watching?" A 24-hour household television usage diary was collected in order to obtain more accurate reports of infant television exposure and to

separate out overall household television usage from infant exposure (see also Anderson et al., 1985; Mendelsohn et al., 2008). Previous studies (Christakis, et al., 2004; Vandewater, et al., 2005; Zimmerman et al., 2007a,b) have only examined either content or amount of television viewed by children via survey report, whereas this study combines parent questionnaires and 24-hour viewing diaries (see also Mendelsohn et al., 2008). Considering the increased availability of infant-directed programming and the potentially long-lasting effects of early television use, the present study investigated how early parental restrictions concerning television are associated with the amount, content type, and context of infant television exposure.

Method

Participants

Participants were recruited using a commercial mailing list or word-of-mouth from the Washington DC metropolitan area. They were recruited as part of an ongoing study examining learning and memory during infancy. This sample consisted of 308 parents with infants 6-, 9-, 12-, 15- and 18- months-old, who completed a 24-hour television diary and answered a questionnaire on television viewing behaviors. A stratified sample was obtained whereby infants were divided by age into 6-, 9-, 12-, 15-, and 18-month-olds, to assess the rapid developmental changes in viewing behavior for children under 2 years of age. The stratified sample of infants consisted of 57 6-month-olds with an average age of 198.9 days (*SD* = 13.8), 51 9-month-olds with an average age of 292.0 days (*SD* = 60.2), 83 12-month-olds with an average age of 382.4 days (*SD* = 15.5), 48 15-month-olds with an average age of 459.4 days (*SD* = 56.4), and 69 18-month-olds with an average age of 566.9 days (*SD* = 9.77). The sample included 167 male and 141 female infants.

Parental educational attainment ranged from 12 to 18 years (*M* =17.24, *SD* = 1.19) and, as reported by 94.16% of the sample, their ranks of socioeconomic status (Nakao & Treas, 1992) ranged from 26.39 to 97.16 (*M* = 79.46, *SD* =12.85). Educational attainment, occupational status, and annual income are the major components of socioeconomic status. The SEI ranks 503 occupations listed in the 1980 US census on a scale of 1 to 100, with higher status occupations (e.g., physician) being accorded higher rank. Where data were available for only one adult (e.g., only one parent/guardian was working), the code for the employed individual was used. In families in which data were available for more than one parent/guardian, their SES scores were averaged. Missing values for socioeconomic status were computed using sample mean replacement.

Families were Caucasian (n = 220, 71.4%), Asian (n = 13, 4.2%), African-American (n = 15, 4.9%), Latino (n = 16, 5.1%), Native American (n = 2, .65%), of mixed ethnicity (n = 26, 8.4%); 16 families did not report their ethnic background. Of those included in the study, 123 of the target infants had one or more siblings and 185 were only children. The presence of siblings in the household was relatively consistent across ages; the numbers of children ages 6 months to 18 months with siblings are as follows: 24 (6 months), 28 (9 months), 29 (12 months), 15 (15 months), and 27 (18 months).

Additional data was collected but not analyzed, as only paired data (questionnaire and diary) was evaluated; those parents who did not complete both sets of data sufficiently were not included in the final analysis. The attrition rate for this study was 18.5%.

Materials

To maximize the reliability and validity of the diary data, parents were asked to record all of the programs and videos that were viewed in their households over the 24-hour period in a

series of columns, labeled on the diary (see also, Anderson et al., 1985; Dale, Bates, Reznick, & Morriset, 1989; Mervis, Mervis, Johnson, & Bertrand, 1989). This information included the time viewing took place, the program and channel that was viewed, the duration of each program, the individuals present in the room, and other comments on the infant's behavior during viewing (e.g., 'he really liked the music' or 'she spent most of the time playing with toys').

