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Children under the age of two are more likely to watch inappropriate background media than older children

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Abstract

Aim—To establish whether young children watched foreground electronic media or background media that was not aimed at them or was inappropriate for their age.

Methods—We performed a longitudinal analysis of mother-infant dyads participating in a larger parenting study. The primary dependent variable was maternal reports of watching habits from media diaries at six, 14, 24 and 36 months. Independent variables were child age, programme content and whether the programme was turned on specifically for the child.

Results—We analysed 3,570 programme exposures in 527 children, mostly from television. Children were significantly more likely to actually watch programmes if they were older, if the content was coded as “educational-young child” or if the parent tuned on the programme specifically so the child could watch it. Children under the age of two were more likely than older children to watch background media that featured age-inappropriate content or had not been turned on for them to watch (30% versus 16% of programmes; AOR = 2.19, [95%CI 1.82-2.65]).

Conclusions—Young children under the age of two frequently watch background media that has age-inappropriate content or has not been turned on for them to watch.

Keywords

Media; Young Child; Television

Emerging data suggests that the impact of electronic media exposure on young children's cognitive and psychosocial development varies, depending upon whether the programme content is in the foreground or background. Programming that is designed for young children (child-directed), comprehensible to the child and watched by the child is referred to as “foreground” programming (1). Programming that is not produced for children (not child-directed), not comprehensible and not watched by the child is referred to as “background”. While foreground exposure is adversely associated with attention, cognition and language

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outcomes (2-6), background exposure interferes with parent–child interactions (7-10) and the quantity and quality of play (11-12).

Given the different impacts of foreground and background media exposure on child development outcomes, it would be useful to understand the circumstances in which children do or do not watch programming to which they are exposed. Prior studies have suggested that the child's age, whether the content of the programme is intended for a child and whether it has been chosen by the parents play a role in determining general exposure and, in particular, predict whether the child watches the programme (13-17). Limitations of prior studies have included: i) lack of a well-defined differentiation between foreground and background media exposure and ii) the use of cross-sectional study designs, in which change over time could not be assessed.

In addition, previous studies have focused primarily on patterns of media exposure in middle-income and high-income children, so we don't know whether similar factors influence patterns of media exposure in low-income populations who may be at greatest risk for adverse developmental consequences. The need to develop a better understanding of foreground and background media was recently highlighted in a study that documented that the greatest amount of background exposure occured among children under the age of two years from low-income families (18).

The gap in knowledge regarding what children watch and don't watch has complicated efforts to determine degree of exposure as well as the impact of foreground and background media exposure. We therefore sought to address this gap by studying patterns of exposure in a low-income sample of children who were followed longitudinally. We had two hypotheses. The first was that children would be more likely to watch programming as they got older and when the programming was specifically aimed at them. The second was that younger children were likely to watch a greater proportion of media that were not intended for them.

Patients and Methods

Study Design

We performed a longitudinal analysis of mothers and infants, from birth to 36 months, who were participating in the Bellevue Project for Early Language, Literacy and Education Success (BELLE), a study assessing the role of primary care interventions in promoting child development through enhanced shared reading and play. Two interventions, the Video Interaction Project (19-20) and Building Blocks were studied in the larger project. Both were designed to enhance shared reading and play, but did not specifically focus on media.

Study Sample

Consecutive eligible mother-infant dyads were enrolled in the postpartum unit of Bellevue Hospital Center, New York, an urban public hospital that primarily serves low-income families. Inclusion criteria, as described previously (9), were: intention to receive paediatric primary care at our institution for at least three years, uncomplicated full-term delivery and no Early Intervention eligibility. The mothers needed to be the child's primary caregiver, be

at least 18 and have no medical problems. They also needed to speak English or Spanish as their primary language and be contactable by phone.

We obtained written informed consent from the parents before participation and the study was approved by the New York University School of Medicine Institutional Review Board and Bellevue Hospital Center Research Committee.

Study Variables and Assessments

Data were obtained by maternal reports on each programme the child had been exposed to. The independent variables were the child's age and whether the programme was intended for the child, based on the programme content using industry ratings and whether the programme was turned on by the parent for the child. The dependent variable for each programme exposure was whether the child watched the programme. We also assessed potential confounders.

