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2012

The Priming Effects of Video Viewing on Preschoolers' Play Behavior

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THE PRIMING EFFECTS OF VIDEO VIEWING ON PRESCHOOLERS' PLAY

BEHAVIOR

A Thesis Presented

By

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Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
Of the requirements for the degree of

MASTER OF SCIENCE

May 2012

Psychology

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ABSTRACT

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MAY 2012

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This thesis investigates the relationship between educational television content and children's play behaviors immediately after viewing. Children ages 41-43 months of age were randomly assigned to view a television program with predominantly object-constructive or social dramatic content. All children participated in a period of video viewing, approximately 25 minutes in length, followed by a 30-minute play session. Each participant was subsequently administered a brief card sorting task to assess categorical knowledge of constructive and social activities. Each child's session was coded for looking at the television, toy choice, and play content (constructive or social-narrative). Video viewing condition and the interaction between categorical knowledge and condition significantly predicted children's subsequent play content. Taken as a whole, these findings imply that short-term priming effects of educational video viewing on children's play are present in 42-month old children but that these effects are moderated by children's categorical understanding of TV content.

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CHAPTER I

INTRODUCTION

Substantial time, effort, and financial resources have been expended to better

understand how children watch television, what children learn while watching, and the

effects of consuming screen media from a very early age. Not only does this research aid

in informing how educational television can be beneficial to early learning, but it also

serves as a window through which children's development can be viewed.

In the late 1970s, The Plug-In Drug was published, focusing public attention to

the potential dangers of TV (Winn, 1977). Winn suggested that regardless of the type of

content, television converts children into passive, disengaged viewers, with the effects of

this passivity overflowing into scholastic achievement, play, and family life. Others have

supported Winn's characterization of television, claiming that TV viewing leads to poor

achievement in school (Singer & Singer, 2001; Mander, 1977; Healy, 1990). Research

focusing on television's behavioral effects has also implicated the medium in fostering

the imitation of aggressive behavior (Bandura, Ross, & Ross, 1963a).   In more recent

years, television has been linked to the prevalence of ADHD in school-aged children, in

so far as viewing before the age of three has been associated with shorter attention spans

by age seven (Christakis, Zimmerman, Digiuseppe, Mccarty, 2004).

In the years since The Plug-In Drug's publication, various researchers have

refuted the claims of television's hypnotic power, demonstrating the potential short and

long-term benefits from television viewing, ultimately citing content as the key variable

in differentiated outcomes (for a review, See Anderson & Collins, 1988).

Today, the debate continues as to the true value of television, whether it causes cognitive passivity and attention deficits (Zoglin & Tynan, 1990) or offers an opportunity to inspire learning from an early age (Christakis et al., 2004, Fisch, Kirkorian & Anderson, 2005; Midgley, 1999).

This study explores whether video viewing of educational content can prime an active cognitive disposition, demonstrated through toy preference and play behavior immediately following viewing. Children, 41-43 months-of-age randomly assigned to condition, viewed 25 minutes of physical constructive or social dramatic *Sesame Street* clips. Immediately following, children were allowed to play with toys. The content of play, constructive and social, was coded. To assess whether preschool children understand the categories of physical constructive and social dramatic activities, a categorization task was administered. This allowed for an investigation into whether children's ability to categorize content is an important factor in predicting television's priming effects.

This literature review begins with a synopsis of preschoolers' exposure to television, an overview of preschoolers' attention to and the educational effects of television, preschool play, transfer and priming, and concludes with a brief summary of young children's categorical knowledge. The introduction will conclude by addressing the gaps in the existing literature and the current study.

Preschoolers and Television

Time Spent with Television

According to the most recent survey commissioned by the Kaiser Family Foundation, children under the age of 6 view screen media for approximately two hours

per day, with nearly 86% of this time being spent specifically with television, DVD, or VHS (Rideout, 2003). In a 2005 survey, it was found that 82% of 3-4 year olds and 78% of 5-6 year-olds watched television on any given day (Vandewater, Rideout, Wartella, Huang, Lee, & Shim, 2007). Even more surprisingly, parents reported that 43% of 3-4 year olds and 37% of 5-6 year olds from surveyed families had a TV, VCR, or video game player in the child's room, making screen media even more accessible and prevalent in preschoolers' daily lives (Vandewater et al., 2007).   By the time American children graduate from high school, their time spent with television exceeds their time spent in school (Fisch, Kirkorian, & Anderson, 2005).

Also reported in the Kaiser survey, two-thirds of children ages 0-6 live in an environment in which the television is on at least half the time (2003). One-third of 0-6 year-olds live in what is referred to as a "heavy" TV household, one that is characterized by the television being on "most of the time" or "always" even if no one in the home is directly watching. It was found that, in these same "heavy households", children are more likely to watch television daily than their peers and, when they do watch, will view longer than other children by an average of 34 more minutes per day (Rideout et al., 2003). Research suggests that children's patterns of early television viewing follow them from early childhood later in life (Certain & Kahn, 2002). Within these "heavy" and "light" viewing homes, schemas for a lifetime of habits are taking shape.

Attention to Television

During the preschool years, attention becomes more affected by the child's immediate surroundings and personal motivation (Ruff & Rothbart, 1996). As the frontal

cortex continues to mature, preschoolers increasingly gain control over their own attention, basing it more on their interests than to novelty (Welsh & Pennington, 1988).