After completing the diary, a structured interview constructed around a 10- item questionnaire was administered. Regarding amount of television exposure, questionnaire/interview items included the age at which the infant was first exposed to television, the estimated amount of time the television was on in the household in a typical day, and the number of infant prerecorded children's programs (DVDs or videos) owned. Regarding content, parents were asked which television shows they viewed as high-quality programs for the infant's age group. Parents were also asked whether the infant was exposed more frequently to television or prerecorded programming. To find out parental attitudes regarding regulating television use for infants, parent were asked to describe any restrictions concerning the infant's use of television and videos. Regarding coviewing behavior, parents were asked: how often they were in the room while the infant was viewing television, how often they talked with the infant during viewing and how often the infant sat and watched programs with siblings; these questions were based on a 4-point Likert scale ranging from never to almost always.

Procedure

The study was described to the primary caregiver and informed consent was obtained. Demographic information including occupation, ethnicity, educational achievement, and languages spoken in the home was also obtained. The rationale for the study was explained and detailed instructions on reporting household television viewing were provided on the diary. Parents were told that the purpose of the study was to assess infants' exposure to television. Parents were familiarized with the procedures they were to use and were informed that an experimenter would be available to answer questions during the 24-hour period. Parents completed the television diary. One day later, the experimenter collected the television diary either in person or via email and conducted the interview either in person or over the phone. Data were collected continuously across seasons and across days of the week from January 2002 to January 2005.

Coding

All diaries and questionnaires were double coded and verified to ensure that data entry was reliable.

Parental restrictions—Parental restrictions regarding time were coded as the frequency of parents who reported any restriction on time of television use and those who specifically reported having a no-TV policy for their child. Parental restrictions concerning content were coded as frequency of parents who specified restriction of viewing to only child-directed programming and frequency of parents specifying no violent programming. Due to the young age of children in this study, parents of children particularly under the age of 1 frequently responded no restrictions yet, so we decided to analyze this response as a separate category. In the data set, a 0 indicated no restriction, a 1 indicated that parents did not have any restrictions yet for their infants, a 2 indicated that parents' had a restriction. N is not consistent across analyses because some answers were not codeable. Percent reliability for coding restrictions was 92%.

Calculation of ratios—The child content ratio was calculated as the ratio of child directed programming viewed by the child divided by infant's total exposure to television. The

coviewing ratio is the total number of hours that parents, siblings, and "others" spend coviewing with the child divided by the infant's total exposure to television (with a maximum set at 100%). These ratios exclude parent reports of no television during the 24-hour diary period (n = 62).

Results

Descriptive Statistics

Amount of Exposure—Table 1 shows mean amount of television exposure by infants as a function of age in a 24-hour period (as determined from the diary), and compares these amounts with parent estimates of the amount of household television on any given day. Viewing amount is relatively constant across age groups. According to diary reports, 62 infants (20.10%) were not exposed to any television on the day of diary collection. Because there was only one day of data collection it is not clear whether this was a typical day or whether this was due to specific parental restrictions on television use.

We also compared exposure as a function of day of the week and season of the year. We conducted a 7(day)×4(season) one way analysis of variance (ANOVA) on infant hours of television exposure. Consistent with prior time use research, we found a main effect of season, $F(3, 280) = 4.56$, $p < .01$, but no other main effects or interactions. Post-hoc Student-Newman-Keuls *t*-tests ($p < .05$) indicated that exposure was higher during Winter (M = 1 hr 42 min, SE = 11 min), than during Fall or Summer (M = 54 min, SE = 15 min, M = 42 min, SE = 15 min, respectively) and exposure during Spring was intermediate (M = 1 hr 6 min, SE = 10 min). The lack of weekday/weekend difference may be due to the age of the infants under investigation (see also Skouteris & McHardy, 2009 for a similar result).

Content—Nearly one-third (30.84%) of parents reported that their children were exposed to television more frequently than to videos, 16.56% of parents reported that their children were exposed to the same amount of both types of media, and almost half of parents surveyed (46.43%) reported that their children were exposed to videos more frequently than television. Families owned on average 5.55 videos (SE = .46), increasing from an average of 4.26 (SE= . 85) when infants were 6 months to 7.16 (SE = .96) when infants were 18 months.