Assessment of whether programme was intended for the child—We determined whether each programme was intended for the child using a 24-hour recall diary of electronic media exposure in the home, obtained by interviewing the mother when the child was six, 14, 24 and 36-months-of-age (21-22). We asked the mother to provide information about all electronic media - television, videos, DVDs, movies, and games – that the child had been exposed on the most recent typical day. This included the name of the television show, movie or game, so that we could categorise the content, and whether the programme had been turned on for the child. We asked the mother to include all programmes that were on while the child was present and awake, from when they woke up in the morning to when they went to sleep at night. Information from the diary was then used to determine whether the programme was intended for the child, based on the programme content and whether the programme was switched on for the child.

Programme content—We used a classification system developed by two of the authors to categorise each programme into one of five categories, using the programme names provided by the mother (10,22). To do this, we used information obtained from industry rating systems and consumer media websites such as TV Parental Guidelines, TV Guide, and Motion Picture Association of America (23-25).

A. *Educational young child-directed programmes* consisted primarily of programmes with educational content intended for children aged two to six years, such as *Sesame Street* and *Blue's Clues*. In addition, media marketed as infant-directed and educational, such as *Baby Einstein*, was also included in this category. However, there were a limited number of exposures to this type of media.

B. *Non-educational young child-directed programmes* consisted of programmes intended for children aged from two to six years without educational content, such as *The Rugrats*.

C. *Older child-directed / teen-directed programmes* consisted of programmes intended for school-aged children of seven years and older and teenagers, but not considered

appropriate for young children on the basis of violence and other content. One example is *Mighty Morphin' Power Rangers*.

D. *Adult-directed programmes* consisted of all television programmes directed to adults, including news, sports, game, talk, variety, soap opera, drama and comedy programmes. Examples include *Good Morning America* (talk show), *La Fea Mas Bella* (soap opera) and *Law and Order* (drama).

E. *Unknown programmes* represented instances in which we were unable to categorise a programme owing to incomplete information due to inadequate parent recall.

Whether programme was turned on for the child—For each programme, we asked the mother: “For whom was the programme turned on?” A programme was considered to be turned on for the child if the child was at least one of the household members for whom the programme was turned on.

Assessment of whether the child watched the programme—We determined whether the child watched each programme based on data collected from the media diary described above. We asked the mother what the child was doing during each programme: “mostly watching”, “sometimes watching” or “not watching”. Children were considered to be watching the programme if the mother reported mostly or sometimes watching.

Potential Confounders—We collected sociodemographic data from maternal interviews conducted during the post-partum period. This information included the mother's education, age, language spoken, birth country and marital status and the child's gender and birth order.

Statistical Analysis

All analyses were performed at the programme level, adjusting for repeated measures across subjects with generalised estimating equations (GEE) using Stata Statistical Software: Release 12 (College Station, Texas: StataCorp LP).

First, we analysed the associations between the independent variables - the child's age and whether the programme was intended for the child, defined as young child-directed content and/or turned on for child - and the dependent variable, which was whether the child watched the programme. These analyses were performed with and without inclusion of confounder variables. Coefficients were exponentiated to derive Odds Ratios (OR) and 95 % Confidence Intervals (CI).

Second, we analysed the association between the child age and whether the child watched the programme in relation to the two variables assessing intention. Specifically, we performed separate GEE analyses, in which child age was the independent variable and whether the child watched was the dependent variable, for each category of media content and by whether the programme was turned on for the child. For these analyses, child age was dichotomised as two-years-old and older (24 and 36 months) versus less than two-years-of-age (six and 14 months), consistent with recommendations from the American Academy of Pediatrics that children under two-years-of-age should not view electronic media(26).

Finally, we analysed the degree to which the child's age was associated with media that had not been intended for the child, in others words it was neither young child-directed content or turned on for the child. This was achieved through GEE analyses, in which age was the independent variable and whether the programme was intended for the child was the dependent variable, with separate analyses for programmes that were watched and not watched by the child.

Results

Descriptive Data

From 1 November 2005 to 31 October 2008, we enrolled 675 mother-newborn dyads. Of these, 527 (78 %) completed one or more media diaries and were included in in this study. Descriptive data are shown in Table 1. The majority of mothers were Spanish speaking, not born in the USA and living with a partner. Mother-child dyads who dropped out of the study before the child was two-years-old were more likely to have had mothers who were younger ($p=0.02$), English speaking ($p<.001$), born in the USA ($p<.001$) and have graduated high school ($p=.003$).