In a study that tested children's (ages 2.5 to 4.5 years) ability to control their attention by locating a rabbit while watching a puppet show, playing with toys, or during a visual reaction-time task, levels of focused attention during the televised puppet show and free play doubled from 2.5 to 3.5 years of age and various errors on the reaction time tasks improved greatly (from 40% to 85%) from 3.5 to 4.5 years of age (Ruff, Weissberg, Lawson, & Capozzolli, 1995 as cited by Ruff & Rothbart, 1996). Some have suggested that at around this age, a "vigilance network" comes online, allows the individual to prepare for an upcoming response by remaining in a "suspended state" awaiting the opportunity to respond (Posner & Peterson, 1990). Between 2 and 3 years of age, children are becoming more able in the control of their own attention and, at 3-4 years of age, synaptic connections in the frontal areas of the brain and metabolic activity in all areas of the brain seem to reach a plateau (Chugani, 1994; Huttenlocher, 1979).

In an effort to characterize the development of attention to TV, Anderson and Levin (1976) analyzed the visual attention of children at various ages to *Sesame Street*. It was found that, for children 1 to 4 years of age, a significant increase in looking at the television occurs during these early preschool years. It was also concluded that, for children younger than 30 months of age, the television merely "captured" their attention periodically, whereas older children seemed to be "more deliberately watching" (p. 810). Results were replicated in a follow-up study indicating that attention does increase with age and in relation to the presence or absence various content signaling attributes (e.g.

auditory changes, movement, cuts, sound effects, applause, etc.) (Alwitt, Anderson, Lorch, & Levin, 1980).

Two theoretical frameworks have been posited to explain the development of children's attention to television: passive models and active models of attention (Bickham, Wright, & Huston, 2001). Singer's (1980) theory regarding attention to television posited that children were passively engaged with television, drawn to the content of television not through cognitive engagement, but through attention grabbing orienting responses. Since then, other theories have been developed indicating that, over the course of development, children's attention to television changes. One differential model, formulated by Huston and Wright (1983), proposed that children attend to different features of television at various points during their early development. Within their research, it was found that perceptually salient formal features (e.g. sound effects, movement, music) seemed to drive attention during infancy, with a shift occurring during the preschool years towards features that drive cognitive understanding of content (e.g. character dialogue, features of narrative). Anderson and colleagues (1986) developed a complementary theory and argued for a cognitively active model for attention to television, with research suggesting that children as young as two years-of-age show differentiated attention to comprehensible versus incomprehensible program content. Since, additional research (e.g. Valkenburg & Vroone, 2004) has shown further support for a developmental change from infancy to early childhood in attention to television around two years of age.

Research monitoring the developmental trajectory of attention to television has indicated that attention to television is at its highest during the preschool and school age

years (Comstock, 1978). It has been suggested that this peak in children's attention to television during the preschool years is related to an increase in program comprehensibility, which has been attributed to better language skills, more knowledge about the world, and a better understanding of television, in general (Anderson, Lorch, Field, Collins, & Nathan, 1986).

In sum, research suggests that children become increasingly able to control their own attention to television as they age. As indicated above, 3.5 year-olds have fewer problems guiding their own focused attention during television viewing and toy play than 2.5 year olds (Ruff et al., 1995 as cited by Ruff & Rothbart, 1996). For this thesis, 42 month-old children would be expected to show substantially high levels of attention, as it is assumed that they have developed advanced strategies for controlling visual attention based on content (Anderson, Lorch, Field & Sanders 1981).

Content Contingency – The Effects of Educational Media

It has been frequently posited that all media is in some way educational. Depending on one's research perspective, the definition of educational media can take various forms. Some consider it to be any medium that conveys a message to an audience whereas others refer only to media with positive cognitive and prosocial themes to be 'educational'. For the purposes of this thesis, the definition for educational media put forth by Kirkorian, Wartella, and Anderson (2008) as "those designed around a curriculum with a specific goal to communicate academic or social skills" will be used (p. 46).

Much of the research that demonstrates positive outcomes associated with the viewing of educational media has come from the research focused on *Sesame Street*. Over the years, various studies have found significant relationships between preschool viewing of *Sesame Street* and vocabulary development during ages 3-5 (Rice, Huston, Truglio, & Wright, 1990), problem solving behaviors (Hodapp, 1977) and school readiness knowledge (Ball & Bogatz, 1970; Bogatz & Ball, 1972). The Early Window Project of the 1990s further supported the link between *Sesame Street* viewing at ages 2 and 3 and increased skills in literacy and math as well as school readiness at age 5 (Wright, Huston, Murphy, St. Peters, Pinon, Scantlin, & Kotler, 2001). In an effort to determine the potential long-lasting effects of *Sesame Street* on children well beyond early and middle childhood, the Recontact Study provided associations between *Sesame Street* viewing and grades into high school (Anderson, Huston, Wright, & Collins, 2001; Anderson, Huston, Schmitt, Linebarger, & Wright, 2001).

Positive outcomes associated with viewing are not limited to skills in the cognitive domain; additionally, *Sesame Street* has also been linked to a variety of positive prosocial outcomes as well. Bankart and Anderson (1979) found that repeated exposures to *Sesame Street* over a four-day period resulted in reduced aggression during free play for both sexes. Gorn, Goldberg, and Kanungo (1976) showed that viewing 12 minutes of multicultural inserts during an episode of *Sesame Street* temporarily increased young children's preferences for playing with children of other races.