Parents were asked to list high-quality age-appropriate programming for their infants. The top-ranked programs and the frequency with which they were watched on a daily basis were calculated. Table 2 lists the percentage of parents who ranked the following top-ranked programs (more than 5%) as high quality: *Baby Einstein, Sesame Street, Clifford, Teletubbies, Barney, Wiggles,* or *Blue's Clues*. Several other programs were mentioned by between 1.5 and 3.5% of parents (*Between the Lions, Bear in the Big Blue House, Caillou, Dragontales, Arthur, Rolie Polie Olie, Mr. Rogers, Dora the Explorer*, see Table 2). The programs listed in Table 2 are hereafter referred to as "child-directed programming". The *Baby Einstein series* (35.06%) and *Sesame Street* (31.49 %) were the highest ranked programs as high quality and age-appropriate. Table 2 also lists the diary data of the percentage of children who viewed one of the seven programs during the 24-hour diary data collection period. Again, *Baby Einstein series* was the most frequently viewed program, with 16.56% of children viewing a Baby Einstein video or DVD at least once during the day. There is a high correspondence between reported high quality programs and programs that infants are being exposed to on a daily basis. Not surprisingly, there were also age-related increases in the number of reported high quality programs ranging from .72 (SE = .11) quality programs at 6 months to 2.00 (SE = .07) quality programs at 18 months of age.

Parent-reported restrictions about appropriate amount and content of television exposure—Table 3 shows the frequency of restrictions on amount and specific content as reported by the 231 parents; 75% parents had some restriction on infant viewing. More than

half of the parents in our sample (56.28%) reported having restrictions on time use, but only 8.66% of parents specifically reported having a no-TV policy for their child. Parents also reported content-related restrictions restricting their children to child-directed content only (20.35%) or restricting content to no violent programming (20.78%).

Coviewing practices—Coviewing was defined as being in the room with the infant at the same time that the television was on. This is a passive measure of coviewing. Parents coviewed with infants for 1.01 hrs (SD = 1.39 hrs), siblings coviewed together for .27 hrs (SD = .61) and "others" (family members, nannies, etc.) coviewed for .10 hrs (SD = .31). On average, 95.6% of the time infants were in the room with others when the television was on, and they were unlikely to be left on their own. Those with siblings coviewed 66% of the time with another sibling and 77% of time with parents and 9% of the time with others, whereas those without siblings coviewed 85% of the time with parents and 11% with others. The numbers do not add to 100% because infants could coview with multiple people at once. Parents also reported that they were likely to sit and talk with their infants once in a while or almost always 70.6% of the time.

Associations between demographic factors, restrictions and amount and content of exposure

Previously, SEI, sibling status, gender, and age have been associated with television exposure and these variables are also included in our analyses (Certain & Kahn, 2002; Christakis et al., 2004; Linebarger & Walker, 2005; Rideout et al., 2003; Rideout & Hamel 2006; Thompson & Christakis, 2005; Vandewater et al., 2005; Weber & Singer, 2005; Zimmerman et al., 2007a). Ethnicity has also been associated with television usage patterns but unfortunately the homogeneity in our sample did not allow us to examine factors associated with ethnicity. Table 4 displays the zero order correlations between these variables as well as parental restrictions. Collinearity diagnostics indicated that all VIFs were < 2. Two regression analyses were conducted to answer questions specifically about amount and content.

