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# The Influence of Television Exposure on Infants' Toy Play

Katherine G. Hanson

*University of Massachusetts Amherst*

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THE INFLUENCE OF TELEVISION EXPOSURE ON INFANTS' TOY PLAY

A Thesis Presented

by

KATHERINE G. HANSON

Submitted to the Graduate School of the  
University of Massachusetts Amherst in partial fulfillment  
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KATHERINE G. HANSON

Approved as to style and content by:

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Daniel R. Anderson, Chair

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David H. Arnold, Member

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Lisa S. Scott, Member

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Melinda A. Novak, Department Head  
Department of Psychology

ABSTRACT

THE INFLUENCE OF TELEVISION EXPOSURE ON INFANTS' TOY PLAY

SEPTEMBER 2010

KATHERINE G. HANSON, B.A., NEW YORK UNIVERSITY

ED.M., HARVARD UNIVERSITY

M.S., UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Daniel R. Anderson

The association between television exposure and infants' toy play was examined. Specifically, differences in the amount of program content and coviewing in the home were expected to predict different patterns of play when children were away from television. This thesis also sought to extend Pempek's (2007) findings indicating that the more parents coviewed certain baby videos (i.e., *Sesame Beginnings*) in the home with their children, the more likely these parents actively engaged with their children in the laboratory. Consequently, the current thesis examined whether or not this active engagement resulted in something meaningful for children's play behaviors. Parents of infants who were either 12- to 15- months or 18- to 21- months were given a TV viewing diary to record their children's TV exposure at home over a two-week period. In addition, parent-infant dyads were randomly assigned to view either *Baby Einstein* or *Sesame Beginnings* videos in the home. A control group was not assigned to watch any videos. All dyads visited the laboratory after the exposure period for a videotaped 30-min free-time session (no TV). Each observation was coded for the amount of time children spent in play, mean play episode length, and total number of play episodes as well as the level

of parent engagement. Results indicated that the amount of television exposure in the home did not influence infants' toy play even when program content and covieing were considered. Moreover, the increase in active parental engagement found in Pempek's study did not result in an increase in children's play behaviors. These results suggest that television does not have a distal influence on children's play behaviors, regardless of content, covieing, and level of parent engagement.

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# CHAPTER I

## INTRODUCTION

In the late nineties, the media industry began to produce materials specifically for infants. Many baby videos claimed to promote cognitive development and learning through their infant-designed content and encouragement of parent-child interaction. However, there was little research to support these claims. In response, the American Academy of Pediatrics (AAP, 1999) recommended that children under the age of 2 not watch any screen media. The AAP based this recommendation on research indicating the importance of early social interactions on brain development. Presumably, watching television replaces these crucial exchanges.

There is a growing body of research suggesting that screen media have a negative influence on infants' development. In particular, there are a number of correlation-based studies, dating back to the 70s, implicating early television exposure with poorer attention, cognitive, and language development (Carew, 1980; Chonchaiya & Pruksananonda, 2008; Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004; Nelson, 1973). However, many of these studies treat all television exposure equally and do not examine specific elements of viewing that can influence television's effects. More recent studies have shown that program content and the viewing context matter (Barr, Lauricella, Zack, & Calvert, 2010; Courage, Murphy, Goulding, & Setliff, 2010; Kirkorian, Pempek, Murphy, Schmidt, & Anderson, 2009; Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008; Zimmerman & Christakis, 2007). As a result, the current study examined two elements of TV viewing—*program content* and *parent-child coviewing*—that have potential to moderate lasting effects of TV exposure on 12- to 21-month old



infants' play when they are away from television. Among major developmental theorists, play is posited to be an important context for children's development (Piaget, 1962; Vygotsky, 1978).

This study is also motivated by Pempek's (2007) dissertation findings of which this data is a part. She examined how baby videos influence parent-child interactions. In the larger design, parents were given baby videos—either *Sesame Beginnings* or *Baby Einstein*—to watch in their home with their infant over a two-week period. A control group was not given a video to view. All parents were asked to record their children's exposure to television during this time. After the two-week period, parents and their children visited the laboratory for a 30-minute playtime session (No TV) that was recorded to code the level of parent engagement. The dyad came back a week later to watch one of the two baby videos and then partake in a 15-minute post-viewing playtime session without TV. Pempek found that there was an overall reduction in parent-child interactions when the TV was on. However, for the *Sesame Beginnings* parents, she found that the more they covieved the baby videos in the home, the more likely they were to actively engage with their children in the laboratory during the initial 30-minute free time session. This was not true for parents who viewed *Baby Einstein* in the home. Consequently, the current study examines whether or not this increased engagement among *Sesame Beginning* parents results in something meaningful for their children's play during the initial 30-minute session.

## **Infant Media Exposure**

### **Time Spent with Media**

Despite the AAP's recommendation, children under two are exposed to television. Approximately 61% of infants under the age of 2 watch television (Rideout & Hamel, 2006), consuming one to two hours of TV a day (Barr et al., 2003; Dalzell, Msall, & High, 2000; Pierrousakos, Hanna, Self, Lewis, & Brewer, 2004; Vanderwater, Rideout, Wartella, Huang, Lee, & Shim 2007). Moreover, 33% of infants live in homes where the television is on at least "most of the time" whether a family member is watching or not (Rideout & Hamel, 2006). This disparity between the AAP's recommendation and infants' media use is, in part, due to the lack of awareness among parents. Only 6% of parents are aware of the AAP guidelines (Rideout, 2004). However, even when parents are aware of the guidelines, it does not necessarily mean that they abide by them. Other factors, such as parental attitudes toward television and parent's own television habits, play an important role in determining infant exposure (Jordan, Hersey, McDivitt, & Heitzler, 2006).

Parental attitudes and beliefs about media appear to be the driving force in determining early exposure to television. A study by Weber and Singer (2004) found that 80% of parents were "comfortable" or "very comfortable" allowing their babies to watch television. An even higher proportion of parents reported that they were "satisfied" or "very satisfied" with the quality of programming for their child (Weber & Singer, 2004). This parental comfort and satisfaction with infant media appears to be influenced by the educational claims of baby videos. Survey data reveals that the top reasons that parents allow their child to watch television is based on the following: 1) their belief in its

educational value, 2) their child enjoys watching television, and 3) it provides them with time for parents to get “me” time or get chores done<sup>1</sup> (Dalzell, Msall, & High, 2000; Rideout & Hamel, 2006; Zimmerman, Christakis, Meltzoff, 2007). Research has found that parental beliefs toward media are one of the best predictors of TV viewing (e.g. Certain & Kahn, 2002; Dalzell, Msall, & High, 2000; Rideout & Hamel, 2006). In fact, many parents believe that educational videos are important for their child’s intellectual development (Garrison & Christakis, 2005).

Such parental beliefs translate into their child’s media exposure. Children under 6, whose parents believe that television encourages learning, are not only more likely to watch television, but they also spend 27 more minutes viewing than those children whose parents believe that television “hurts learning” (Rideout & Hamel, 2006). Furthermore, the best predictor of heavy TV watching households is parental beliefs about media. Parents of infants who believe that TV educates are twice as likely to live in a heavy TV household (Vanderwater, Bickham, Lee, Cummings, Wartella, & Rideout, 2005). Thus, these results suggest that infants’ TV exposure is most likely driven by parental belief in media’s educational value.

### **The Importance of Program Content**

The programs that infants watch reflect parents’ positive attitudes toward media. When asked to name their children’s favorite television programs and videos, parents named programs known to be educational, at least for older children, such as *Sesame Street* and *Blue’s Clues* (Weber & Singer, 2004). For videos, parents named more age-

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<sup>1</sup> ‘Television as a babysitter’ is a popular reason why parents allow children to watch television. However, some studies suggest otherwise. For example, Certain & Kahn (2002) found that a busy home life, as indicated by child care status and maternal employment (e.g.) are not good predictors of the amount of infant media consumption. This finding suggests that television as a babysitter may not be the primary reason for infant exposure.

appropriate programs including *Baby Einstein*, *Elmo*, *Barney*, *Teletubbies*, and the *Wiggles* (Weber & Singer, 2004). Although educational media may be a favorite thing to watch, infants are also exposed to background television. Pierroutsakos and colleagues (2004) asked parents to keep a television viewing diary for their infant between the ages of 2 ½ months to 24 months. They found that half of the infants' total exposure was dedicated to child-friendly content and half was dedicated to older children or adult content. Similarly, Schmitt (2001) reported that adult programming consisted of 55% of infant and toddler exposure. Thus, although parents report that they allow their infant to watch television because of its educational potential, they do not consider periods of incidental exposure when the infant may be in the presence of television and not watching. This discrepancy between parental beliefs about television's educational potential and actual practice highlights an important consideration. Program content is an important factor to take into consideration when gauging media's effects on young children.

Anderson and Evans (2001) suggest that television's influence on children is content dependent. They posit that program content can be divided into two broad categories: background television and foreground television. Background television (BTV) refers to programs, such as *Jeopardy* or *Spongebob*, designed for older children and adults that do not actively engage very young children's attention and comprehension. In contrast, foreground television (FTV) refers to children's programming, like *Teletubbies*, designed to actively engage their attention and comprehension. These two types of content can have very different effects on infants. Although both types of programs can have a potential negative effect on children,

research has shown that foreground television can have a positive effect, facilitating cognitive development and learning, at least for preschool-aged children and older (e.g. Anderson, Huston, Schmitt, Linebarger, & Wright, 2001). However, the educational and cognitive benefits for infants are less clear.

