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Young Children and Media Limitations of Current Knowledge and Future Directions for Research

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Although television viewing has been a normative activity for 50 years, the rise of infant viewing is a relatively recent phenomenon. The American Academy of Pediatrics discourages TV viewing in the first two years of life. The scientific evidence base supporting this recommendation has been meager but is growing. This article reviews the limitations of our current knowledge and argues in favor of additional focused research on media's effects on very young children.

Keywords: *TV; media; children; infants*

The phenomenon of very young children watching television is not new, but it has taken on increased urgency of late with an explosion of products and programs specifically targeting infants and toddlers (Garrison & Christakis, 2005). In spite of American Academy of Pediatrics recommendations that children younger than the age of 2 years be discouraged from watching television, a study from the 1990s reported that 48% of 1- to 2-year-olds and 17% of infants from birth to 1 year old are reported by their parents to watch TV (Certain & Kahn, 2002). More recent studies have found that 74% (Rideout, Vandewater, & Wartella, 2003) to 100% (Weber & Singer, 2004) of children watch television before the age of 2. Today, the median age at which children begin to regularly watch television is approximately 9 months (Zimmerman, Christakis, & Meltzoff, 2006). This dramatic shift in the initiation of viewing occurs in a setting with limited scientific knowledge of the effects of television at this age (Garrison & Christakis, 2005). This article will make the case that media's effects on preschool children warrant special consideration by the research community as well as by society at large. It will also explore limitations in the current research base in terms of both conceptualization of viewing and measurement of exposure and effects and suggest future research directions.

Why Focus on Young Children?

There are ample reasons to be concerned about the differential effects of television viewing on very young children compared to their older counterparts (American

Academy of Pediatrics, 1999; Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004; Zimmerman & Christakis, 2005). First and foremost among them is the fact that their brains are undergoing rapid changes during the first 3 years of life (Barkovich, Kjos, Jackson, & Norman, 1988; Giedd et al., 1999; Greenough, Black, & Wallace, 1987). This critical window of synaptic development occurs in direct response to external stimuli and sets patterns for lifelong function. Accordingly, the quality, intensity, and types of stimulation encountered during this age may have lasting effects on cognitive development. The influence that television might play in this neuromaturational process should not be understated. Estimates of media usage in children younger than the age of 3 suggest that children watch on average about 1 to 3 hr per day (Christakis, Ebel, Rivara, & Zimmerman, 2004; Christakis, Zimmerman, et al., 2004; Rideout & Hamel, 2006; Rideout et al., 2003). A significant proportion of children are exposed to considerably more, especially in light of the fact that 30% of U.S. households report having a television on all the time even if no one is watching it (Rideout & Hamel, 2006). To put this exposure into perspective, it must be noted that children younger than the age of 3 are awake for only 10 to 12 hr per day, suggesting that as much as 30% of their waking hours may be spent in front of a monitor. The effects of television on the developing brain may be mediated through two pathways. The salient features of the medium itself—the quick cuts, the bright lights, and music—could overstimulate the developing brain, leading to long-term effects on cognition and attention (Christakis, Zimmerman, et al., 2004; Healy, 1990, 2004; Winn, 2002). In addition, the time spent with media could displace other, more age-appropriate and developmentally appropriate activities, such as reading, singing, or speaking “parentese.” Second, early viewing habits predict future ones (Certain & Kahn, 2002; Christakis & Zimmerman, 2006). We recently reported that the more television children watch before the age of 3, the more likely they are to protest having the television turned off at school age (Christakis & Zimmerman, 2006). Third, preschool children represent a population for whom both benefits and harms of viewing have been demonstrated. In fact, for children ages 3 to 5 years, numerous studies have demonstrated that appropriate viewing of high-quality content can improve children’s cognitive and behavioral development (D. R. Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; J. L. Singer & Singer, 1998); however, preschool children have also been shown to be at risk for adverse cognitive and behavioral outcomes related to viewing (Christakis, Zimmerman, et al., 2004; Paik & Comstock, 1994; Zimmerman & Christakis, 2005; Zimmerman, Glew, Christakis, & Katon, 2005).

Conceptual Model

A conceptual model for the effects of media exposure on child outcomes is presented in the Figure 1. Direct effects (Arrow 1) are frequently estimated by regressing