Associations with amount of television exposure—We first looked at how demographic variables and parental restrictions on television use were associated with infant television exposure by conducting a linear regression simultaneously entering the variables of age, socioeconomic index, gender, number of siblings, time use restrictions, and content restrictions (child content and no violence). The overall model was not significant, $F(6, 245) < 1$, $R = .12$, $R^2 = .02$. Although 75% of the sample reported having restrictions on either time use and/or content regarding infant exposure to television, neither time nor content restrictions were associated with absolute amounts of infant television exposure. To specifically address whether a no-TV policy influenced infant television exposure, we conducted a one-way analysis of variance (ANOVA) across parents who reported a no-TV policy ($n = 22$) compared to those parents who either reported no such policy ($n = 201$) or had not decided yet ($n = 28$). We found no association between the amount of television use for those who did (M = 1hr, 1 min) and did not (M = 1 hr 11 min) have a no-TV use policy, F (2, 248) = 1.4, *ns*. Those who had not decided yet about a no-use policy exposed their infants to non-significantly higher amounts of television (M = 1 hr 40 min). Half of the parents who reported a no-TV policy had exposed their child to television the day before. That is, the AAP recommendation is not being followed even by those parents who have adopted it. It is possible, that parents are not considering adult-directed television exposure.

Associations with content of television exposure—Second, to assess how demographic variables and parental restrictions were associated with the content of television exposure, we conducted a linear regression simultaneously entering the variables of socioeconomic index, gender, number of siblings, time use restrictions, and content restrictions

(child content and no violence) on the ratio of the total amount of child-directed programming viewed by the participant relative to the overall amount of television viewed by the child (child content ratio). Table 5 presents the results of the regression analysis on ratio content. The overall model for the content ratio was significant, $F(6,195) = 12.50$, $p < .001$, $R = .53$, $R^2 = .28$ indicating that having restrictions concerning child content was significantly associated with viewing a higher proportion of child-directed programming. Also, having siblings was associated with greater likelihood of exposure to child-directed programming ($M = 41.4$ min, $SD = 4.2$) than not having siblings ($M = 30.6$ min, $SD = 3.6$). Higher socioeconomic status is also related to more exposure to child-directed programming. Finally, older infants viewed a higher proportion of child-oriented television than younger infants (see Figure 1). In fact, 6-, 9- and 12-month-olds were exposed on average to 45 mins adult-directed television (45, 47, 43 mins respectively) while 15- and 18-month-olds were exposed to 14 and 28 mins respectively.

Discussion

The present study was an initial investigation into the relations between age, demographic factors, parental restrictions, and the amount, content, and context of television exposure during infancy. The findings from the present study with regard to the amount of time that infants in the sample were exposed to television is consistent with recent data collected from parent surveys (Rideout & Hamel, 2006; Rideout et al., 2003; Stanger, 1997; Zimmerman, et al., 2007, a,b; but see Mendelsohn et al., 2008). Consistent with the findings from Rideout and colleagues (2003), few parents reported having a “no-television” policy for their infant (8.66% of sample) but 20.10% were not exposed to television on the day the diary was collected, suggesting that not all infants were being exposed to television on a daily basis. Those who had a no-TV policy did not necessarily restrict television exposure.

Although the amount of time was consistent with past studies, the content of exposure appears to be associated with a number of factors. Results indicate parental restrictions on programmatic content, age, and demographic factors (including presence of siblings and socioeconomic status) are associated with exposure to higher proportions of child-directed programming relative to overall television exposure. Younger infants were exposed to higher levels of adult-directed television than older infants. This finding has not previously been reported, perhaps because previously parents were asked how much infants “watch” television. In this study, we deliberately focused on household television exposure across a 24 hr period to examine infant television exposure, regardless of whether the content was intended for them. During adult-directed programming infants typically attend only 5% of the time (Anderson & Pempek, 2005) and parents may not consider that infants are “watching” television. These findings are particularly relevant to early childhood development, as the amount of adult-directed television, particularly for young infants, may be detrimental to play, language development and executive functioning (Anderson & Pempek, 2005; Barr et al., 2010; Kirkorian et al., 2009; Schmitt et al., 2008; Singer & Singer, 2001; Tomopoulos et al., in press). Recently, Mendelsohn and colleagues (2008) similarly reported that their 6- to 9-month-old infants from low income Latino families were exposed to approximately 50% child-directed and 50% adult-directed programs but their average television exposure was twice as high. They also reported that parents were most likely to interact with their 6 to 9-month-old children during educational programs and least frequently during adult-directed television. Our findings indicate that younger infants may be the most vulnerable to exposure to adult-directed television and exposure levels decreasing by the second year of life when parents perceive higher quality programming to be available. That is, parents may perceive that their children attend to infant-directed and child-directed programming but not to adult-directed programming and ascribe different values to each of these experiences.