Anderson and Pempek (2005) conducted an extensive literature review on the impact of television on very young children. They noted that infants' ability to learn from screen media is limited by a *video deficit*. That is, infants have difficulty learning from video demonstrations compared to equivalent live demonstrations. The video deficit among young children calls into questions the educational claims made by baby videos and supports, in part, the AAP's recommendation. Furthermore, Anderson and Pempek reported that television exposure during infancy is generally associated with poor cognitive, attention, and language outcomes. However, many former studies did not examine content differences on later outcomes; rather, the studies examined television exposure as a whole. Of those that do separate content effects of television on infants, the findings have been mixed at best (e.g., Linebarger & Walker, 2005).

Background television is associated with poorer developmental outcomes for children, while foreground television is associated with mixed findings. Barr, Lauricella, Zack and Calvert (2010), for example, concluded that the amount of background television viewed at age 1 and 4 was negatively associated with poorer executive functioning at age 4. This was not true for foreground television. In terms of child-friendly content, Zimmerman and colleagues (2007) noted a significant negative relationship between watching baby videos at 8 to 16 months and language development. This association was not significant for infants 17 to 24 months. Linebarger and Walker

(2005) also examined language outcomes at 30 months and earlier infant television exposure. Their research indicated that outcomes were program specific. *Dora the Explorer* and *Dragon Tales* were positively associated with greater vocabulary and expressive language, whereas, *Teletubbies* was negatively associated with vocabulary and expressive language. These studies highlight that there may be a general negative association between background television and children's development. In contrast, foreground content has the potential to positively influence infants' abilities, but its influence may be dependent on age and specific programs.

In summary, infants are exposed to media on a daily basis, and their exposure is determined, in part, by parental beliefs toward media's potential to help promote their children's development. However, early correlation-based studies suggest that television exposure among infants is associated with negative outcomes, while more recent studies suggest that content is an important determinant of television's influence.

## **Television and Play**

### **The Development of Very Young Children's Play**

Given the prominence of TV in children's lives, the current study examines how television's influence on children's play behaviors has the potential to generalize to times when they are away from television. Major developmental theorists believe that play is an important context for development. It provides children with the opportunity to meaningfully, and yet manageably, interact with their environment and 'practice' a variety of skills from attention and language to more general cognitive and social skills (Piaget, 1962; Ruff & Lawson, 1990; Vygotsky, 1978). In play, children engage with people and objects, and these interactions, in turn, provide them with information to adapt

their future behaviors (Piaget, 1962). As children play with objects, for example, they learn about the objects' texture, weight, rigidity, function, and components, and they also fine-tune important skills like hand-eye coordination. In short, children's knowledge and skills are rooted in everyday play.

Although there is not a set definition of play, it is generally characterized by a variety of behaviors that includes positive affect, intrinsic motivation, active engagement, non-literality, and an interest in the means and not the end product (Rubin, Fein, & Vanderberg, 1983). Play is also characterized by a stage-like progression—from simple manipulations to more complex symbolic play—that occurs similarly across children. The quality and quantity of play at a given age can be viewed as a window into children's current perceptual, motor, and cognitive abilities.

During the first five months of life, infants predominantly engage in undifferentiated manipulative play behaviors that include mouthing objects and visual exploration of their environments (Fenson & Schell, 1985). At this time, play is centered on the pleasure of engaging in these sensorimotor activities (Piaget, 1962). Infants indiscriminately apply these actions to all objects given their limited knowledge and experience and poor cognitive and motor skills. Nevertheless, these simple exploratory behaviors provide children with the ability to gather useful information about objects (Ruff, 1984). As children become motorically coordinated, they engage in multimodal exploration grasping objects and visually explore them (Rochat, 1989).

From 6 to 12 months, infants' play becomes differentiated, and they begin to adapt their actions to specific objects (Casby, 2003; Belsky & Most, 1981; Fenson, Kagan, Kearsley, & Zelazo, 1976). As their visual-motor skills become more

sophisticated, mouthing decreases and fingering, rotating, and transferring objects from one hand to the others increases (Ruff, 1984). The properties of objects influence infants' play behaviors and length of time spent in play. Among 9- to 12-month-old infants, for example, variations in texture increase their looking behavior and fingering, while decreasing their dropping, throwing, and pushing behaviors (Ruff, 1984). Conversely, changes in weight promote more dropping and throwing. In addition, infants tend to play longer and prefer toys that are more complex and provide more feedback (e.g., plasticity or sound; McCall, 1971). Around 12 to 17 months, they begin to engage in functional play, manipulating toys based on its conventional use (e.g. putting lid on a pan) and relational play, associating two objects together (e.g., placing spoon on lid; Fenson et al., 1976). Their play also becomes more self-directed (feeding oneself) in contrast to early object-oriented play (Fenson & Ramsay, 1980).

At 12 months, the first signs of pretend play emerge (Fenson et al., 1976). Pretend play is characterized by a nonliteral, 'as if' quality. As infants cognitively mature and gain experience, their behavior becomes decentered, integrated, and decontextualized (Fenson & Schell, 1985; Fein, 1981). Around 16-19 months, infants begin to engage in other-directed acts enlisting inanimate objects (stuffed animals) in their play, and they begin to perform simple pretend schemes with their inanimate playmates (bear drinks from cup). Around 24 months, infants' play has simple structures, combining different action schemes into one, and they begin to represent imaginary objects (pretend cup).

During these early years, parents are a key factor in their children's play development. For children under two, parental guidance during play increases the quality and quantity of play (Bigelow, Maclean, & Proctor, 2004; Clark-Stewart, 1973; Fiese,



1990; Slade, 1987). Vygotsky (1978) proposed that children's learning and development depends on transactions between children and their social environment. Specifically, he argued that higher levels of cognitive functioning are first learned and performed on a social level. Children eventually internalize this knowledge, and they, then, can perform the behaviors independently. Vygotsky (1978) elaborates on this developmental process in his theory of the Zone of Proximal Development (ZPD). The first level in the ZPD is the "actual level of development," which represents what the child has mastered and can perform independently (Vygotsky, 1978, p.86). The second level is the "level of potential development" (Vygotsky, 1978, p.86). According to Vygotsky, children at this level can solve a task or problem through "scaffolding," in which the child collaborates with an adult or competent peer.

Mothers naturally engage in these scaffolding behaviors while playing with their children. Fiese (1990) examined 15- to 24-month-old children's play behaviors while the child was alone, with their mother in spontaneous play, and with their mother who modeled specific play behaviors. Children engaged in higher forms of play (e.g., symbolic play) when they were playing with their mothers. When playing alone, 15-24 month-old infants tended to engage in more exploratory, low-level play. Damast, Tamis-Lamonda, and Bornstein (1996) found that mothers are also sensitive to their children's level of play maturity, adjusting their behavior accordingly. When children are involved in less sophisticated forms of play, mothers tend to respond more and increase their own level of play complexity, whereas the opposite is true if the child is engaged in a higher level of play (symbolic play).

## **The Influence of Television on Play**

Children spend a significant portion of time playing in front of the television. Based on video observations in the home during the 80s, Schmitt (2001) reported that while the television was on, children played 32% of the time and interacted with others 39% of the time. In a more recent survey, Masur and Flynn (2007) reported that 83% percent of infant 11 to 18 months played in front of the television at least some of the time. Of these children, 44% of the parents reported that it was on half the time or more while their children played alone. In addition, 92% of the parents stated that the television was on at least some of the time while they engaged in play with their children, and about 53% of these parents had the television on for half the time or more while they played together.

In the presence of television, children's play can be affected directly by distracting them from play and indirectly by distracting their parents from engaging with them in play. Schmidt and colleagues (2008) compared 1-, 2-, and 3- year-old children's play behaviors while the TV was tuned to an adult program, *Jeopardy*, to their play behaviors when the TV was turned off. Although children paid little cumulative attention to the television, the proportion of time spent in play, the mean play episode length, and the mean length of time spent in focused attention during play were reduced when the television was on compared to when it was turned off. Schmidt and colleagues hypothesized that the television is an effective distracter, eliciting a strong orienting response in children, and thereby disrupting the quantity and quality of their play behaviors. At this early age, it was further hypothesized that when attention is still developing, constant disruptions over time could lead to serious problems later on. The

patterns of reduction in attention and play found in Schmidt et al.'s (2008) study is similar to children with attentional problems (Alessandri, 1992; Handen, McAuliff, Janosky, Feldman, & Breau, 1998; Roberts, 1986). There are a few correlation-based studies that suggest a negative relationship between early exposure and poorer attention later on (e.g., Zimmerman & Christakis, 2007). Other research has shown that a noisy home environment (that includes TV as part of the ambient noise) is associated with poorer cognitive development (e.g., Wachs, 1986).

In summary, play is an important component of infant development, and as Schmidt and colleagues (2008) demonstrated, it is negatively influenced by the presence of television. In the next section, children's attention and TV comprehension development is discussed to assess how television has the potential to distract children away from play.