In the past twenty years, research has grown beyond *Sesame Street* to examining the cognitive outcomes associated with viewing other educational programs for children. In a study examining the impact of educational programs with various narrative story

structures, results indicate enhanced narrative skills and story knowledge in children

exposed to extended periods of viewing traditional narrative stimuli (*Clifford the Big Red

Dog*) versus embedded narrative (*Pinky Dinky Doo*) or expository (*Zooboomafoo*) stimuli

(Linebarger & Piotrowski, 2009). Preschoolers have also shown increases in interactivity

with the television (Crawley, Anderson, Santomero, Wilder, Williams, Evans, & Bryant,

2002) and overall school readiness skills (Baydar, Kagitcibasi, Kuntay, & Goksen, 2008)

over periods of extended viewing, further indicating that effects of programming can also

be found through repeated exposure.

Another such effort is *Between the Lions*, a PBS program designed for young

school-age children to promote literacy strategies and enjoyment from reading.

Research surrounding this program suggests that kindergarten viewers of this series

showed higher levels of word recognition and standardized test measures as compared to

non-viewers (Linebarger, Kosanic, Greenwood, & Doku, 2004). This same study also

yielded an interesting distinction between at-risk versus not-at-risk kindergarteners such

that at-risk viewers had significantly greater gains than not-at-risk youth. This suggests

that educational programs may have different implications for children with varying

parents' education, socioeconomic statuses, and access to resources.

Other work has also supported the notion that television can enhance

preschoolers' understanding and frequency in the engagement of prosocial behavior.

Friedrich and Stein (1973) found that Kindergarteners who viewed *Mister Rogers

Neighborhood* demonstrated higher levels of rule obedience, task persistence, and delay

tolerance relative to baseline measures than children exposed to neutral programming.

Similar findings in a summative evaluation of *Dragon Tales* indicated that, after multiple

exposures to the series, preschoolers showed higher levels of initiating organized play with others, choosing challenging tasks, sharing, and cooperation then children exposed to control condition programming (*Between the Lions*), as measured by parent, teacher, and researcher ratings (Rust, 2001).

Most of the research reviewed above focuses on the acquisition of skills such as literacy, numeracy, inquiry in science, or prosocial attitudes. The success of educational programs in facilitating these acquisitions is presumably a consequence of knowledge and skills directly related to the specific content that the children viewed. The question posed by the present research is whether educational content also promotes a generalized *interest* in the *categories* of content shown. So, for example, there is no evidence that successful teaching of mathematical concepts in a show such as *Square One TV* results in a generalized interest in math or engaging in mathematically oriented play. No research was found that investigates the impact of educational media on cognitive disposition immediately after viewing. The proposed study seeks to identify how viewing educational media affects play with toys that are conceptually related to TV content but which were not specifically related to the content. Such an influence on play disposition constitutes a form of far transfer or cognitive priming.

The Influential Effects of Media: Transfer and Cognitive Priming

Much has been written about learning transfer, particularly in the literature examining the application of academic skills attained during formal learning. Transfer has been used to describe the circumstances under which information learned at one point in time is utilized as a strategy for enhanced performance at a later point in time (Royer, Mestre, & Dufresne, 2005). The key notion regarding the transfer of learning is how

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much of what is demonstrated is absorbed and applied at a later date, across varying contexts.

Transfer, as opposed to simple imitative behavior or recall or recognition of specific concrete events and facts, demonstrates flexibility in the individual's usage of the newly acquired knowledge. In most venues of education, transfer is an ideal but difficult outcome to achieve, intending for learning to go beyond the superficial nature of recall and be applied to a variety of real-life contexts (Royer, Mestre, & Dufresne, 2005).

It should be noted that transfer, in the context of an activity such as toy play, is quite different than imitation. Imitation is characterized as the mimicry of behavior explicitly demonstrated to a child. An example of this would be to show the child a simple three-step process of assembling a toy, then asking them to recreate the assembly process with the same parts. Infants as young as 18-months-of-age have been found to exhibit simple imitation behaviors following video demonstrations (e.g. Barr & Hayne, 1999). Transfer, however, is demonstrated when children generalize the learning content from one context to another. If a child is shown a grabbing tool to reach an object far away on a table, they exhibit transfer if they demonstrate the use of a similar tool to reach or grab an object off of a shelf or in a different 'hard-to-reach' context.

Many studies that examine the impact of television on children's behavior focus on behaviors imitated from televised models. Bandura, Ross & Ross (1963b) demonstrated children's tendencies to imitate the aggressive acts of a televised adult acted upon a Bobo doll when given the opportunity to play with the same toy immediately following a viewing session. Studies have also examined the extent of transfer from television , particularly in the case of aggressive and violent behavior.

Various studies have substantiated the notion that televised violence is not only imitated during child play, but also transfer effects are found, with generalized increases in aggressive play seen as late as 8 months after the initial exposure (Hicks, 1965; Hanratty, O'Neal, & Sulzer, 1972; Friedrich & Stein, 1973).