Media programmes

The majority of media programmes were television shows. Across all ages, less than one per cent of programmes were video games. A limited number were movies, amounting to less than five per cent for children under two-years-old and around 15% for those over the age of two. Programmes were more likely to be watched by children as they got older (Table 2). For example, 36-month-old children watched 90.8 % of programming to which they were exposed, compared to six-month-old infants who watched 65.5 % of programming (Adjusted Odds Ratio (AOR) 2.01 [95 %CI 1.42-3.10]). Similarly, young child-oriented programmes were more likely to be watched (educational 93.5 %; non educational 93.3 %), than programmes intended for adults (54.4 %; young child educational vs. adult AOR 3.46 [95 % CI 2.50-4.78]; young child non–educational vs. adult AOR 4.26 [95 %CI 2.48-7.31] respectively). Programmes were more likely to be watched if the programme was turned on for the child than if it was not (AOR 12.79 [95 %CI 9.58-17.07]). In addition, within the subset of programmes that were reportedly watched sometimes or mostly, 78% of programmes watched by younger children were “sometimes” watched, compared to 64% for older children ($p<.001$).

We then looked at the relationship between child age and whether the child watched the programme for each category of media content and by whether the programme was turned on for the child (Table 3). We found that older children (two-years-old or greater) were more likely to watch programming across all media content categories (all $p<0.01$) and to watch programming that was not turned on for the child ($p<.001$) compared to younger children (less than two-years-old). In the sub-group analyses, children who watched more adult-directed programmes as younger children also did so when they were older ($p<0.001$). However, age was not a predictor of whether children watched programmes that were turned on for them, with more than 90% of such programmes being watched by the child regardless of age ($p=0.12$). Interestingly, the majority of the programmes that children watched that

were turned on for them, were also age-appropriate (less than two-years-old: 585 of 896 programmes or 65.3 %; two years and older: 730 of 1043 programmes or 69.9 %). Limiting analyses to the 298 children who had one or more assessments at both the younger and older ages led to similar patterns of association.

Figures 1a and 1b show the proportion of media represented by programmes intended for the child (young child-directed and/or turned on for the child by the parent) in relation to child age. The analysis of programmes that had been watched (Figure 1a), showed a higher proportion of programmes that had been intended for the child, because the content was young child-directed or had been turned on by the parent. For children aged two years and older the figure was 57% of programmes and for children under this age the figure was 40% ($p<.001$ [AOR: 1.97; 95 %CI 1.68-2.30). A greater proportion of programmes that were neither young-child directed or turned on for the child by the parent were watched by children who were less than two-years-old (30.4%) than children who were over the age of two (16.4%; AOR = 2.19, 95 %CI 1.82-2.65). In contrast, when it came to programmes that had not been watched (Figure 1b), most programmes showed no evidence of being intended for the child regardless of age and they were watched in similar proportions by younger and older children (83.4 % vs. 81.2 %, [AOR=1.15; 95 %CI 0.74-1.77]).

Discussion

To our knowledge, this is the first study to assess factors associated with whether children actually watch the programmes they are exposed to in their homes. Regarding our first hypothesis, programmes were more likely to be watched by children as they got older or if the programme showed evidence of being intended for the child (either with young child-directed content or with having been turned on for the child). Furthermore, as children became older, programmes were more likely to be watched across all content categories, even if they were not turned on for them. However, programmes that had been turned on for the child were frequently watched regardless of age, with the majority of programmes turned on for the child watched by both younger and older children. Regarding our second hypothesis, we found that programmes intended for the child made up a greater proportion of programmes watched by older children compared to younger children. In particular, for younger children, nearly one-third of programmes watched were not intended for the child (not young child-directed and not turned on for the child). In contrast, programmes that had not been watched were predominantly not intended for the child regardless of age.

A large body of prior work has sought to better understand foreground and background media in the context of patterns of exposure by content, attention to programming by content and parental motivations in turning on programmes for the child. Regarding patterns of exposure, both early longitudinal studies and more recent cross-sectional studies have shown that exposure to different types of content change as children age beyond infancy, with the relative proportion of child-directed content increasing and the relative proportion of adult-directed content decreasing (13,15,27).