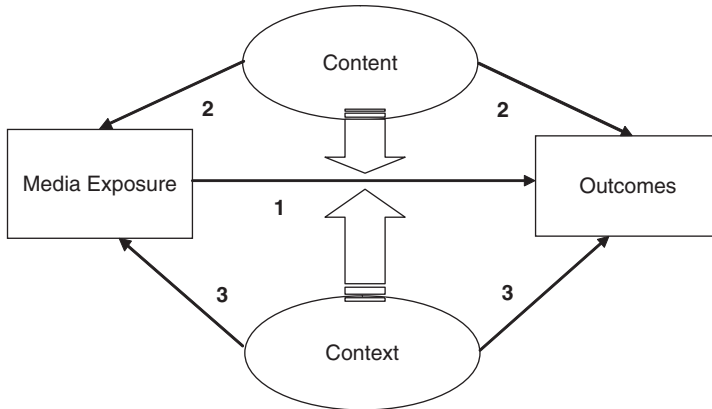
exposure (measured as hours per day) on outcomes of interest while attempting to control for a variety of covariates (typically demographic ones). Unfortunately, such an approach oversimplifies exposure to media by explicitly discounting two critical moderators: content and context. Ample data exist to suggest that more important than how much children watch is *what* they watch (e.g., what types of programs) and *how* they watch (e.g., alone or with parents or other caregivers; Forge & Plemister, 1987; Friedrich & Stein, 1973, 1975; Friedrich-Cofer, Huston-Stein, Kipnis, Susman, & Clewett, 1979). For example, certain shows have demonstrable benefits with respect to cognitive and behavioral outcomes, whereas others have been shown to promote aggression (C. A. Anderson, 2002; D. R. Anderson et al., 2001; Paik & Comstock, 1994; J. L. Singer & Singer, 1998; M. I. Singer et al., 1999). The salubrious effects of television can be enhanced and the harmful effects mitigated by the presence of an adult moderator (Bankart & Anderson, 1979; Friedrich & Stein, 1975; Friedrich-Cofer et al., 1979; Silverman & Sprafkin, 1980). As a result, more nuanced assessments of television viewing are needed, assessments of which include data on both the content and the context of viewing. Conceptually, *television viewing* may be an inadequate terminology because it privileges the passive visual aspect of the medium to the exclusion of other critical ones. A more appropriate phrase is *television experience* because it captures a broader sense of all that may be going on while the child watches. Measuring the television experience requires assessing both the content and context of viewing. Analytic models should consider both the direct and the moderating effects of both (Arrows 2 and 3).

Limitations of Current Research Base

The importance of the early viewing experience and its effects on child development notwithstanding, our current knowledge with respect to it is unfortunately quite limited. Research into the effects of media on very young children lags far behind the widespread dissemination of products. As a result, available programming targeting children younger than the age of 2 years is not informed by scientific data, and we are, in effect, in the midst of a large, uncontrolled experiment on today's infants and toddlers.

Issues related to measuring exposure. Our understanding of media effects is hampered by limitations in our current ability to measure exposure. A variety of techniques have been historically used to measure the amount of media children watch. These have included global estimates (e.g., how much television does your child watch on a typical weekday?). Although correlated with actual viewing, such estimates are inherently inaccurate and may bias results (D. R. Anderson, Field, Collins, Lorch, & Nathan, 1985; Borzekowski & Robinson, 1999). Other options, including time diaries,

Figure 1
Conceptual Model of Media Exposure and Outcomes



hold greater promise, and need to be overly burdensome for parents (Timmer, Eccles, & O'Brien, 1985). Proprietary devices, such as the people meter (Nielsen) or the portable people meter (Arbitron), are not generally available for research purposes. Issues related to measurement are discussed at greater length elsewhere in this issue (Vandewater & Lee, 2009). Furthermore, in light of the conceptual model presented in Figure 1, it is unfortunate that most existing data sets collect very little if any data on the critical moderating variables of content and context. As important as both are, we know very little about how they operate at a population level. This oversight is not entirely coincidental. Collecting detailed data on what programs are being watched is no mean feat. Providing lists of program titles involves literally thousands of options, which will almost certainly be incomplete. Having parents enter free text also presents coding problems. Some researchers have resorted to taxonomizing programs into categories (e.g., educational vs. noneducational programs or children's versus adult programming). Unfortunately, there is no consensus on how programs should be categorized. Although there would be widespread agreement of shows at either extreme (e.g., *Sesame Street* vs. *Jackass*), there is an enormous gray area, where consensus among either parents or researchers can be difficult to achieve. Furthermore, content alone is not sufficient to categorize programs. *Sesame Street* is educational for children at a certain age, but for younger children, it has been associated with delayed language acquisition (Linebarger & Walker, 2005). Hence, the show itself is not determinative of its value; the context in which it is viewed in large part may establish it as educational or not. Unfortunately, collecting data on context of viewing is not easily done using traditional survey methodology. Asking whether a parent is present during viewing is simple enough

(although it may or may not have validity), but assessing whether parents are actually watching a program with their child, whether they are processing it and discussing it with them, is more difficult to know, and it is precisely these behaviors that moderate the effects of viewing on outcomes. In addition, standard measurement techniques are poorly equipped to handle today's multitasking generation. Even diaries that collect primary and secondary activities are limited in situations where three or four are occurring concurrently with no obvious hierarchical relationship. And even research that does address content has to date not focused in a detailed way on commercials, although their effects on child outcomes are as great or greater than any of the programs actually viewed (Christakis, 2006; Institute of Medicine, 2006). Although a program may be considered acceptable for general audiences, the commercials that occur during it may well not be. Exposure to alcohol advertisements, a mainstay of sports programming, which is rated for general audiences, has been found to increase the risk of adolescents' consumption of alcohol (Snyder, Milici, Slater, Sun, & Strizhakova, 2006). Finally, collecting exposure data in the context of a study of media can be affected by transparency of design. The Hawthorne effect can significantly change viewing habits of families. We have found that in the context of television monitoring and reduction trials, the simple act of having parents record what their child watches has profound effects on viewing behavior. Although this is useful as an intervention, it makes collecting naturalistic data more difficult.