## **Infant Attention and Television**

### **The Development of Attention**

Ruff and Rothbart (1996) posit that there are two major attention systems that emerge in the first few years of life. The first system is present at birth and is characterized by an orienting reflex (OR) that responds to novel and salient objects and events in the environment. This early attention system is automatically activated by exogenous events and is driven by lower level mechanisms of arousal (Colombo, 2001). During the second year of life, infants' attention begins to be governed by a second 'system of higher level of controls,' that facilitates self-directed attention and allows the infant to focus on events of interest and inhibit competing attentional events (Ruff & Rothbart, 1996). This endogenous form of attention provides infants with the ability to

engage in more effortful, deeper, and sustained attention whereby infants can process information and become less distractible (Colombo, 2001). Although the orienting reflex never disappears, it gradually gives way to the higher level of attentional control, which comes online around 18 months and continues to develop into the preschool years.

Early television exposure could negatively influence infants' attentional abilities by serving as a distraction while the child is engaged in other activities. Research suggests that television's impact as a distracter depends on the child's age and the complexity of the distracter. For example, young infants (10 months) are more vulnerable to distraction than older children (26 months and 42 months; Ruff & Capozzoli, 2003). This early sensitivity to distraction is most likely driven by the orienting reflex, whereas, older children have more control over their attention and better inhibitory responses.

Distraction is also governed by the complexity and novelty of the stimulus. The more complex and novel the auditory and/or visual stimulus, the more likely it will disrupt the infants' attention (Oakes & Tellinghuisen, 1997; Tellinghuisen, Oakes and Tjebkes, 1999). Therefore, some types of distracters are more disruptive than others, depending on the child's age. Young infants are more distracted by auditory visual stimuli than by either an auditory or visual stimulus alone (Oakes & Tellinghuisen, 1997; Ruff & Capozzoli, 2003). However, 26 month-old children are more distracted by visual stimuli (either visual alone or audio-visual) and 42 month-old are distracted by visual stimuli only.

This body of research suggests that there may be a sensitive period for television to negatively influence children's attention development. Infants' attention may be particularly vulnerable to television's distracting effects during the first couple of years of

life given that their attention is highly influenced by the orienting reflex, which is activated by perceptually complex and salient stimuli in their environment. As Schmidt and colleagues' (2008) study suggests, television is an effective distracter, reducing attention and play when infants are in front of the television compared to times when the television is turned off. Over time, it is hypothesized that continuous disruptions by the television could promote the constant activation of the OR and hinder the development of endogenous attention, resulting in attentional patterns that are of poorer quality.

### **The Development of Attention and Comprehension to Television**

Prior to the late nineties, media research did not focus on very young children because there was very little programming for infants and toddlers, and when they did watch, it was for short periods of time. Laboratory research by Anderson and Levin (1976) found that attention to television increases linearly from 1 year to four years. At 12 months, children attend to the television 12% of the time, whereas by 48 months, they attend to the television for about 58% of the time. Children under the age of two generally played and socialized instead of watching television. The television would "capture" the infants attention every so often for a brief period of time. However, around 30 months, there was a qualitative shift from not attending to actively orienting towards the television and deliberately watching television more frequently and for longer periods of time. These laboratory findings were validated by Anderson and colleagues in-home study, monitoring 99 families' television habits over ten days. The in-home study confirmed that in a natural setting, children under 2 years of age paid little attention to television. At 6 months, infants spent 11% of the time attending to television when it was

on, while two years spent 39% of the time looking at the television when it was on (Schmitt, 2001).

Recent studies of infants' attention to television indicate that infants do attend to television especially when the programming is directed at them. Barr and colleagues (2008) noted high levels of attention, ranging from 12% to 99% ( $M = 65\%$ ), among 12 to 18 month-old infants when they watched a 15-minute baby video. Looking time was marginally related to the level of familiarity with the baby videos, with increased looking time at familiar videos compared to unfamiliar videos. Demers (2008) also found higher rates of attention ( $M = 31\%$ ) to familiar baby videos among infants 12 to 18 months. The discrepancies between Anderson and colleagues studies and the more recent studies may be attributable to the content of the media as well as repeated exposure. During the time of Anderson and colleagues studies, there was very little, if any, media for infants unlike today (Schmitt, 2001).

The development of attention and comprehension to television mirrors the progression of infants' general attention development. As previously mentioned, attention is initially driven by perceptually novel and salient stimuli in the environment, activating the orienting reflex; however, in the second year of life, infants' attention becomes more self-initiated and self-directed. Huston and Wright (1983) posit that the perceptually salient features of television, such as sound effects, loud noises, and fast pacing, drive early attention to the television. Over time, children learn which features of television are informative and which are not, and as a result, begin to selectively allocate their attention to television. Anderson and Lorch (1983) posit that attention to television is also driven by comprehensibility. Research suggests that 18 months marks an early form of

comprehension to foreground television (Pempek et al., 2007). Around this time, infants begin to demonstrate a sensitivity to the linguistic and sequential cues in infant-directed television programs (Pempek et al., 2007; Richards & Cronise, 2000). Pempek et al. (2007) showed 6-, 12-, 18-, and 24-month-old infants a normal video of *Teletubbies* and either a linguistically distorted (reversed utterances) or a sequentially distorted (randomly edited shots) version of *Teletubbies*. Infants at all ages paid similar amounts of overall time looking at the television. However, only the 18-month-olds and 24-month-olds paid more attention to the normal version relative to the distorted versions; whereas, the younger infants paid equal amounts of attention to the normal and distorted versions. These findings indicate that young infants' attention are driven by the formal features, whereas, older infants are driven by the comprehensibility of the program and are able to allocate their attention appropriately. Other research also supports this distinction in attention between younger and older infants (e.g., Valkenburg & Vroone, 2004).

In summary, there is some evidence suggesting that early television exposure is associated with poorer attention and play behaviors. A possible explanation for this association is that the perceptually salient features of television that is meant to capture their attention disrupt children's attention to other activities like play. Since television is a constant presence in many homes, over time, children's dampened play behaviors in front of the television may generalize into times when they are away from television.

### **Attention to the Television and Attention during Toy Play**

Choi and Anderson (1991) posit that attention to toys during play and attention to TV may rely on similar attentional processes. For these behaviors, attention is characterized by constant shifts to new scenes or action sequences. Units of behaviors

that are marked by such sub-events or shifts in attention often result in a lognormal distribution as seen in both attention to TV and to toys. This distribution is marked by many short play episodes or looks at TV, but it also contains longer episodes and looks as well (although much fewer in number). Attentional inertia appears to be the underlying mechanism that sustains children's attention across each sub-event, whether it is across TV segments or sequences and toys necessary to carry out a pretend tea party. Attentional inertia is the increasing probability that children will maintain their current behavior (i.e., looking at TV or toys), the longer that particular behavior has already been sustained. One of the main differences in the distribution between these two types of behaviors is in the peak of the probability of termination. For looks at television, attention peaks in vulnerability to termination around 1 to 2 seconds, and steadily declined thereafter, whereas for toy play, it peaks around 3 to 15 seconds. The distribution patterns for these behaviors have been shown to reflect cognitive engagement (Choi & Anderson, 1991; Richards & Turner, 2001). These parallels between the mean length of attention to TV and mean length of toy play suggests similar attentional processes.

### **Parents' Potential to Moderate Television's Effects**

As mentioned previously, parents are an integral component of children's play development and have the potential to act as a buffer against television's disruptive effects. Mothers naturally focus their child's attention when their child engages in play (Findji, 1993). On average, mothers focus their child's attention 30 times per hour lasting for a few seconds (Findji, 1998). They demonstrate a sensitivity to their child's attentional focus and often adjust their own behavior to match their child's (Belsky, Goode, & Most, 1980; Findji, 1998). A large portion of maternal intervention involves



introducing objects when their child's attention is not engaged, maintaining their child's focus of attention, and to some extent, redirecting their child's attention (Bornstein, Toda, & Azuma, 1990; Findji, 1998). Maintaining is a particularly effective strategy for infants' attentional development, extending the length of children's attentional focus during play. Maternal maintaining behaviors follow the child's attentional focus and support the child's cognitive load (Bono & Swifter, 2003; Findji, 1998). Consequently, infants engage in more focused attention when they are playing with their mothers than when play alone (Findji, 1993; Landry & Chapieski, 1988; Lawson, Parinello & Ruff, 1992) and infants' play lengths are increased when parents are actively engaged with them (Slade, 1987). Thus, even if television acts as a distracter for infants, parents may buffer the effects of television by helping their children to maintain focus while in play.

### **Coviewing**

Coviewing by infants and parents is a typical practice in the home. Approximately 68% of parents of young children are in the same room at least "most of the time" or more (Rideout & Hamel, 2006). Among children under two, approximately 60% of parents coview with their child at least half the time or more (Zimmerman, Christakis, & Meltzoff, 2007). Moreover, parents reported that watching television is one of their favorite activities with their child (Weber & Singer, 2004). Coviewing with an adult has positive educational benefits among preschool-age children and older (e.g., Salomon, 1977; Watkins, Calvert, Huston-Stein, & Wright, 1980). While viewing together, parents adapt their conversations with their children depending on the program (Stoneman & Brody, 1982). When adults comment on important aspects of the show, children recall

more information. Many baby videos are tapping into these findings by encouraging coviewing to promote the videos educational value (Garrison & Christakis, 2005).