Regarding attention to programming, experimental studies have found reduced attention to adult-directed programmes across the preschool period (28) and that repeated exposure,

together with adult interactions, promoted attention to infant directed content (14). Finally, population-representative surveys have identified reasons that parents turn on programmes for their children, including perceived educational value, potential use as a “babysitter” to allow them to get chores done and to help the child stay quiet (15,29). Our study adds to this work by longitudinally assessing characteristics associated with whether the child watched programmes to which they had actually been exposed in the home.

Our results show that there is a substantial amount of programming that was not intended for the child, but was nevertheless watched. This is important given the ubiquitous presence of television, with one-third of young children living in households in which a television is on most or all of the time (29). Young children are therefore exposed to a steady stream of media by parents that investigators may view as in the background due to adult-directed content (4,13) but nonetheless may be watched. This is concerning as adult-directed programming in older school-age children has been associated with sleep disturbances (30).

Findings from this study therefore suggest the potential need to reconsider definitions of foreground and background media in very young children (1,7). In particular, the present definition of foreground media may not sufficiently account for all programming watched by children in their homes, while the present definition of background media may overestimate programming not watched by the child. While programme content and who the programme is turned on for were important predictors of what the child watched, the definition of foreground and background cannot be solely based on these criteria. Refining these definitions would be important for clinical, research and policy efforts in order to better understand consequences of media exposure and develop interventions to reduce exposure.

The primary limitation of this study relates to our determination of whether the child watched or did not watch each programme. Watching was considered present based on maternal report of “sometimes” or “often”, utilising a previously validated media exposure instrument (21, 22). However, this measure is still subject to bias, as it is based solely on maternal reports. Future study including direct observation of the child in the home would be needed to address this issue. In addition, we studied maternal intention for the programme to be watched by the child in relation to young child content that had been turned on for the child. Qualitative study would be needed to understand underlying parent decision-making processes regarding which programmes are or are not turned on for the child. We also focused on the total number of programmes and not on the duration of programmes. It may be that young children were watching more programmes that may reflect less overall time. Future analyses will look at change over time in duration of programmes watched. Another limitation of utilising reported data is that it is possible that repeated watching of episodes of the same programme could have been reported as a single programme viewing. Additionally, this data pre-dates tablet and smart phone use and it would be interesting to reassess in future study what impact these changes have had. Finally, our results are applicable to low- income, primarily Spanish-speaking families and may not be applicable to other populations.

Results from this study are important and have implications for researchers, policy makers and clinicians. For researchers, findings suggest that specific details about watching need to be obtained in order to accurately distinguish between foreground and background media exposure. As they develop recommendations and guidelines, policy makers should recognise that media exposure in infants and toddlers extends well beyond young child content programming and programmes turned on for the child. Finally, clinicians should advise parents to limit all exposure of young children to media, including background media that is not intended for the child.

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Key Notes

- This study explored whether 527 young children watched foreground electronic media or background media that was not aimed at them or was inappropriate for their age.
- Children were significantly more likely to actually watch programmes if they were older, the content was educational or the parent had turned it on for them.
- Younger children watched more background media that featured age-inappropriate content or had not been turned on for them.

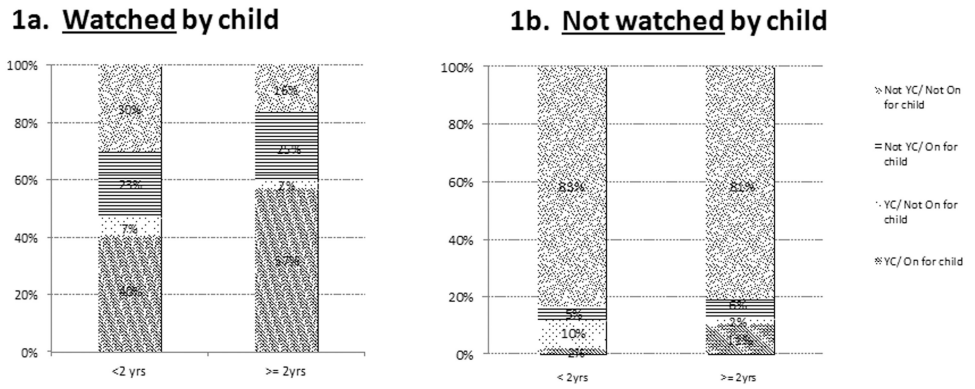

Figure 1. Proportion of programs intended for child (young childdirected content* and/or turned on for child) by age, among programs