Nearly half the parents reported a preference for videos/DVDs over regular commercial programming. This suggests that there is some characteristic inherent in videos which make that medium more appealing to parents than television—whether it is the absence of commercials or the ability to control more carefully the content of what children are watching is unknown. It is also possible, that there would be advantages of DVD exposure over typical television exposure due to the importance repetition of the televised content for learning early in development (Barr, Muentener, Garcia, Fujimoto & Chavez, 2007; Linebarger, & Vaala, in press; Skouteris & McHardy, 2009). How parents are judging quality programming is not clear. *Sesame Street*, *Blue's Clues*, and *Barney* have all benefited from careful design and have been rigorously tested to ensure educational benefits, at least for preschoolers (e.g. Anderson et al., 2001). By contrast, many infant-directed products have yet not been empirically tested but make a number of explicit and implicit educational claims (Garrison & Christakis, 2005).

Infants were in the room with others during television exposure and 70% of parents reported that that sat and talked with their infants. Furthermore, those with siblings frequently coviewed child-directed programming with their siblings. That is, there is ample opportunity for parents to provide active coviewing experiences for their infants because of the need to maintain high proximity to their infants. Researchers are beginning to examine individual differences in coviewing practices (see Barr, Zack, Garcia & Muentener, 2008; Fidler, Zack & Barr, 2010). Researchers have not yet examined what role siblings may play in learning from television during infancy.

A major limitation for the study was its relatively homogenous sample population. Most families were Caucasian, with a high socioeconomic index, which limits its generalizability, particularly to those populations that might be most at-risk. Future studies should certainly focus on more vulnerable populations (i.e., low-income, minority families; see Mendelsohn et al. 2008; Tompoulos et al., in press). In this study, higher SEI status was associated with higher exposure to child-directed programming. There were also several notable exploratory findings related to television exposure and ethnicity—Latino infants tended to view higher proportions of child-directed programming, and African-American children tended to view higher overall amounts of television than Caucasians—but due to low power and problems of interpretation these findings are only exploratory. This sample had relatively little variance in terms of socioeconomic status and race, so it would be valuable to investigate high-risk children in a larger sample size.

Television is now clearly part of the early educational environment. Exposure to television during infancy will very likely have long-term consequences, which remain largely unknown but are very likely to vary as a function of content and context of the viewing experience. Demographic factors such as siblings and socioeconomic status, and parental restrictions are associated with the content and context of television usage. Content my be more important than viewing time for young children and programs with age-specific curricula, coupled with adult-mediated viewing, could allow children to learn more efficiently and effectively (Skouteris & McHardy, 2009; Thakkar et al., 2006). Because studies have shown that television shows produced with children's development in mind can have positive effects for the cognitive and prosocial development of preschoolers (Anderson et al., 2000; Thakkar, et al., 2006), it is possible that children's educational television and infant-directed videos/DVDs might also have the potential for a positive influence on infants' cognitive skills (but see also Zimmerman et al., 2007b), particularly if parents sit and talk with their children during viewing (Barr, et al., 2008; Fidler et al., 2010). Certain and Kahn (2002) found that higher television viewing during the first two years of life predicted higher television usage in preschoolers and kindergartners. It is quite possible that early restrictions surrounding content and coviewing may be the start of a trajectory that predicts later media diet.