Of the few studies on infant coviewing, the findings are not as clear-cut as they are for preschool age children. Among children under 3 years, Lemish and Rice (1986) found that the quality of interactions in the presence of television was similar to the interactions during book reading. In their study, the context of viewing provided parents and children with a variety of rich experiences driven by the quality of content. That is, the more age-appropriate and educational the program, the higher the quality of interactions among parents and their children. Akin to behaviors surrounding storybook reading, children and parents often engaged in labeling, questioning, commenting, and describing events on screen. Similarly, Barr and colleagues (2008) found that parents' engagement enhances the viewing experience for infants between 12 to 18 months. Higher levels of TV scaffolding by the parent (i.e., parental behaviors relating to TV content) resulted in infants engaging in higher levels of visual attention and responsiveness to the television content.

Other studies examining foreground television's influence on parent-child interactions are not as positive. Mendelsohn et al. (2008) reported very little parent-child interactions between low-income parents and their 6-month-olds in the presence of television. Parents reported that they engaged with their children for only about a quarter of the time while the television was on (approximately 2 hours per day). Although a majority of the interactions were more likely to occur during educational children programs, parents were not more likely to coview these types of programs relative to other non-educational programs. Furthermore, Courage and colleagues (2010) directly

tested the immediate effects of TV on parent-child interactions and children's attention during play. Even with foreground television, parents were visually less attentive to their children while a baby video played. Moreover, parents were less interactive with their children while the television was on, even though the programs were supposed to promote parent-child interactions. The infants were also less attentive to the toys and to their parents in the presence of a child-directed television program.

As mentioned previously, Pempek (2007) found that baby videos can influence parents' behaviors toward their infant. Coviewing specific types of baby videos actually enhanced parent-child interactions. Specifically, the more parents watched *Sesame Beginnings*, a parent-directed video modeling positive parent-child interactions, the more likely the parents actively engaged with their children during a 30-minute free play session. In contrast, *Baby Einstein*, a video directed at infants, did not elicit this relationship. However, direct comparisons of parent-child interactions in the presence and absence of television yielded fewer interactions that were of lower quality while the television was on.

Lastly, Kirkorian and colleagues (2009) demonstrated that when the television was tuned into an adult-directed program, like *Friends*, the quality and quantity of parent engagement was reduced. Parents were verbally less interactive and responsive to their children. They also tended to passively engage their child (e.g., talk to their child while watching the television). Given that parents are an important aspect of children's play development, television could indirectly affect children's play by distracting the parent.

Taken together, these coviewing studies suggest that child-friendly content's influence is not clear-cut. Although these studies suggest that parents can positively

affect infant behavior while in the presence of television, guiding them through the viewing experience, these interactions are of lower quality when compared to interactions without television.

### **Overview of Study**

The current study had two goals. The first was to assess the cumulative influence of television content and covieing in the home on 12- to 15-month-old and 18-to 21-month old infants' play behaviors in the laboratory away from television. It was hypothesized that the amount of background television and parental covieing of background television in the home would be negatively associated with children's play in the laboratory. While children played in front of the television at home, it was presumed that parents were less likely to engage with their children when an adult-directed television program was on, resulting in poorer levels of play, and that this pattern of play would generalize to times when the TV was not on. For foreground television programs and parental covieing, the expected results are exploratory in nature given the mixed findings of the current body of available research.

The second goal of this study was to expand on Pempek (2007) findings by examining the effects of specific baby videos on infant play. Pempek found that the more parents covieed *Sesame Beginning* in the home with their child, the more actively engaged they were in the laboratory (no TV). Based on her findings, it was posited that *Sesame Beginnings* parents, and not *Baby Einstein* parents, would engage in a more thoughtful interactive style with their infant, which in turn, would predict longer infant play.

For this study, parents filled out an intensive home viewing diary over a two-week period prior to coming into the laboratory. After the two-week period, the parent and their infant visited the Child Study Center for a half hour free time session (No TV) that was videotaped for later coding of infants' play behaviors. Specifically, the amount of time spent in play, mean play length, and number of play episodes were examined. Research demonstrates that certain play patterns are predictive of later attention problems (Alessandri, 1992; Handen, McAuliff, Janosky, Feldman & Breau, 1998; Roberts, 1986). Patterns of poor play behaviors are indicated by less time spent in play, shorter mean play lengths, and high numbers of play episodes.

## CHAPTER II

### METHOD

#### Design

This thesis is part of a larger study examining the effects of foreground television on parent-child interactions (Pempek, 2007). Parent-child dyads were recruited based on the infant's age (12 to 15 months and 18 to 21 months) and were randomly assigned to one of three video conditions—*Sesame Beginnings* (SB), *Baby Einstein* (BE), or No Video (Control). After two-weeks with the provided videos, the dyads visited the Child Study Center for a 30-minute free-time session without TV. A week later, the parent and child returned for their second visit, consisting of a 25-minute TV session followed by a 15-minute TV-free session. The current study only examines a portion of the original design of the larger study. Specifically, this thesis assessed the association between television exposure in the home and infants' play behaviors during the first 30-minute free time session in the laboratory (No TV), and only the relevant aspects will be described.

#### Participants

Participants were recruited using data from Experian, a commercial database. The sample consisted of 150 infants, who were either 12- to 15-month-olds or 18-to 21 month-olds infants (see Table 1 for breakdown by age, sex, and video condition). Approximately 81% of the sample was Caucasian, 5% were Hispanic, 3% were African American, and 11% were other. The average level of education was 15.5 years of schooling, which is equivalent to one semester shy of graduation, and ranged from a 10<sup>th</sup>

grade education to completing a PhD program. Participants received a t-shirt, a \$10 Stop-and-Shop gift card, and DVDs as tokens of appreciation.

### **Setting and Apparatus**

Participants came to the Child Study Center in Springfield, MA. They were escorted into a 3.40 m by 2.94 m room set up like a traditional living room with a comfortable armchair, a large pillow, a bookshelf containing variety of age-appropriate toys, a coffee table with magazines for parents, a 21-inch television and DVD player (the TV set was not in use during the this session). The array of toys consisted of a jack-in-the-box, plastic piano, cooking set, nesting blocks, a stuffed bear, 3 age-appropriate books, 4 rattles, 6 sensory blocks, stacking rings, a puzzle, and shape sorter. There was also a digital video camera beneath the television and a microphone placed in the experimental room. The observation room (3.42 m by 2.29 m) had a large one-way mirror (approximately 1.35 m by 1.60 m) that looked into the experimental room. The observation room contained a second digital video camera that was manipulated by the researcher to record the parent and child in the experimental room. The researcher toggled between the two video cameras via a mixer to capture the best angle of the parent and child. Both cameras were connected to a digital video recorder.

### **Stimuli and Materials**

**Videos.** Parents in the *Sesame Beginnings* condition received *Beginning Together* and *Make Music Together* DVDs, while parents in the *Baby Einstein* condition received *Baby Beethoven: Symphony of Fun* and *Baby Monet: Discovering the Seasons* DVDs. Parent in the No Video/Control condition were not given videos to view in their home. Both video series encourage parent-child interactions through coviewing. At the onset of

*Sesame Beginnings*, parents are encouraged to coview with their child, whereas, the *Baby Einstein* video promotes coviewing through an extra clips.

The *Sesame Beginnings* videos, produced by Sesame Workshop, are approximately 25 minutes in length, targeting parents and children 6 months and older. These videos model positive parent-child interactions through segments with human and Muppet caregivers and their babies. *Beginning Together* contains parent-directed messages, exemplifying how to make everyday routines with their child special. *Make Music Together* contains songs and tips for parents on creative ways to make music with their child.

The *Baby Einstein* video series, now produced by the Walt Disney company, is directed at infants as young as 1 to 3 months of age. Both of the videos are approximately 30 minutes in length. In *Baby Beethoven*, Beethoven's symphonies are played against a backdrop of puppets, toys and babies. In *Baby Monet*, paintings by Claude Monet and images of spring, summer, fall, and winter are set to music by Vivaldi.

**Questionnaires.** Over the two sessions, parents received four questionnaires that consisted of questions regarding demographic information, reactions and attention to the baby videos, and potential differences in everyday parent-child interactions since starting the study (see Appendix A, Session 1 Parent Survey).

**Viewing Diary.** Prior to the first laboratory visit, parents were asked to record their infant's exposure to television for two weeks (see Appendix B, viewing diary). Each day was broken into 15-minute increments from 6AM to 11PM. Parents indicated when the child was exposed to television, other people in the room (i.e. mother, father, other, sibling), and the content of the program (i.e. foreground or background programs). For



foreground programs, parents were requested to write in the specific program name. In addition, the parents in the *Sesame Beginnings* and *Baby Einstein* group recorded when their child watched the assigned videos. This viewing diary methodology was validated by Anderson and colleagues (Anderson, Field, Collins, Lorch, and Nathan, 1985) among 5-year-olds.

**Procedure.** After receiving the parent's general consent form, all parents were mailed a two-week viewing diary to fill out for their child prior to coming to the Child Study Center. Parents in the *Sesame Beginnings* condition and the *Baby Einstein* condition were given two DVDs and asked to view each of the video eight times before their first visit. The parent who was most likely to watch TV with the child was asked to participate in the laboratory sessions.

During their visit to the Child Study Center, the researcher informed the parent that they would stay in the observation room for 30 min and to act as they normally do at home if they had a free half hour with their child (No TV). The parent then read over a consent form for session 1 (see Appendix C). As soon as the experimenter left the parent and child, she entered the observation room to start recording. At the conclusion of 30 min, the researcher notified the parent that the experiment was finished and asked the parent to complete the questionnaires.

