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When the television is on: The impact of infant-directed video on 6- and 18-month-olds' attention during toy play and on parent–infant interaction

Mary L. Courage*, Ashley N. Murphy, Stephanie Goulding, Alissa E. Setliff

Memorial University, Newfoundland, Canada

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ABSTRACT

The pattern of 6- and 18-month-old infants' and their parents' attention to toys, a commercially available infant-directed video, and each other were examined in a 20 min free-play context as a function of whether the television was on or off. The results indicated that infants at both ages directed significantly more of their attention to the toys than the video when the toys were novel. Attention to the parent was low across the session. Parents directed most of their attention to the infants and the toys and relatively little to the video. They also talked to and played with their infants less when the video was on than when it was off. These results are discussed in terms of Cohen's (1972) model of attention-getting and attention-holding and the implications of this for learning and distractibility.

Parent report data indicate that infants begin watching video material as early as 3 months of age and become regular viewers over the first 2 years, watching an average of 1–2 h a day (Rideout & Hamel, 2006; Zimmerman, Christakis, & Meltzoff, 2007). Although parents state that most of the viewing is of child-appropriate material, babies of this age are also exposed to additional "background" television that is not directed at them specifically but that periodically gets their attention during play (Anderson & Evans, 2001; Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008; Setliff, Murphy, & Courage, 2008). The amount of screen time that very young children experience will likely increase as new infant-directed programming (e.g., the *BabyFirstTV* 24-h channel) and digital technologies (portable DVD players) become widely available.

Infant-directed video material is often marketed either explicitly or implicitly as an opportunity to enhance early learning (see Garrison & Christakis, 2005) and in a recent survey 56% of parents queried indicated that baby videos can have a very positive effect on early child development (Rideout, 2007). It is not surprising therefore that the production of infant-directed video material has become a 200-million dollar industry (Park, 2007). However, empirical evidence indicates that learning from video material is unreliable at least before about 18 months of age (Barr & Hayne, 1999; Hayne, Herbert, & Simcock, 2003; Meltzoff, 1988; Robb, Richert, & Wartella, 2009). Even then, infants will show a "video deficit", the phenomenon whereby they typically learn new information and behavior more effectively from interaction with a live model than from a video model (see Anderson & Pempek, 2005; Barr, 2008; Deloache & Chiong, 2009). This video deficit has been observed in deferred imitation, object retrieval, word learning, and language recognition tasks (Barr & Hayne, 1999; Krcmar, Grela, & Lin, 2007; Kuhl, Tsao, & Liu, 2003; Schmitt & Anderson, 2002; Troseth, Saylor, & Archer, 2006).

* Corresponding author at: Department of Psychology, Memorial University, 300 Prince Philip Drive, St. John's, Newfoundland, Canada A1B 3X9. Tel.: +1 709 737 8027; fax: +1 709 737 4000.
E-mail address: mcourage@mun.ca (M.L. Courage).

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Research on the origin of the video deficit indicates that several perceptual, cognitive and social immaturities make learning from video difficult for very young children. One of these is the problem they have in equating information obtained from the 2D video format with that of the corresponding 3D live source (Barr, Muentener, Garcia, Fujimoto, & Chavez, 2007; Troseth & DeLoache, 1998). Another is the fact that their everyday experience with video tells them that the content is neither real nor directed to them personally and therefore not a source of useful information (Troseth, 2003). Mitigating these factors can result in improved video-learning performance. For example, Barr et al. (2007) showed that 12–21-month-olds who were given extended exposure to video modeling of action sequences increased their level of imitation to that of infants who had observed a live model. This is important as infants and toddlers usually watch television and video material repeatedly in their homes (Rideout, Vanderwater, & Wartella, 2003). Barr and Wyss (2008) showed that imitation from television was enhanced in 2-year-olds when appropriate verbal labels were provided either by the parent (live during co-viewing or on video) or as a "voice over" on the video itself. Finally, Troseth et al. (2006) reported that 2-year-olds who were provided with contingent interaction with a model via closed-circuit video prior to a hiding task were subsequently able to use that model's video instructions to find a toy (also see Nielsen, Simcock, & Jenkins, 2008).