However, transfer is not limited to negative affect. On the contrary, research has found links to prosocial behavior beyond simply imitating behaviors seen in the program (e.g. sharing a toy with another child). In an experiment comparing the behaviors of children who viewed *Mister Rogers Neighborhood*, violent cartoons (*Batman/Superman*), and a neutral nature program, Friedrich and Stein (1973) found that preschoolers from lower socio-economic status families who viewed *Mister Rogers* demonstrated an increase in interpersonal prosocial and self-control behaviors beyond those contexts demonstrated in the episode.

The effects of transfer have also been well demonstrated for specific cognitive skills as well. *Blue's Clues* is another program that has demonstrated an impact on children's cognitive and school readiness skills. While watching, children are asked to work with the host to solve a daily question by finding paw print-marked clues left by the host's dog, Blue (i.e. "What game would Blue like to play today?"). Embedded within the format of the show is an interactive exchange between the host and the viewer, as he asks questions like "What do we do when we find a clue?" (Audience response: "put it in our handy-dandy notebook"). In a study spanning two years of children's exposure to *Blue's Clues*, regular viewers performed better than non-viewers on problem solving tasks seen on the show and at solving riddles (Crawley, Anderson, Wilder, Williams, & Santomero, 1999; Bryant, Mulliken, Maxwell, Mundorf, Mundorf, Wilson, Smith,

McCollum, & Owens, 1999). Other series such as *Allegra's Window* and *Gullah Gullah Island* have also been shown to yield similar results (Fisch, 2004).

One theory, Fisch's Capacity Model (2000), attempts to combine literature spanning information processing, cognitive schemas, and other mechanisms for learning to account for transfer from television (For a complete review of the Capacity Model, see Fisch, 2000). To summarize, the model suggests that transfer relies on an initial comprehension of the educational content, the creation of a mental representation that is significantly more abstract than the initial learned content, and its relationship to the novel problem to which it will be applied. Breakdowns at any level of this process can result in a failure of transfer. Conversely, if conditions can be idealized to promote success at each level, it is possible that transfer can be maximized.

However, it is also thought that television can prime specific behaviors, attitudes or dispositions in viewers in the short term after viewing. Priming, as opposed to transfer, is behavior stimulated outside of an individual's cognition (Bargh & Morsella, 2008). One of the most recognizable examples of television priming attitudes or thoughts is the notion of including subliminal messages in advertisements or propaganda films, thought to stir powerful feelings or affiliations with certain ideas without the individual realizing why.

A body of literature exists demonstrating priming studies during which subjects' mental representations are activated in subtle ways (i.e. through viewing a television program) and then behavior is subsequently evaluated (Bargh & Chartland, 2000). Several studies have supported the phenomenon of cognitive priming following television viewing in adults or adolescents. Shrum, Wyer, and O'Guinn (1988) suggested that

heavy television viewing adults' beliefs about social reality were more consistent with the content of TV programs than the beliefs of light viewers. Hansen and Hansen (1990) found that, immediately following the viewing of rock music videos, adult participants that were shown an antisocial act rated the event as less negative than individuals who watched neutral videos, suggesting that these music videos may have a priming effect for antisocial behavior or attitudes. In a study that examined the correlational relationship between teen's media diets and sexual activity, Brown (2008) found that adolescents who had more substantial diets of television shows with frequent sexual content were more likely to be sexually active. Other research has found links to media priming aggressive behavior, alcohol consumption, or positive associations with smoking (Anderson & Bushman, 2002; Roehrich & Goldman, 1995; Pechman & Knight, 2002)

Another area within which television has been seen to prime behavior is the effect of viewing on food consumption. Studies have found support for a link between viewing of food advertisements affecting food preferences and consumption patterns. Gorn and Goldberg (1982) showed children at an overnight camp a cartoon with either candy or food advertisements; in the subsequent 2 weeks, children who viewed the candy advertisements selected healthy food options less often than other children. In an experiment examining elementary school children's snacking behaviors following viewing, children who viewed a cartoon during which food advertising was shown, children consumed 45% more when shown food advertising during viewing (Harris, Bargh, Brownell, 2009). In a second experiment by the same authors, adults that were exposed to snack food advertising consumed more of both healthy and unhealthy snack foods as compared to other adults who were shown advertisements for healthy nutrition

or no advertising. Though studies like this do not provide causal evidence that advertisements cause unhealthy food choices or increased consumption, the social cognitive theory of thought processing suggests that advertisements may prime subjects to behavior in certain ways outside of their conscious awareness (Bargh & Morsella, 2008).

How exactly is a primed behavior activated? Dijksterhuis and Bargh (2001) suggest that the primed behavior appears to hinge on an overlap between representations activated by the perception of behavior (i.e. those portrayed on television) and those mental representations used to enact the behavior oneself. Primed behavior works in very much the same ways that imitation and mimicry is accomplished by adults albeit a much more subtle and unconscious activation of behavior (Chartrand & Bargh, 1999; Bargh, 2005). In young children, it is suggested that this priming mechanism can provide support for children's ability to learn vicariously through experience in their world (Tomasello, Carpenter, Call, Behne, & Moll, 2005).