Note. YC: Young child-directed; On for child: Turned on by parent for the child

*Young child-directed includes young child-directed educational and non-educational media

Table 1

Descriptive Data (n=527 dyads)*

MOTHER	
Mean (SD) age, yrs	27.8 (5.4)
High school Graduate	223(42.3%)
Married or living with partner	447 (84.9%)
Non-US Born	459 (87.1%)
Spanish Language	422 (80.1%)
CHILD	
Female	268 (50.9%)
First born	213 (40.4%)

*All descriptives shown as mean (sd) or n (%)

Table 2

Independent predictors of child watching the program (n=3,570 programs)*

		# programs watched/ total programs (% watched)	OR (95% CI)	AOR (95% CI)†
Child age	6 months‡	715/1091 (65.5%)	-	-
	14 months	748/1007 (74.3%)	1.53 (1.27-1.85)	1.61(1.29-2.02)
	24 months	823/960 (85.7%)	3.08 (2.47-3.85)	2.21 (1.70-2.87)
	36 months	465/512 (90.8%)	5.22 (3.73-7.30)	2.01 (1.42-3.10)
Media Content	Young-child directed (educational)	1191/1274 (93.5%)	14.13 (10.70-18.67)	3.46 (2.50-4.78)
	Young-child directed (non-educational)	251/269 (93.3%)	10.75 (6.77-17.06)	4.26 (2.48-7.31)
	Older Child/Teen	168/200 (84.0%)	4.01 (2.76-5.83)	2.26 (1.43-3.56)
	Unknown	531/714 (74.4%)	2.39 (1.95-2.92)	1.49 (1.18-1.89)
	Adult‡	599/1101(54.4%)	-	-
Program turned by parent on for the child	Yes	1969/2043 (96.4%)	23.66 (18.13-30.89)	12.79 (9.58-17.07)
	No‡	782/1527 (51.2%)	-	-

Note. AOR, adjusted odds ratio; CI, confidence interval: OR, odds ratio

*Analysis done at level of program; n=3,558 programs for content

†AOR - adjusted for all potential confounders (Child: gender, birth order; Mother: age, language, birth country, education, marital status) using Generalized Estimating Equation

‡Reference group

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Table 3

Relationship between child age and whether programs were watched based on if intended for the child (By each category of media content and by whether the program was turned on by parent for the child)

				# (%) watched of programs exposed						
	Age (mos)	Total number of children	Total number of programs	By media content*					By whether program was turned on by parent for the child	
				Young Child-Educational	Young Child-Non Educational	Older Child/ Teen	Unknown	Adult	Yes	No
	6	407	1091	237/280 (84.6%)	71/84 (84.5%)	34/51 (66.7%)	144 /216 (66.7%)	229/460 (49.8%)	455/489 (93.0%)	260/602 (43.2%)
< 2yrs	14	324	1007	326/344 (94.8%)	50/53 (94.3%)	33/42 (78.6%)	166/230 (72.2%)	169/333 (50.8%)	464/472 (98.3%)	284/535 (53.1%)
	24	358	960	398/412 (96.6%)	78/80 (97.5%)	55/58 (94.8%)	132/161 (82.0%)	154/243 (63.4%)	641/660 (97.1%)	182/300 (60.7%)
≥ 2yrs	36	296	512	230/238 (96.6%)	52/52 (100%)	46/49 (93.9%)	89/107 (83.2%)	47/65 (72.3%)	409/422 (96.9%)	56/90 (62.2%)
	p-value†		**3570**	**p<.001**	**p=.006**	**p<.001‡**	**p<.001**	**p<.001**	**p=.12**	**p<.001**

*Number of programs watched/ number of programs exposed in category (%)

†p-values between < 2 yrs (6 & 14) months and ≥ 2 yrs (24 & 36) months, adjusted for confounders (Child: gender, birth order; Mother: age, language, birth country, education, marital status)

‡Convergence not achieved