All sessions were videotaped for later coding at the University of Massachusetts Amherst by trained research assistants.

### **Videotape Coding**

Adobe Premiere software was used to capture children's play behaviors. This application includes a utility that marks the onset and offset times of designated

behaviors. Software developed in our laboratory was used to convert play behavior onset and offset times to create a variety of measures of duration (number of play episodes, length of play episodes, and percent time spent in play).

To mark the onset and offset of each unique play episode, procedures by Choi and Anderson (1991) and adapted by Schmidt (2003) were used (see Appendix D). In general, the onset of a play episode was marked by the infant's physical contact with a toy and the offset of a play episode began when the child's attention was diverted from the toy for three seconds or more. This coding allowed for offset time to capture when the child was holding the toy, but his attention was directed elsewhere.

Parental engagement was originally coded for Pempek's (2007) dissertation and was used in the current analysis. This coding pass marked one of four types of parent engagement per 10-second interval over the course of the first session: 1) actively engaged—attentive and responsive to child, 2) passively engaged—responding to child, but attention is directed elsewhere, 3) monitoring—watching their child, but not engaging, and 4) not interacting with their child. Based on these ratings, a weighted average was calculated to capture the variability in the amount of parental engagement  $[(2 * \text{Active}) + (1 * \text{Passive}) + (1 * \text{Monitor}) + (0 * \text{Not Interacting})]$ .

### **Reliability**

To assess inter-observer reliability, 25% of the tapes were double coded by different research assistants periodically to ensure consistency throughout the project. Intra-class correlations were calculated to assess the amount of agreement between coders for mean play length (.87) and level of parent engagement (.91; from Pempek et al., under revisions). Both exceeded acceptable levels of agreement (.70 or greater).

Table 1

Sample by Age, Sex, and Video Condition

	12 Months		18 Months		Totals
	Male	Female	Male	Female	
BE	13	14	13	10	50
SB	13	11	13	12	49
CG	14	13	12	12	51
Totals	40	38	38	34	150

## CHAPTER III

### RESULTS

#### **The Amount of Television Exposure**

On average, infants were exposed to 2 hours and 14 minutes of television per day over the two-week period prior to the laboratory observation. About half of the exposure time was dedicated to foreground television (1 hr 9 min). Parents covieved foreground television for 41 minutes per day and background television for about 45 minutes per day.

Children in the *Baby Einstein* and *Sesame Beginnings* groups covieved the videos with their parents for about 44 min each day over the two-week exposure period. There were no significant differences in the amount of covieving for either group,  $t(72.91) = -1.58, p > .05$ . There was also no difference in the total amount of television exposure (excluding baby videos) among the three video groups,  $F(2, 147) = 1.58, p > .05$ .

#### **Play Behaviors**

To assess potential age, sex, and video differences, a 2 (Age: 12, 18 months) x 2 (Sex: Male, Female) x 3 (Video: Baby Einstein, Sesame, Control) between-subjects analysis of variance (ANOVA) was conducted for each play behavior.

For the amount of time spent in play, there were no main effects of age, sex, or condition, but there was a significant age by sex interaction,  $F(1, 138) = 5.55, p = .020$ . This interaction demonstrated that at 12 months, boys ( $M = 78.20\%$ ,  $SE = 0.21$ ) and girls ( $M = 75.80\%$ ,  $SE = 0.21$ ) did not significantly differ in their amount of time spent in play; however, at 18 months, girls ( $M = 80.50\%$ ,  $SE = 0.23$ ) spent significantly more time in

play than boys ( $M = 72.90$ ,  $SE = 0.21\%$ ),  $t(70) = 2.62$ ,  $p = .011$  (see Table 2 for descriptive statistics for play).

For mean play length, there was a main effect of age,  $F(1, 138) = 8.47$ ,  $p = .004$ . Twelve-month-olds' average play length episode lasted 37.73 s ( $SE = 2.14$  s), whereas, 18-month-olds' average play length episode lasted 46.71 s ( $SE = 2.23$  s).

Lastly, for the number of play episodes over the half-hour session, there was a significant main effect of age ( $F(1, 138) = 7.74$ ,  $p = .006$ ) such that 12-month-olds averaged 42.22 ( $SE = 1.88$ ) play episodes over the half hour, while 18-month-olds averaged 34.69 play episodes ( $SE = 1.95$ ).

Since video condition was not a significant factor for any of the dependent play variables, it was not considered in the regression analyses examining the general influence of TV on play. This finding also negates the hypothesis that the increase in parental engagement for parents who covieved *Sesame Beginnings* in their home with their children is reflected in the quantitative aspect of their children's play.

### **Attention to Toys and Attention to TV**

Correlations between attention to toys in session 1 and attention to TV during session 2 suggest that there is a negative relationship between these variables (see Table 3). The correlation between the amount of time spent in play in session 1 is negatively associated with the amount of time spent watching TV during session 2 ( $r(144) = -.240$ ,  $p < .01$ ) and mean length of attention to TV ( $r(144) = -.173$ ,  $p < .05$ ). Mean play length is not significantly related to any TV measures. The number of play episodes is negatively related to the mean length of attention to TV ( $r(144) = -.227$ ,  $p < .01$ ). Also, important to

this analysis is the association between the average play length and the average look length to television. These two measure where not significantly related in either direction.

Although attention to TV and attention to toys show similar distribution patterns and termination probabilities (Choi & Anderson, 1991), the negative correlations between these two measures of attention and the null association between the average play episode and look length suggest that these behaviors may be drawing from different attentional processes. These differences could be explained by a number of possibilities, none mutually exclusive. First, Choi and Anderson note that attention to TV is receptive and passive in nature, whereas, attention to toys is more productive and active. Consequently, two different modes of attention (passive vs. active, OR vs. focused attention) may be activated. A second possibility could be due to age. In the past studies noted by Choi and Anderson, the sample consisted of preschooler aged children or adults. The infants' attention in the current sample is fundamentally different than older children. At this time, attention is exogenously driven among infants (relative to adults), whereas older children and adults' attention is endogenously driven. Thus, infant attention is dictated by the sensory motor saliency of the stimuli at hand (e.g., toy or particular TV segment), and not by an attentional system that reflects a higher level of control. It is posited that as children mature, this later attentional system shows a stability or similarity in processing across attentional objects.

### **General Television Exposure and Infants' Play Behaviors**

The first set of analyses used multiple linear regression to determine the amount of influence that general television exposure in the home had on observed play behaviors. For all regression analyses, a control model was built for each dependent variable

(percent of time spent in play, mean play length, and number of play episodes) that took into account maternal education ( $M = 15.5$ ,  $SD = 2.47$ ) and number of siblings ( $M = 0.73$ ,  $SD = 0.99$ ) as control variables. In addition, the age and sex of the child were considered to examine developmental and possible gender differences. Only factors that significantly explained variability in the dependent variable were included. As you can see in Table 4, the total amount of television viewed over the two-week diary period was not significantly correlated to any of the play behaviors.

**Percent of time spent in play.** For percent of time spent in play over the 30-minute laboratory session, the control model included maternal education and number of siblings. The residuals were not normally distributed so the dependent variable was squared to meet the assumptions of regression and will be reported with this transformation unless otherwise specified.

The number of sibling was significantly related to the total amount of play ( $\beta=0.038$ ,  $SE=0.017$ ,  $p<.05$  ), and there was a significant interaction between number of siblings and maternal education ( $\beta=0.016$ ,  $SE=0.007$ ,  $p<.05$  ) indicating that among children with highly educated parents, there was an increase in time spent in play as the number of siblings increased, but for parents with lower amounts of education, there was no change in the amount of time spent in play regardless of the number of siblings. In addition, the age and sex of the child significantly interacted ( $\beta=0.142$ ,  $SE=0.06$ ,  $p<.05$  ) suggesting that for girls, there was an increase in play as they get older, and conversely for boys, there was a decrease in time spent in play. Altogether, these factors accounted for 9.3% of the variability in the percent of time spent in play.

The total amount of television viewed during the two-week diary period was not significantly related to the amount of time spent in play, ( $\beta=0.001$ ,  $SE=0.001$ ,  $p>.05$ ). In fact, the best model was the baseline model that included maternal education, number of siblings, sex, and age.

**Mean play length.** For mean play length, the dependent variable was transformed using the natural logarithm to normalize the distribution of the residuals. The number of siblings and maternal education were not significantly related to the dependent variable so they were not included in the control model. Age ( $\beta=0.206$ ,  $SE=0.069$ ,  $p<.05$ ), but not sex of the child, was significantly related to the average play length, accounting for 5.7% of the variability in mean play length. That is, 18-month-olds had longer play episodes than 12-month-olds. The total amount of exposure to television was not significantly related children's mean play length, ( $\beta=0.002$ ,  $SE=0.002$ ,  $p>.05$ ).

**Number of play episodes.** The final control model for the total number of play episodes included the age of child and number of siblings. Both of these factors accounted for 10% of the variance to the number of play episodes. This model excluded one case that was an extreme outlier with 133 play episodes from all analyses to maintain the assumptions of regression. To maintain the assumption of normality of the error distributions, the dependent variable was transformed using the cubed root.