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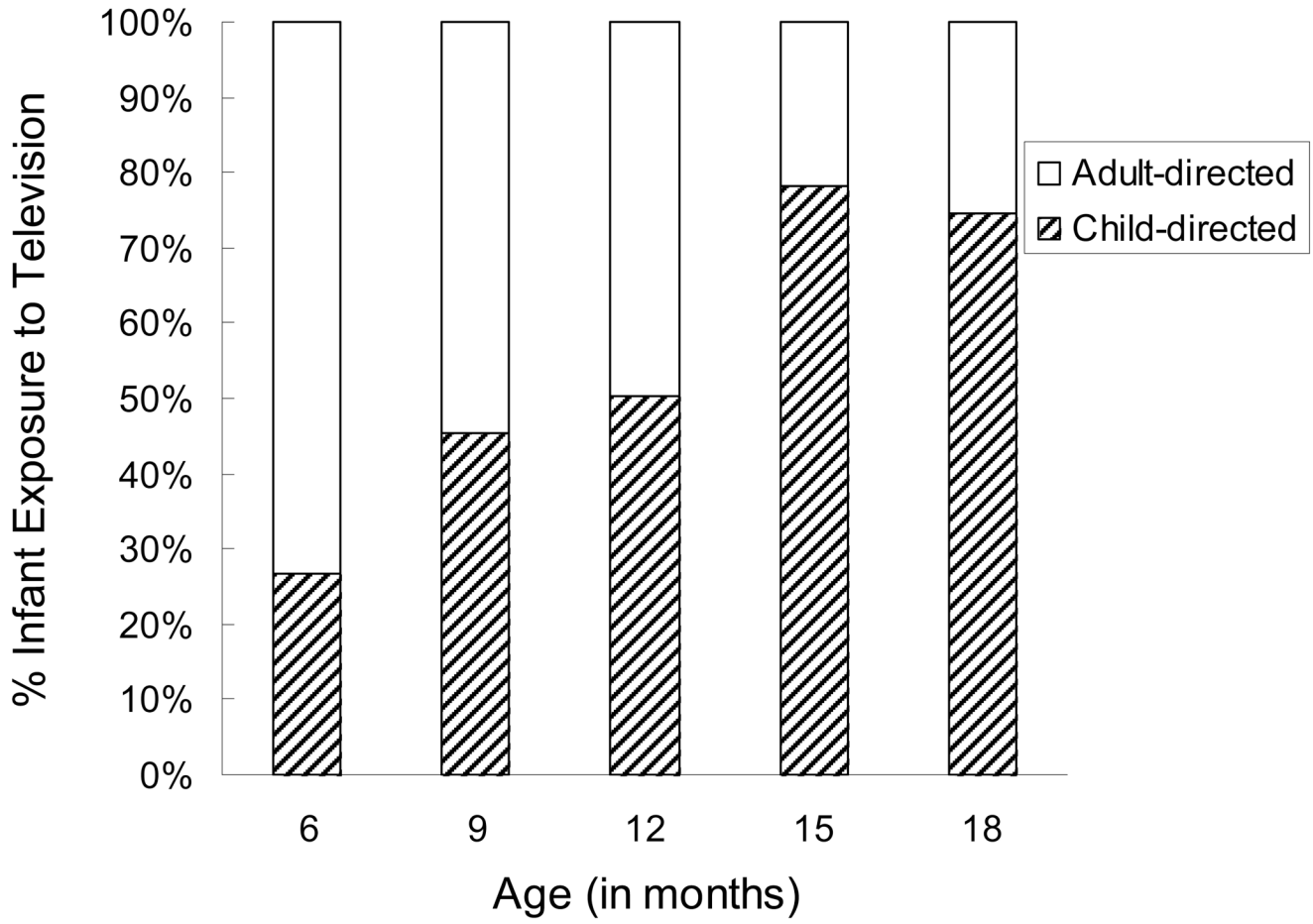

Figure 1.
The proportion of exposure to child-directed and adult-directed programming as a function of age (months).

Table 1

Mean (SD) for the amount of television infants (N = 308) are exposed to, as a function of age (in months), measure, and content. Infant exposure is defined as the infant being in the same room when the television was on.