Questionable Generalizability

The most robust studies on the effects of television viewing to date come from experimental trials. Unfortunately, many of these have been implemented in situations that hamper their generalizability. For example, studies conducted in laboratory settings, or with select populations, or with short-term follow-up (e.g., immediately after or shortly after) viewing, although essential to our understanding of certain aspects related to viewing (e.g., attention to screen, etc), inherently tell us very little about real-world behaviors and effects. An additional 30 min of viewing, whether as a single session or as multiple ones, may have marginal effects when superimposed on a background rate of 20 or more hours per week. And viewing in a laboratory setting as opposed to a naturalistic one imposes both implicit and explicit constraints on the viewing experience. For example, parents restricted to a room with their children while the television is on may well interact with them in ways they would not when their child is watching at home and they have alternative activities or tasks to attend to. Accordingly, laboratory settings hold marginal promise for assessing real-world contextual features of viewing. Furthermore, many of these experimental studies have been conducted years ago, using programming that is no longer available, exposures that are decidedly briefer than current averages, and children who are older than many children are today when they begin viewing.

Future Research Directions

In light of current limitations to the existing research base, it is clear that considerable work in the area of young children and media is needed. Media's presence in the lives of young children is large and growing. Given this irreversible trend, the reality is that research paradigms must focus on behavioral optimization rather than on reduction or elimination of TV altogether. The harm-reduction approach adopted by the addiction research community provides a useful analogy but only to a point. Needle distribution and methadone maintenance programs can reduce the spread of AIDS and crimes inspired by drug craving. But aside from reducing untoward effects, there is no demonstrable benefit to such policies. The upside is all about reducing the downside. In the case of media and children, the situation is a bit more complicated. Although a great deal of programming is harmful to children, other shows have proven benefits. Appropriate use of media, then, need not be based entirely on minimizing harm but on maximizing benefit as well.

In terms of research design, several limitations should be addressed. In general, population-based experimental studies with long-term follow-up are needed. In some cases, these should be conducted as efficacy studies, designed to enhance our understanding of causal relationships. For example, does early television viewing reduce attention spans later in life? Answering this will require a long-term intensive intervention to reduce early exposure. Because randomizing children to watch television or not would be unethical, we need an experimental design based on an intensive intervention designed to reduce viewing. Although not practical on an ongoing basis, such efforts are needed to determine whether such a relationship truly exists. Similar high-intensive interventions have been used to assess the benefits of breastfeeding (Kramer et al., 2001). Furthermore, based on the conceptual model outlined herewith, analogous studies should manipulate and evaluate the effects of content and context of viewing.

Effectiveness trials are needed to test pragmatic, implementable, cost-effective approaches to media optimization for children. This public health approach is vital to ensuring that what we learn from scientific experiments can be scaled up to benefit broader populations of children. Efficacy studies can inform effectiveness ones both by providing a definitive understanding of causal relationships and by identifying subpopulations most likely to benefit from a program. To date, very few such studies have been conducted. Both efficacy and effectiveness studies should focus on theory-driven outcomes derived from the existing research base. There are ample hypotheses generated from cross-sectional and longitudinal studies, laboratory-based assessments, and general developmental theory. Real-world experimental manipulation of media exposures is needed to test these. Moreover, studies should be solution oriented in their design, exploring specific approaches and populations that might benefit from interventions (Robinson & Sirard, 2005). In the case of young children, the possibility of a primary prevention approach to excessive or inappropriate viewing should be explored. Rather than focusing on television reduction strategies later in life, a fruitful approach may be to establish appropriate usage during infancy and early childhood.

Finally, gene–environment effects should be explored. Media exert considerable environmental influence on children’s development. These effects may indeed be more pronounced in the setting of particular genotypes. Candidate genes for depression, externalizing behaviors, and attentional problems have been identified. To what extent these interact with media exposure is unknown but of central importance.

All of these questions require resources to explore. Given the considerable influence that media are exerting on our children, funds should be allocated to advance the scientific field. There is clearly public interest in learning more about how to best use media to optimize children’s cognitive and social development. And lately there has been interest from Congress as well. The Children and Media Research Advancement Act has bipartisan support in both houses. Its passage will hopefully spur much needed research.

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