There was a significant influence of age ( $\beta= -.254$ ,  $SE=0.068$ ,  $p<.001$ ), indicating that older children had fewer play episodes than younger children, and there was also an age by sibling interaction indicating among 18-month-olds, the number of siblings predicted an increase in the number of play episodes, and among 12-month olds, as the number of siblings increased, there was a decrement in the number of play episodes ( $\beta=$



.149,  $SE=0.070$ ,  $p<.05$ ). The total amount of television was not significantly related to the outcome ( $\beta= -.003$ ,  $SE=0.002$ ,  $p>.05$ ).

In sum, the total amount of television exposure did not have an influence of children's play behaviors. Other factors, such as age, sex, education, and number of siblings were better predictors of the quality and quantity of play.

### **The Influence of TV Content on Play Behaviors**

**Percent of time spent in play.** Neither the total amount of background television ( $\beta= .001$ ,  $SE=0.001$ ,  $p>.05$ )<sup>2</sup> nor the total amount of foreground television ( $\beta= .000$ ,  $SE=0.001$ ,  $p>.05$ ) predicted the total amount of time spent in play (squared). The best model that predicted the total amount of time spent in play were the control models that included known variables that predict play behaviors and developmental differences.

**Mean play length.** The most predictive model of mean play length (natural log) was the baseline model that included age of the child ( $\beta=0.206$ ,  $SE=0.069$ ,  $p<.05$ ) and not background television ( $\beta=0.004$ ,  $SE=0.002$ ,  $p>.05$ ) or foreground television ( $\beta=0.001$ ,  $SE=0.003$ ,  $p>.05$ ).

**Number of play episodes.** The best model for the cubed root number of play episodes was the baseline model that included a main effect of age and an age by sibling interaction (no outlier) as mentioned previously. Foreground television was not related ( $\beta=-.001$ ,  $SE=0.003$ ,  $p>.05$ ) to number of play episodes, and background television was only marginally significant ( $\beta=-.004$   $SE=0.002$ ,  $p<.10$ ).

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<sup>2</sup> To meet the assumptions of normality, this model does not include influential data points as indicated by Cook's D.

## **The Influence of Coviewing on Play Behaviors**

**Percent of time spent in play.** Neither the total amount of background television coviewed between parents and children ( $\beta = .001, SE = 0.001, p > .05$ ) nor the total amount of coviewed foreground television ( $\beta = .001, SE = 0.002, p > .05$ ) predicted the total amount of time spent in play (squared).

**Mean play length.** Again, neither, the amount of coviewing background television ( $\beta = 0.000, SE = 0.003, p > .05$ ) or foreground television influenced children's mean length of play ( $\beta = 0.000, SE = 0.004, p > .05$ ).

**Number of play episodes.** Background television coviewed between parents and children did not influence ( $\beta = -.002, SE = 0.003, p > .05$ ) the number of play episodes nor did the amount of foreground television ( $\beta = -.000, SE = 0.004, p > .05$ ).

Taken together, neither differences in the amount of background television and foreground television, nor the amount of parental coviewing in the home predicted children's play behaviors in the laboratory session.

## **Parent Engagement and Children's Play**

**Percent of time spent in play.** Parent engagement did not significantly predict the amount of time children spent in play ( $\beta = .003, SE = 0.053, p > .05$ ). With the control model, the relationship did not change ( $\beta = .029, SE = 0.038, p > .05$ ).

**Mean play length.** Without the control variables, parent engagement significantly predicted children's mean play length ( $\beta = .241, SE = 0.120, p < .05$ ), indicating that the more parents actively engaged with their children, the greater the average play episode. However, when the control variable, age, was entered into the model, parent engagement was no longer significant ( $\beta = .185, SE = 0.120, p > .05$ ).

**Number of play episodes.** The relationship between parent engagement and the number of play episodes is marginally significant ( $\beta=-.227$ ,  $SE=0.121$ ,  $p>.063$  outlier not included), suggesting that the more parents actively engaged with their children's play, the fewer play episodes. With the control model (age, sibling), the relationship becomes insignificant ( $\beta=-.129$ ,  $SE=0.118$ ,  $p>.05$ ).

In summary, parent engagement by itself predicted longer play episodes and also fewer numbers of play episodes, but not a greater amount of time spent in play across the half-hour session. However, when the control variables were included, parent engagement was no longer a significant predictor.

### **Baby Videos and Play**

Pempek (2007) found that increased coviewing of *Sesame Beginnings* videos in the home predicted an increase in parent engagement in the laboratory. To assess if this increase in parent engagement had a meaningful outcome for children, a series of regressions was conducted to examine whether or not the variable, baby videos, moderated the relationship between coviewing in the home and parent engagement in the laboratory on children's play. For all analyses, the relevant control variables were included. For each of the three play behaviors, the three-way interactions among baby video (SB or BE), coviewing, and parental engagement was investigated. However, the three-way interaction was not significant for total amount of time spent in play ( $\beta=.051$ ,  $SE=0.031$ ,  $p>.05$ ), mean play length ( $\beta=.115$ ,  $SE=0.073$ ,  $p>.05$ ), or number of play episodes ( $\beta=-.005$ ,  $SE=0.071$ ,  $p>.05$ ). Given that the main effect of video condition was not a significant factor for play, nor was parental engagement a significant factor when the control variables were included, this finding was not surprising.

Table 2

Play Behaviors (Untransformed) by Age

	Total Percent		Number of Play Eps		Mean Play Length	
	12	18	12	18	12	18
Mean	0.77	0.76	42.04	34.76	38.02	46.53
Std. Dev.	0.13	0.13	15.12	17.33	19.03	18.88
Minimum	0.30	0.35	14.00	13.00	17.48	9.34
Maximum	0.99	0.95	76.00	133.00	124.69	96.55
Skewness	-0.92	-1.04	0.33	2.84	2.42	0.61
Kurtosis	1.34	0.86	-0.70	13.69	8.04	0.05

Table 3

Correlation Matrix of Play Behaviors during Session 1 and Attention to TV during Session 2

	1	2	3	4	5
1 Play Percent	1.00				
2 Play Mean	.312**				
3 Play Number	.114	-.758**			
4 TV Percent	-.240**	.000	-.116		
5 TV Mean	-.173*	.138	-.227**	.642**	
6 TV Number	-.086	-.106	.110	.573**	-.123

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 4

## Correlation Matrix of Play Behaviors and Television Exposure at Home

	1	2	3	4	5	6	7
1 Play Percent							
2 Play Mean	.312**						
3 Play Number	.114	-.758**					
4 Total TV	.107	.125	-.026				
5 Tot BTV	.110	.118	-.022	.792**			
6 Tot FTV	.040	.059	-.016	.660**	.064		
7 Tot BTV Coview	.032	-.026	.061	.715**	.852**	.119	
8 Tot FTV Coview	.063	.000	.048	.603**	.120	.838**	.266**

## CHAPTER IV

### DISCUSSION

The amount of children's early exposure to television predicts poorer cognitive, attention, and language skills measured later (e.g., Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004). Many of these past correlation-based studies assessed children's developmental abilities through parent questionnaires and TV exposure through parental recall. The current study assessed whether the amount of television exposure was related to infants' play, another important aspect of children's development. In addition, it sought to uniquely assess TV's relationship to an observable behavior (play) and measure children's television exposure in the home using a validated methodology.

Past research suggests that specific types of television content and parental coviewing have the potential to moderate the effects of television exposure on children. Therefore, the current study had two goals: 1) to examine whether or not the amount of television exposure influenced children's play when they were away from television, 1a) to assess if TV's influence was moderated by content and the viewing contexts, and 2) follow-up on Pempek's (2007) finding—that increased coviewing of *Sesame Beginnings* in the home predicted higher levels of parent engagement in the laboratory—and determine if higher levels of parent engagement translated into something meaningful for their infants' play.

In this study, infants spent a significant portion of their day watching television that was comparable to levels in past studies. They were exposed to television for about 2 hours each day, which translates into approximately 17% of their time awake.

In contrast to the earlier correlation-based studies that found a negative relationship between early exposure and poorer developmental outcomes later on, the current study found no such association. This discrepancy could be due to the timing of measurement. Past studies looked at early exposure during infancy and compared it to outcomes during the preschool years or later. Consequently, children in the current study might be too young to see any significant effects. That is, what may be affected is the development of higher cognitive functions that can not be measured yet.

Although Schmidt and colleagues (2008) found that children's play was reduced in the immediate presence of television compared to when the TV was not on, the current study did not extend their findings to longer-term influences of TV exposure on play. It was hypothesized that infants' attentional vulnerability to highly complex distracters, such as television, had the potential to generalize into shorter play periods when the television was not on. However, this study did not find a reduction in play as a function of the amount of TV exposure. This null association was found regardless of program content or coviewing status in the home. What predicted infants' play behaviors were the control variables consisting of age, sex, number of siblings, and education.

A counter hypothesis could assert that the presence of television has the potential to bolster children's attentional episodes. Outside the laboratory, children's natural environments are not quiet places, but are filled with noisy activity from family members as well as other types of technology in the home. Infants, therefore, may be equipped with the ability to manage their attentional resources, inhibiting extraneous stimuli, by engaging in focused attention. Ruff, Capozzoli and Salterelli (1996) found that distracters actually facilitate episodes of focused attention in play among 10-month-old infants.