	Questionnaire	Diary (hrs in a 24 hr period)			
Age (in months)	**Estimated Household TV usage (hrs)**	**Recorded Household TV usage**	**Infant exposure to Adult programs**	**Infant exposure to Children's programs**	**Infant Total Exposure**
6	3.75 (2.88)	1.67 (1.33)	.76 (.86)	.26 (.53)	1.01 (1.04)
9	3.15 (2.48)	2.63 (2.31)	.80 (1.51)	.54 (.79)	1.34 (1.85)
12	3.96 (2.61)	2.21 (2.16)	.72 (1.3)	.47 (.68)	1.19 (1.43)
15	3.20 (2.05)	1.86 (1.44)	.23 (.41)	.68 (.68)	.91 (.86)
18	3.91 (2.35)	2.20 (2.06)	.47 (1.16)	.95 (.98)	1.44 (1.68)
Total	3.66 (2.51)	2.12 (1.95)	.61 (1.15)	.58 (.79)	1.19 (1.44)

Table 2

Percentage of parents from the sample (N=308) who listed the following shows as high quality and age-appropriate for their infants and percentage of infants who viewed the program in the diary records.

Parent rated high quality age-appropriate programs	% Parents who rated program as high quality	Frequency viewed (%)
Baby Einstein	35.06	16.56
Sesame Street	31.49	5.52
Teletubbies	12.01	6.17
Wiggles	10.40	8.40
Barney	6.80	4.90
Clifford	5.52	5.84
Blue's Clues	5.52	1.60
Caillou	3.25	3.57
Mr Rogers	2.92	0.65
Between the Lions	2.60	0.97
Bear in the Big Blue House	2.27	0.97
Rolie Polie Olie	2.27	0.97
Dragontales	1.95	4.85
Arthur	1.62	2.60
Dora the Explorer	1.62	1.30

Table 3

Percentage and number (N) of parents with and without time and content restrictions, “no television” policy for their infants (total N = 231).

	Time restriction		Content restriction	
	Time % (N)	**No-TV policy % (N)**	**No Violent content % (N)**	**Child-directed programming % (N)**
No	34.20 (79)	81.82 (189)	70.13 (162)	69.7 (161)
Not yet	9.52 (22)	9.52 (22)	9.52 (22)	9.52 (22)
Yes	56.28 (130)	8.66 (20)	20.35 (47)	20.78 (48)

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Table 4

Correlation table for variables of interest

	Age	**Female**	**Siblings**	**Time restriction**	**Child content restriction**	**Violent content restriction**	**SEI**	**Coview**	**Ratio coview**	**Ratio content**
Female	.04	-								
Siblings	−.07	−.09	-							
Time restriction	.11	.14*	.01	-						
Child content restriction	−.19**	−.05	−.01	−.52*	-					
Violent content restriction	−.15**	−.07	−.06	−.52**	.66*	-				
SEI	.05	.00	.02	−.08	.06	.02	-			
Coview	.18**	−.05	−.17	−.02	.02	−.02	−.03	-		
Ratio coview	−.12	−.18**	.58*	−.04	.01	−.07	.06	−.06	-	
Ratio child content	.42*	−.06	.14*	.11	.03	−.11	.19*	.07	.02	-
Infant total hrs	.05	.04	.01	−.09	−.08	.02	−.06	−.07	−.11	−.16*

* significant to the 0.05 level

** significant to the 0.01 level

The categorical variable of gender was dummy coded and age was entered as an ordinal variable. Spearman rank correlations were reported if one of the variables was not continuous

Table 5

Results of a simultaneous linear regression on the content ratio (time spent viewing child-directed programming / total time exposed to television).

	Unstandardized Coefficients		Standardized Coefficients	
	B	**Std. Error**	**Beta**	
Age (months)	0.04	0.01	0.42	**
Gender	−0.01	0.05	−0.10	
Sibling Status	0.11	0.05	0.14	*
Child-Directed Content restriction	0.11	0.03	0.22	**
Violent content restriction	−0.03	0.03	−0.07	
SEI	0.01	0.01	0.18	**

* significant to the 0.05 level

** significant to the 0.01 level