Very little experimental work investigated the priming effects of television on children's behavior. Josephson (1987) conducted an experiment in which groups of boys in second and third grade were shown either a violent or non-violent television program. Boys from both groups were either exposed to a violent cue or not. The boys who were shown the violent program and exposed to a cue at a later time point were more aggressive than those exposed to violent content alone. This research suggests that, aggressive behavior may not be primed to occur without a trigger; however, when boys were put in a frustrating circumstance, those that viewed the violent programming tended to act more aggressively. Though this experiment looks at the negative impact of

television's ability to prime behaviors; no known research was found to support television's ability to prime positive behaviors like increased cognitive activity or themed play.

The present experiment presents children *Sesame Street* segments that show physical-constructive activities or social-narrative activities. Subsequently, the children are allowed to play with toys that do not represent the specific objects or characters shown in the programs. It is posited that there will be cognitive priming such that children will match their play schemes to the category of content that they viewed.

Preschooler Play

The Development of Preschool Play

It is widely acknowledged that play offers children the opportunity to explore their world, experiment with objects and the environment, and express personal motivations and creativity. However, a lack of consensus exists around a universal definition for what it means to play. According to the work of Piaget, play is characterized as an opportunity for a child to use assimilation and accommodation to exercise and change their conceptions about the world (1962).   Others describe play as the demonstration of behaviors in an unprecedented context (Power, 2000). Some have used comparisons to animal models of play to define it as an act unmotivated my extrinsic pressures or drives (e.g. Fagen, 1981). However conceived, it is clear that children spend a great amount of time in play. It may be less important to define play and more important to understand the value of this informal, exploratory behavior.

Despite the frequency and ubiquity of child play, little is known about its impact on development. Mostly, this can be attributed to the fact that no known cases exist in which a child was deprived of play without other serious deprivations that may have played a role in creating developmental delays or deficits (Rosen, 1974; Smilansky, 1968). As few would consider a deprivation of play ethical, we may never be sure of the absolute role of play on children's psychological, emotional, cognitive, or physical development. Though some claim that play is merely driven as a stimulus seeking behavior devoid of motive or goal (Ellis, 1973), many feel that the continued exploration of play as a developmental construct is worthy cause for exploration (i.e. Smith & Vollstedt, 1985; Rubin, Maioni, Hornung, 1976; Power, 2000).

A fundamental observation is that the structure and social complexity of play increases with age. Early hypotheses of play progression posited that young children grow from solitary play, into onlooker and parallel behavior, and finally associative and cooperative play (Parten, 1932). Subsequent work has since suggested that in the early preschool years (3- and 4- year olds) play is characterized by more solitary and onlooker play, with other forms maturing later in the preschool years (Barnes, 1971).

Though solitary play is classified as one of the least mature forms, research has investigated whether solitary play may contribute something of value to children who are capable of higher forms of social play. In a study by Moore, Evertson, & Brophy (1974), Kindergarten children were observed during solitary free-play sessions and were found to be active rather than passive, often engaged in activities such as arts and crafts, block building, puzzles, and large muscle play. This type of evidence suggests that children can be cognitively active when engaged in solitary activities.

Another way by which play has been characterized is by content rather than by increasing maturity. Originally hypothesized by Piaget (1962) then further developed by Smilansky (1968), common categories of play have taken shape as follows: (1) *functional play*, characterized by repetitive muscular movements with or without the use of an object, (2) *constructive play*, defined as the manipulation of objects for creative or constructive purposes, (3) *dramatic play*, during which the child takes the place of an imaginary person or situation, and (4) *games with rules*, characterized by a set of pre-decided but flexible regulations to guide play.

One might suggest that the content of children's play may be affected by skill or cognitive competencies. Research in this area suggests that preschoolers generally spend more time engaged in functional and constructive play, mostly attributable to cognitive achievements for this age group (Rubin & Maioni, 1985).

Another phenomenon of note is the possibility of differences in children's play based on socioeconomic status (Rosen 1974; Smilansky 1968). Early play research suggests a relationship between low socioeconomic status and low levels of constructive play, attributed to less space and fewer materials in the average low-income home (Gulick, 1920). In a study by Rubin and colleagues (1976), middle- and lower-class preschoolers were observed for the content and maturity of their play. Results showed that lower-class children showed significantly more functional and solitary play than their middle-class peers.

Lastly, gender may play a role in children's selectivity of toys or propensity to engage in various kinds of play. In studies examining children's understanding of gender roles during play, preschoolers reliably apply gender stereotypes to toys when asked how

family members would want them to play (Raag & Rackliff, 1998). During the preschool years, gender roles are beginning to take shape; however, 3-year-olds are much less rigid in beliefs than later in childhood (5-year-olds) (Freeman, 2007).

Children's propensity to take information obtained in one context and use it for symbolic play may depend on the development of representational skills, or the ability to think flexibly about the meaning of concrete objects (Piaget, 1962, Vygotsky, 1967). According to the work of Vygotsky, children's ability to play more abstractly with objects increases with age (1967). In a study by Elder and Peterson (1978), preschool children of various ages (2, 2-and-a-half, 3) were compared on their ability to engage in symbolic play with various objects. Two sets of similar or dissimilar objects were chosen on the basis of their physical comparison to the realistic objects. For example, an object similar to the comb would be a flat piece of wood, whereas a dissimilar object was a rubber ball. Children in the similar condition were then given one of the similar objects (e.g. the flat piece of wood) and asked to pretend they have a comb and to use it. In the dissimilar condition, the child would be given one of the dissimilar objects (i.e. the ball) and asked to pretend they have a comb and to use it. In the dissimilar condition, they were subsequently asked what the object actually was and how to really use it (e.g. bounce or throw the ball). Results indicated that children of all ages did much better in the similar than the dissimilar condition, indicating that similar objects allowed them to form a representation for object use. Children over three years of age performed equally well in the similar and dissimilar conditions, suggesting that representational skills have become increasingly flexible by this age. This study has implications not only for our

understanding of children's object use during symbolic play, but also how they may take information they know from one context and utilize it in play at another given time.