These researchers presented auditory-visual distracters in the experimental group while the infants engaged in play. They found that over time, infants in the experimental group were more likely to engage in more focused attention and less likely to spend time in causal attention than the control group who were not distracted while in play. 42-month-old children were also found to engage in more focused attention in the presence of a distracter (Ruff & Capozzoli, 2003). Thus, young children can utilize other resources to maintain a healthy level of attention during play. Schmidt et al. (2008) found reductions in the mean length of focused play episodes, but not a reduction in the overall time spent in focused play. Presumably, the number of focused play episodes increased in the presence of TV to combat the reduction in mean focused play episodes. However, the current study did not support this hypothesis either. Future studies could look at individual differences to examine how young children cope with distracters like television to assess if some strategies are more successful than others. For example, television's constant distraction could potentially promote executive functioning through task switching from TV viewing to play for some children.

Pempek (2007) found increased parent engagement among high *Sesame Beginning* coviewers in the same No TV session examined here. As a result, the current study assessed whether this increase in parental engagement had a measurable influence on children's play. However, there was no difference in children's play behaviors by video condition, regardless of the amount of times that the videos were coviewed in the home. The increase in active engagement for *Sesame Beginnings* parent, compared to *Baby Einstein* parents, may not have been great enough to make a significant difference in their children's play. That is, there could be a minimum level of engagement needed



for children to engage in high quality play, and all parents met this criterion. There was not one parent who did not engage with their child at least some of the time during the 30-min free time session. The positive increase in *Sesame Beginnings* parents' behaviors may have other outlets that benefited their children, such as increasing the complexity of play, focused attention, or amount of language heard.

Although an association between television exposure and infants' play was not seen in this study, television's most powerful influence on children may be indirect and through the parent as in Pempek's (2007) study. Parents are an integral aspect of children's play and attention development. When mothers engage in children's play, it becomes more complex and longer (Slade, 1987). Parents are able to model and scaffold complex play behaviors: they label and point to salient aspects of the toy, they demonstrate its function, and they can initiate and maintain play episodes. Consequently, if parents are distracted by television and disengaged with their children, then over time, television could have an indirect effect on children's play. Although the current study did not find that coviewing in the home had influenced children's play behaviors in the laboratory, other studies suggest that TV's influence on parents could have a significant impact on children over time.

Recent studies found that television viewing disrupts parent engagement. Kirkorian and colleagues (2009) noted that parents' ability to engage with their child was disrupted in the presence of background television. Courage et al. (2010) found similar results for foreground television. Parents viewing baby videos were less likely to pay visual attention to their children and were less likely to actively engage with them. In a recent analysis, TV content and coviewing in the home predicted parent engagement

away from television (Hanson, Demers, Pempek, Kirkorian, & Anderson, 2010). That is, parents who watched more background television with their child in the home were more likely to show poorer engagement with their child when they were away from television. An alternative explanation posits that it is not television that is causing these behaviors, but that TV is an indicator of a certain type of parent or household. Thus, media's effects on infants' development may be due to parents' own use and attitudes about television than infant exposure to television per se. Moreover, what we do not know is how this influence compares to times when the parent is preoccupied with other activities (e.g., talking on the phone, on the computer).

Taken together, the latter studies support the AAP's contention that television can reduce important social interactions among infants and their caregivers. It appears that television negatively influence parents' ability to engage with their children, which in turn, may have important consequences for their children's development.

### **Study Limitations and Future Directions**

There were a number of limitations for this study. Although there were explicit instructions to the parents in the diaries on how to use it, there was diversity in the way parents interpreted the instructions and possibly in their accuracy of recording. Also, what was included as foreground television depended on what the parent thought was age-appropriate. Given the research on children's comprehension to television, most television should be considered background television to very young children, especially for those under 18 months. Another limitation of the study was that there is not a measure of engagement in the home while viewing. That is, we do not know if parents were interacting at all while the television was on.

Future analysis with the larger data set will examine the quantity of play across the other two sessions within the larger study (i.e., 25-minute TV session and 15-minute no TV session immediately after viewing). Although we did not find an influence of television as a function of the amount of TV exposure over a two-week period, there is most likely a difference in play behaviors in the immediate presence and absence of the baby videos. It will be interesting to assess if the potential decrement in play is similar to the decrement found for background television (Schmidt et al., 2008). In addition, future analysis will take a closer look at children's play behaviors across the 30-minute free play session. Each play episode was also coded for who initiated the play episode (mom, child) and how the mother participated within each play episode (maintain, disrupt, both, no involvement). From this, we will be able to examine if mother's initiation of a play episode or participation in a play episodes results in better patterns of play, and how television has the potential to moderate these effects.

APPENDIX A

PARENT QUESTIONNAIRES

Session 1 Parent Survey

Please answer the following questions. Whenever a question asks about “your child,” it is referring to the child who is the focus of this study.

- 1) How many years of education have you and your child’s other parent *completed*? For example, this would be 12 if you completed high school, 13 if you completed one year of post high school training, 14 if you completed an associate’s degree, 16 if you completed college, and so on.

You: \_\_\_\_\_ Other Parent: \_\_\_\_\_

- 2) What is your child’s ethnicity? (*Check all that apply*)

\_\_\_\_\_ White/Caucasian \_\_\_\_\_ Hispanic \_\_\_\_\_ Black/African Am.  
\_\_\_\_\_ Am. Indian/Native Am. \_\_\_\_\_ Asian Other \_\_\_\_\_

- 3) Child’s birth date \_\_\_\_\_ 4) Zip code \_\_\_\_\_

- 5) What are the ages of other children in your home? (*Write ages below*)

\_\_\_\_\_ Male \_\_\_\_\_ Male \_\_\_\_\_ Male \_\_\_\_\_ Male  
\_\_\_\_\_ Female \_\_\_\_\_ Female \_\_\_\_\_ Female \_\_\_\_\_ Female

- 6) Does your child have any vision or hearing difficulties? \_\_\_\_ YES \_\_\_\_ NO

- 7) How many hours is your child out of the home on each of the following days?

Monday \_\_\_\_\_  
Tuesday \_\_\_\_\_  
Wednesday \_\_\_\_\_  
Thursday \_\_\_\_\_

Friday \_\_\_\_\_

Saturday \_\_\_\_\_

Sunday \_\_\_\_\_

8) Does your child normally watch child videos at home? \_\_\_\_ YES \_\_\_\_ NO

9) Do you use children's videos at home as a form of entertainment for your child? \_\_\_\_ YES \_\_\_\_ NO

Do you use children's videos at home when you need a break?  
\_\_\_\_ YES \_\_\_\_ NO

Do you use children's videos at home to inspire discussion with your child?  
\_\_\_\_ YES \_\_\_\_ NO

What other ways do you use children's videos at home?

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10) How often do you view children's videos together with your child? (*Please circle one*)

All of the time	Most of the time	Half of the time	Once in a while	Almost never
1	2	3	4	5

## Session 2 Parent Survey

Please answer the following questions. Whenever a question asks about “your child”, it is referring to the child who is the focus of this study.

1) What is your reaction to the video you saw today? (*Circle one answer*)

Very much disliked	Somewhat disliked	Neutral	Somewhat liked	Very much liked
1	2	3	4	5

Was there anything in particular that you liked or disliked?

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2) What do you think was your child’s reaction to the video you saw today? (*Circle one answer*)

Very much disliked	Somewhat disliked	Neutral	Somewhat liked	Very much liked
1	2	3	4	5

Was there anything in particular that you think your child liked or disliked?

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3) If you were in the group that was asked to watch videos at home, what did you and your child think of the other video that we sent you?

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4) How much did you learn from the video that you just saw? (*Please circle one answer*)

- a. Not much
- b. A few things
- c. Many things

5) How much do you think your child learned from this video? *(Please circle one answer)*

- a. Not much
- b. A few things
- c. Many things

6) How would you use this video at home? *(Please circle one answer)*

- a. I wouldn't use this video at home.
- b. I would turn on this video for my child and leave the room.
- c. I would turn on this video for my child and stay in the room but most likely not watch it myself.
- d. I would watch this video with my child.

7) How do you think the video affected your interactions with your child? *(Please circle all answers that apply)*

- a. It did not affect our interactions.
- b. It made my child and I more likely to interact *while the video was on*.
- c. It made my child and I more likely to interact *after the video was over*.
- d. It taught me ideas or strategies for interacting with my child that I plan to use later.

What other ways do you think the video affected your interactions with your child?

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8) Did you watch the informative clip for parents that was included on the DVD?

\_\_\_ YES \_\_\_ NO

9) How many videos, either given to you as a gift or purchased, do you have for this child that he or she watches at least occasionally? \_\_\_\_\_

Of these, how many are from the *Baby Einstein* series? \_\_\_\_\_

10) How does this video compare to other videos for infants that you know about? *(Please circle one answer)*

- a. I have not seen other videos for infants.
- b. This video is worse than other videos for infants.
- c. This video is about the same as other videos for infants.
- d. This video is superior to other videos for infants.

11) Would you be likely or not likely to purchase another video in this series?

Likely  Not likely

12) Would you recommend this video to a friend that has a child the same age as yours?

YES  NO



**Please place a checkmark in the box next to the answer that best applies.**

1. How much attention do you think your child paid to the video today compared to when they watched it at home?

More                       Less                       About the same

2. If your child was assigned to watch *Sesame Beginnings* videos:

How many times did you watch the *Together Time* chapters on the DVDs?

0                       1                       2                       3                       4 or more

How many times did you watch the *Inside Beginnings* chapters on the DVDs?

0                       1                       2                       3                       4 or more

3. If your child was assigned to watch *Baby Einstein* videos:

How many times did you watch the *Bonus Material* chapters on the DVDs?