However, these demonstrations of infant and toddler learning were based on simple video scripts designed to teach infants something quite specific (e.g., imitation of a modeled response) in a controlled setting. Few studies have used commercially available infant-directed video material such as would be found in a typical family home. In one such study, Robb et al. (2009) had parents show 12- and 15-month-olds a *Baby Wordsworth* video repeatedly at home and found they were no better on tests of expressive or receptive communication of target words than infants who did not view the video. Collectively, this research indicates that learning from videos is neither easy nor robust for infants and toddlers, findings that are discrepant with marketing claims and with parental expectations of this material.

The extent of infants' exposure to television and videos has also prompted concerns about the potential of this material to impede cognitive and social development, though to date there is little direct experimental evidence for this. One concern is that the rapid pace of changing images that characterizes children's television programs repeatedly elicits the infant's orienting reflex, compels their visual fixation on the screen, making it difficult for them to disengage. The argument has been made that this abnormal fixation might contribute to problems in the development of attention later on (e.g., increased distractibility; attention deficit hyperactivity disorder) (e.g., Christakis, Zimmerman, DiGiuseppe, & McCarthy, 2004; Landhuis, Poulton, Welch, & Hancox, 2007). Another concern is that exposure to television and videos are passive activities that interfere with time spent in more creative pursuits such as toy play, exploration, language and social interactions (e.g., Vandewater et al., 2005). A recent report on the impact of background television on toddlers' play showed that it significantly reduced the amount of focused attention they paid to their toys (Schmidt et al., 2008). These findings give weight to the recommendation of the American Academy of Pediatrics (2001) that infants under 2 years of age should not watch any video material at all. However, as with the studies that examined the learning potential of video material, few of the studies cited in support of these detrimental effects have included commercially available, age-appropriate material.

Several basic but interrelated questions about the impact of videos on infants' learning, play, and social interaction can be addressed by examining the manner in which they deploy their attention in a free play situation in which toys, an infant-directed video, and the activities of other people (e.g., a parent) compete for their attention. With this goal in mine, we examined the extent to which these three sources of stimulation were able to "get" (frequency of looks) and to "hold" (duration of looks) 6- and 18-month-old infants' attention and the implications this might have for learning and for distractibility. As described by Cohen (1972) and Cohen, DeLoache, and Rissman (1975), infants' attention consists of an attention-getting process that determines whether and how quickly they orient to a stimulus that has been detected and an attention-holding process that determines the duration they look at the stimulus once fixated. Attention-holding involves information processing, is influenced by the novelty and complexity of the pattern, and habituates over time, whereas attention-getting is primarily an orienting response and does not involve information processing or habituation.

Application of that model to the question of whether infants will learn from videos (or toys, or a parent) in a competitive context suggests that a necessary though not sufficient prerequisite might be that it both get and hold their attention. In contrast, attention-getting without attention-holding might preclude or delay learning from the video (or toys, or parent) and might also distract infants from other ongoing cognitive or social activities in which learning is also taking place. Although Barr, Zack, Garcia, and Muentener (2008) reported that infant-directed videos successfully held the attention of 12–18-month-olds, many new videos are marketed toward even younger infants and the ability of these to get and hold their attention is unknown.

A second goal of the present study was to examine parents' attention and responsiveness to their infants in this competitive play context. Barr and Wyss (2008) and Barr et al. (2008) showed that parents who co-viewed videos with their infants and who "scaffold" the viewing interactions with labeling, pointing, and questions had infants who spent more time looking at the television than did infants of parents who scaffold less. Though this study did not evaluate learning from the video directly, there is evidence from studies of storybook reading that greater attention to the material during parent–child interaction facilitated learning from it (Deloache & Mendoza, 1987). However, as the 6-month-olds in the study reported here were pre-linguistic, parents might engage their infants' attention to the video less than they would for the older 18-month-old infants thus reducing the likelihood that the younger infants might attend to the video. The parents' behavior during video viewing was also of interest as many infant videos are marketed as tools for fostering social interaction and the extent to which these claims translate into parent behavior is unknown.