In an ethnographic study examining the influence of television's effect on the content of preschool play, James and McCain (1982) observed classrooms of preschool/school-age children (3-7 years old). Within this day-care environment, children were exposed on a regular basis to programs such as *Mickey Mouse*, *Batman*, and *Star Trek*. Results indicated that television's influence extended to gross motor play (running, hiding, etc.), manipulative/constructive play (building, digging), language play (talking as characters would speak), pretend play (role-playing as Mickey Mouse or Batman), and social play (establishing rules for heroes versus villains).

What may be the important considerations for some of the TV's influence on play? Age (Ward, Wackman & Wartella, 1977), intelligence (Singer & Lenahan, 1976; Lyle & Hoffman, 1972), sex of child (Stein & Friedrich, 1972), and imaginativeness (Singer & Singer, 1976) all may play a role in the variability in effects (see Tower, Singer, Singer, & Biggs, 1979 for a review).

Very little research has assessed the effect of differentiated content on the toy play and toy choice of preschoolers immediately following television viewing. Though it seems that young preschoolers may be generally predisposed to spend more time in functional or constructive types of play, this research project seeks to assess how play behaviors may be affected by the type of content presented immediately prior.

<center>**Preschoolers' Categorical Knowledge**</center>

The Development of Categories

For play to match a category of TV content, presumably the child must be able to categorize the content. Categorization has been theoretically defined as the act of treating a group of things as similar or equivalent (Neisser, 1987). For children, category learning and concept formation are key to making sense of their world.

According to Quinn (2004), substantial evidence exists to support the notion that even before the onset of language, infants are able to create object categories based on perceptual information; later in life, children use earlier learned perceptually-based categories formulate more abstract, conceptual representations. This distinction between perceptual versus conceptual is a central question in deciding what information is used by young children to form categories (Mandler, 2000). Some believe that infants begin using perceptual information at a very early age with a separate conceptual system coming online during the first year of life (Mandler, 2000). Others believe that it does not make sense to distinguish between these two systems, as it is difficult to measure what type of information is being used during infant categorization (Jones & Smith, 1993, as presented in Oakes & Rakison, 2003).

Category learning displays the increasing ability to deal with complex rules and information with the onset of age; however, the systems to learn these rules may be present even during the first few months of life. This ability to categorize allows us to use our working memory storage to only remember the important details of the individual

object, rather than having to commit all details of the object to memory (Oakes & Rakison, 2003).

What are preschool children capable of in terms of category formation? A relatively strong connection has been proposed between the formation of a complex hierarchy of categories and the acquisition of language (Gelman & Markman, 1986; Gentner & Namy, 1999). In studies that examine children's extension of categories to novel words, results suggest that preschool children are highly likely to extend category membership to other objects of a like kind (e.g. Golinkoff, Hirsh-Pasek, Bailey, & Wenger, 1992). Additional research has found that, when given novel-named object (i.e. "a dax") with an obvious function (i.e. painting), preschool children extended the novel name to other objects with a similar function (Kemler Nelson, 1995).

Theory suggests that preschoolers have achieved the capability of teleological reasoning, logic that focuses on the assumptions of goals, functions, or purposes (Kelemen, 1998). This notion suggests that individuals apply function to objects: that they were created to fulfill a specific purpose. Research with infants as young as 9-16 months suggests that, with 30 seconds of experience with one exemplar, infants apply similar play activities with other perceptually similar objects (Baldwin, Markman, & Melardin, 1993).

However, it has been suggested that preschool children may only be successful with teleological reasoning when the object can be classified based on perceptual cues to function (i.e. a nose is for smelling, a mop is for cleaning, a chair is for sitting) (Keil, 1992) as opposed to objects that do not seem to have an outright function (i.e. mountain, cat). In many circumstances, the most successful application of this teleology is with

biological tools (arms, nose, eyes) or tools/artifacts. This categorical framework is

referred to selective teleology: children are limited in the extensions they can make to

objects and their functions. Other theorists suggest that infants are substantially more

lenient in attributions of object purpose, generally applying the notion that all objects

have been created for some purpose (Leslie, 1994). This theoretical standpoint is referred

to as promiscuous teleology. Though each theory has its fundamental differences in how

young children come to attribute functionality to objects, whether innately predisposed or

acquired, both suggest that, by the preschool years, children can identify the potential

functions of objects and establish categories for classification.

In sum, current research suggests that preschoolers, with a collection of past

experiences and the availability of language, become capable of establishing categories

for objects and words that bridge beyond perceptual similarity. Preschoolers have been

found to establish categories for objects based on function and non-obvious object

properties. It is believed that their extensions of categories should reach beyond the

shape or size of objects, but also to their function or intended use. However, this ability

to categorize based on function or use may be constrained to objects with obvious

connections to functions (tools, artifacts, biological parts).