0                       1                       2                       3                       4 or more

How many times did you watch the *About Baby Einstein* chapters on the DVDs?

0                       1                       2                       3                       4 or more

How many times did you or your child watch the *Languages* chapter on *Baby Monet*?

0                       1                       2                       3                       4 or more

Answer each question by circling the response that best describes your interactions with your child *since your participation in this study began*.

1. Interactions with your child while **Feeding**:

Mostly Worse	1	Somewhat Worse	2	About the Same	3	Somewhat Better	4	Mostly Better	5
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2. Interactions with your child while **Playing with Toys**:

Mostly Worse	1	Somewhat Worse	2	About the Same	3	Somewhat Better	4	Mostly Better	5
-----------------	---	-------------------	---	-------------------	---	--------------------	---	------------------	---

3. Interactions with your child while **Bathing**:

Mostly Worse	1	Somewhat Worse	2	About the Same	3	Somewhat Better	4	Mostly Better	5
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4. Interactions with your child while **Watching TV/Video**:

Mostly Worse	1	Somewhat Worse	2	About the Same	3	Somewhat Better	4	Mostly Better	5
-----------------	---	-------------------	---	-------------------	---	--------------------	---	------------------	---

5. Interactions with your child while **Diapering**:

Mostly Worse	1	Somewhat Worse	2	About the Same	3	Somewhat Better	4	Mostly Better	5
-----------------	---	-------------------	---	-------------------	---	--------------------	---	------------------	---

6. Interactions with your child while **Playing without Toys**:

Mostly Worse	1	Somewhat Worse	2	About the Same	3	Somewhat Better	4	Mostly Better	5
-----------------	---	-------------------	---	-------------------	---	--------------------	---	------------------	---

7. Interactions with your child while **Dressing**:

Mostly Worse	1	Somewhat Worse	2	About the Same	3	Somewhat Better	4	Mostly Better	5
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## APPENDIX B

### TWO-WEEK VIEWING DIARY EXCERPT

**Media Exposure Diary Instructions:**

1. We are interested in how often infants are in the room while the TV is on, regardless of whether they are paying attention. Please use this viewing diary to record television and videos that your infant is exposed to over the next 14 days.
2. When your infant is in the presence of a TV program or video made especially for infants or preschoolers, please draw a line through the second column (labeled “Program made for preschool children or younger”) next to the appropriate time blocks. Please indicate the name of the program or video in the third column.
3. If your infant is in the presence of a TV program or video for older children or for adults, please mark a line in the fourth column corresponding to the appropriate time blocks. You do not need to record the name of the program or video.
4. For all exposure that occurs, please use the fifth column to check off any adult or caregiver (Mom, Dad, Other) who was in the room with the child.
5. In the final four columns, please indicate the age of any other children that were in the room while the TV was on.

Day 1 (6:00 am -2:29 pm) Date: _____										
Time	Program made for preschool children or younger	Name of program or video	Program for older children or adults	<u>Check off any adult that was in the room</u>			Ages of other children in the room			
				Mom	Dad	Other				
6:00-6:14 am										
6:15-6:29 am										
6:30-6:44 am										
6:45-6:59 am										
7:00-7:14 am										
7:15-7:29 am										
7:30-7:44 am										
7:45-7:59 am										
8:00-8:14 am										
8:15-8:29 am										
8:30-8:44 am										



## APPENDIX C

### INFORMED CONSENTS

#### Session 1 Consent Form

During your visit today, you and your child will be videotaped during 30 minutes of free play in our playroom. Your child will be free to play with an array of age-appropriate toys. Please feel free to interact with your child in any way you wish or to read any of the magazines or newspapers available. Your child will remain in the room with you throughout the entire session. Afterwards, you will be asked a few questions about your child's home environment. Before you leave, you will be given another viewing diary to record your child's TV viewing in the time until your next visit. Your child will receive a t-shirt as a small token of thanks. Compensation for the cost of parking in the lot behind the Child Study Center will be given to you before you leave today.

There is no discomfort or danger involved with this study, either to you or your child. There are no direct benefits from participating in this study, but the information we gain will increase our knowledge of how children's play and social interactions are affected by baby videos. All information about individuals is kept confidential. All of the toys presented to the children are age-appropriate, as designated by the manufacturer. Participation in this study is completely voluntary, and if at any point during the experiment you or your child wishes to terminate your involvement with the study, please let us know. If you would like to speak with the Principal Investigator of this study, contact Daniel Anderson, Professor of Psychology, at (413) 545-2069 (anderson@psych.umass.edu). If you would like to discuss your rights as a participant in our research study or wish to speak with someone not directly involved in this study, you may contact the Human Subjects Review Board at (413) 545-3428 (HumanSubjects@ora.umass.edu). We thank you for your participation and would be glad to answer any questions.

I understand the procedure and agree to participate with my child

\_\_\_\_\_  
(Child's full name)

\_\_\_\_\_  
Parent/guardian's name (print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## Session 2 Consent Form

During your visit today, you and your child will be videotaped throughout the entire 45-minute session. For the first 30 minutes, one of the *Sesame Beginnings* DVDs that you watched at home will be shown to you. The final 15 minutes will be a free play period without the TV on, much like in Session 1. Your child will be free to play with an array of age-appropriate toys or to watch the TV when it is on. Please feel free to watch the video and to interact with your child in any way you wish. You may also read any of the magazines or newspapers available. Your child will remain in the room with you throughout the entire session. Afterwards, you will be asked a few questions about your response to *Sesame Beginnings*. At the end of the session, we will explain to you in more detail what we are studying and you will be given a chance to ask any questions that you have about the study. You will receive \$10 Stop & Shop gift card as a small token of thanks. Compensation for the cost of parking in the lot behind the Child Study Center will be given to you before you leave today.

There is no discomfort or danger involved with this study, either to you or your child. There are no direct benefits from participating in this study, but the information we gain will increase our knowledge of how children's play and social interactions are affected by baby videos. All information about individuals is kept confidential. All of the toys presented to the children are age-appropriate, as designated by the manufacturer. Participation in this study is completely voluntary, and if at any point during the experiment you or your child wishes to terminate your involvement with the study, please let us know. If you would like to speak with the Principal Investigator of this study, contact Daniel Anderson, Professor of Psychology, at (413) 545-2069 (anderson@psych.umass.edu). If you would like to discuss your rights as a participant in our research study or wish to speak with someone not directly involved in this study, you may contact the Human Subjects Review Board at (413) 545-3428 (HumanSubjects@ora.umass.edu). We thank you for your participation and would be glad to answer any questions.

I understand the procedure and agree to participate with my child

\_\_\_\_\_  
(Child's full name)

\_\_\_\_\_  
Parent/guardian's name (print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## APPENDIX D

### CODING MANUAL

#### **Instructions for Coding Onset/Offset of Object Play Episode (Schmidt, 2003)**

The main goal when coding onset and offset of play episodes is to capture continuous play schemes. Often a play episode will involve a single toy or object, or it may involve several different objects at one time, or in sequence. Play episodes may be continuous and uninterrupted, or a child may briefly look away (as at the TV), fall, or lose attention to the object of play for a short period of time. If the child returns to play with the same object after a lapse in attention, the play episode is considered continuous. The most difficult part of this coding is making the judgment as to when a child starts playing with an object, and when they lose attention to and refrain from playing with that object. Most often, the end of a session will occur when the child's attention is directed to a new toy initiating a new play scheme. When a child does relinquish contact with an object, or seems to redirect their attention, it is important to look ahead in the tape to determine whether or not the play episode has ended completely, or whether it continues in some manner. In general, it helps to follow these basic guidelines:

- The onset of a play session should be coded when the child is visually and tactually engaged with a toy/object.
- If the child relinquishes contact with the toy/object and orients their body away from the toy, the offset of the play episode should be coded.
- If the child remains in contact with the toy, but their attention is focused somewhere else, it is important to look ahead to determine if the suspension in play is temporary or permanent. If the suspension is temporary and the child resumes play, the play episode is continual.
- If the child looks at the TV, and the child does something different after the look has ended, the play session should be coded as ending when the child began their look at the television.
- If the child is playing with a toy, leaves that toy, and moves on to another toy, it is important to look ahead to determine whether the new toy is incorporated into the first play scheme, or if it is the beginning of a new episode.
- Often a child will remain in contact with a toy but will essentially be finished playing with it. For example, children will often carry a toy around or rest their hand on it, but not be actively playing with it. If this occurs, the play session should be coded as ending when the child's attention was focused away from play with that particular toy. It is extremely important to look ahead in the tape to

determine whether play has definitely ended with the toy in question, or whether it is just temporarily suspended.

- Often the child will play with something other than the conventional toys in the room (napkins, magazines, blinds, etc). If the behavior looks like object play, you should code the play episode as if it were occurring with a conventional toy. Remember – one year-olds do not necessarily know what a “toy” is.
- If the child touches a toy briefly, you should code it as a play episode only if the contact is meaningful. In other words, if the child meant to touch the toy, not if they just happened to bump it or brush it accidentally.
- Play in the mirror, with the rug, or other forms of play that are not explicitly object play should not be coded. Only if an object/toy is used in conjunction with these (i.e. banging the toy on the mirror) should the episode be coded.

Make your best judgment as to what the child is doing. If you believe that they are finished playing with a particular object or that a play scheme has ended, then go with that. Do not agonize over your decision.



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