According to Mandler (2000), it is crucial to use the right type of categorization

paradigm in order to capture accurate results. She argues that typical picture preference

tasks may not accurately depict infant categorization, and recommends more active

techniques requiring more than perceptual information must be used to capture data on

conceptual capabilities. Categorization research with preschoolers was often criticized

for oversimplifying objects, disassociating them from their natural environment and for

making inferences that favor investigator's hypotheses (Denney & Moulton, 1976).

Denney (1975) developed a Picture-Pairing Test (PPT), which used common objects for stimuli and incorporated instructions that allowed children to exercise categories based on both similarity (which are alike) and complementary (which go together) qualities. In addition, Denney's PPT also limited the group size of pictures and maximized the number of possible responses per child to avoid making inferences based on limited data (Denney & Moulton, 1976). Results indicate that paradigms like the PPT yield a successful measure of preschooler categorical knowledge while minimizing methodological issues.

According to Fisch's Capacity Model for learning from television (2000), children must form a mental representation for the content being disseminated in order for transfer to other contexts to occur. I believe that this mental representation is similar to children's ability to classify and notice the similarities across contexts. For example, in the case of the *Blue's Clues* transfer research; children must have been able to note the perceptual similarities of each *Blue's Clues* episode in order to categorize them as the same type of program. Extending that further, children were also able to see the perceptual similarities between *Blue's Clues* and the novel program, *Big Bag*, to categorize them as similar programs to which their interactions with the program would be similar. How well children are able to categorize activities across segments within a television program is the secondary focus of this study.

A review of the literature has found that much of the categorization literature focuses mostly on young children's ability to categorize objects. Though much research has been done to examine the function of objects, little to no published work extends to

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preschoolers' capability of classifying actions or activities into categories (i.e. building

with blocks versus playing with a baby doll). No research was found linking children's

categorical knowledge to the success of transfer or priming effects.

It is my working hypothesis that children's ability to categorize and classify

actions and interactions as similar would have a direct impact on whether the program

content primes children for a specific cognitive disposition. If the 41-43 month old

children are able to sort activities into constructive or social type activities, a heightened

influence of the television content on their play behavior should be present.

Overview of Study

The goal of this study is to investigate the impact of television content on

preschoolers' toy play immediately after viewing.

A substantial body of literature exists to support the notion that there are positive

long-term outcomes associated with the viewing of educational programs such as *Sesame*

Street during the preschool years (see, e.g., Fisch, 2004 for a review). The general

assumption has been that these outcomes are associated with specific content viewed, for

example, learning number and letter identification from *Sesame Street* helps children in

their early schooling that deals with numbers and letters. However, few studies have

examined the short-term effects of viewing educational content on the play behaviors

immediately following video viewing. As play has been found to be a strong indicator

for the child's current cognitive state (Kelly-Vance, Ryalls, & Glover, 2002), this study is

among the first to address whether the content of educational programming motivates

preschoolers' toy choices and play behavior; in other words, to serve as a priming agent to a category or type of play.

However, to posit that children's viewing of the content will prime their play assumes that they are able to perceive the similarities amongst the constructive or dramatic segments they view. This type of categorization is hypothesized to be more complex than object categorization. However, no available research suggested that preschoolers succeed at the categorization of actions or behaviors at the same level of success as they do objects. This study seeks to see if preschoolers succeed in an action categorical task that would suggest whether or not they perceive the television content as similar. The following are research questions that will be addressed within this study:

RQ1: Does TV content influence subsequent play content?

RQ2: Does television content influence toy choice during a subsequent play session?

RQ3: Does children's categorical knowledge influence the way children were primed by the content?

In this study, preschoolers 41-43 months-of-age will participate in a video viewing condition (physical constructive or social narrative). This age group was chosen for this study for several reasons: one being that it is past the age at which young children overcome the video deficit (Anderson & Pempek, 2007). In addition, this age has displayed the ability to control their own attention to the television and display imitative and transfer behaviors after viewing (e.g. Bandura et al., 1963a; Hayne, Herbert, & Simcock, 2003; Troseth & DeLoache, 1998; Schmitt & Anderson, 2002). Finally, this

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age is of particular interest as most other studies examining the impact of video viewing on play have focused on older children.

Subjects were randomly assigned to video viewing condition and shown approximately 25-minutes of *Sesame Street* clips. Immediately following the video viewing session, the child participated in a 30-minute free play session during which an array of toys was revealed. The same array was made available to both conditions. The video viewing and play sessions were videotaped and subsequently coded for child behaviors including attention to television, play onset/offset, toy choice, and content of play (physical constructive versus social dramatic play). Lastly, children were asked to perform a short card-sorting task based on their notions of social dramatic or constructive activities. This last task will allow us to assess children's capabilities in activity categorization and how it may relate to the impact of the television content on their play behavior.

CHAPTER II

METHOD

Design

This thesis is part of a larger study examining the effects of educational video content on children's play and toy choice. In the full design, preschoolers (ages 41-42.99 months) were assigned randomly to one of three conditions— a physical constructive video viewing condition (PC), a social dramatic video viewing condition (SN), and a neutral video viewing condition (N). This thesis assesses the effects of television exposure to constructive and social narrative content on children's toy play.

Participants

Subjects were (40) 41-42.99 month-old typically developing children, evenly divided across two conditions (physical constructive and social narrative). Efforts were made to equally divide subjects by gender, however we received a higher rate of participation from boys' families than girls; therefore any subsequent gender effects will be considered with this caveat (see Table 1 for participants by condition and gender). One participant was excluded from all subsequent analyses due to identification of a developmental disability following participation. Approximately 89.7% of the sample was Caucasian, 0% were Hispanic, 0% were African American, and 10.3% identified as Other. The average parent education level was 16.69 years and ranged from 12 to 21 years. Participants were recruited through the Massachusetts Birth Records. As the state birth records have only been maintained for the past two years, the birth records were also referenced for siblings within the appropriate age range. A mailing to each family was conducted by sending a letter describing the study. One week later, families with an

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active telephone number were called to further explain the research and procedures of the Children and Media lab, answer any questions, and to schedule an appointment if they agreed to participate. The day prior to their visit to the Child Study Center, they received a reminder phone call to confirm the date and time of their scheduled arrival.

Setting and Apparatus

All sessions for this study were conducted at the Child Study Center located in Springfield, Massachusetts. Greeted by research assistants, the parent and child were brought to the experimental room, measuring 3.40m x 2.94m in size, which was furnished to resemble a traditional living room with an armchair, a large pillow, coffee table, parent magazines, and a 21-inch television and DVD player. Beneath the television was a digital video recorder and microphone. In order to view the experimental room, a connected observation room, 3.42 m x 2.29 m in size, contained a one-way mirror (1.35 m x 1.60 m). In this observation room, a researcher had the ability to record the child via several experimental room cameras. In order to capture the best angle of the child's TV viewing behavior and subsequent toy play, the researcher chose the best shot from either camera, toggling back and forth to present the best representational view of behavior. A digital file was recorded with the best angle being the primary image.

Stimuli and Materials

Videos. Each child was shown a program comprised of clips from episodes of *Sesame Street*. The constructive program's total run time was 24:23 and the dramatic program's run time was 25:46. Each clip reel was edited together using Adobe Premiere and was comprised of segments collected from the archives of Sesame Workshop. A panel of

undergraduates rated clips based on clip effectiveness in communicating physical constructive or social narrative content (see Appendix A, Clip Rating Sheet). Only clips that received the highest ratings in each category were deemed appropriate for inclusion in their video condition.

The physical constructive video consisted of a selection of clips that demonstrate processes of assembly, deconstruction, parts-of -a- whole, or step-by-step processes of creation. Examples of such segments include the assembly of a pizza while noting each ingredient, the step-by-step assembly of a musical instrument, and the construction of a house.

The social dramatic video consisted of a selection of clips that focus on conversational, narrative storytelling of relationships and character actions. Examples of such segments include the telling of classic fairytales, the collection of multiple characters engaging in an activity together (e.g., cooperation), or the discussion of a family relationship or ritual.

Efforts were taken to select clips for the physical constructive and social dramatic video viewing conditions that were similar in length and in number of formal features (for a review of formal features and preschool attention, see e.g., Rice, Huston & Wright, 1982). Though it was found that social dramatic clips tend to be longer on average, every effort was made to assure that each condition is equivalent in attention-driving properties. The primary difference between the two video viewing conditions was the type of content displayed to the child. Clips took the form of live action, animation, or a combination of both. Segments were edited together in each condition to create a magazine-format

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program, approximately 25-minutes in length, focusing on either constructive or dramatic content.

Toys. Immediately following the video viewing session, a research assistant brought an array of toys into the observation room. Each subject received the same array of toys that included the following: (1) workbench, (1) set of blocks, (2) wooden puzzles, (1) doctor's kit, (2) baby dolls – one male, one female, (1) playhouse, (1) piano, (1) sit and spin, and (2) board books. Each toy was selected based on its propensity to encourage a given type of play. Physical constructive toys included the workbench, blocks and puzzles. Social dramatic toys included the doctor's kit, the baby doll, and playhouse. Neutral toys included the piano, sit and spin, and board book. Toys were classified into the categories listed above by an independent panel of undergraduates. Before starting the proposed study, several subjects were run to assure that no one toy was particularly attractive over all others. The presentation of toys was counterbalanced to ensure that the display of toys for children would not be a confounding factor.

Questionnaires. A questionnaire and viewing diary were administered to parents in order to gain access to demographic information, home video viewing data, and toy presence in the home (see Appendix B, Session 1 Parent Survey, and Appendix C, Viewing Diary).

Procedure

Upon their arrival at the Child Study Center, the parent and child were brought to the experimental room by the researcher and told that they would be in the room for approximately one hour. The parent was given a consent form to review (see Appendix D), which provided that parent with an overview of the session activities. Once consent

was received, the researcher asked the parent to allow the child to watch television and act as if they would while at home. After the parent was given these instructions, the researcher left the room to begin recording the session.

After a lapse of a minute or two to allow the parent and child to get settled, the researcher turned on the television for viewing session. During this portion of the experiment, the child was not provided toys.

Immediately following the program, the television was turned off and the researcher returned to the room to reveal an array of toys. The child was instructed that they would be able to play with the toys. The parent was discouraged from interacting with the child during this free-play session and was encouraged to fill out the questionnaire and diaries or allowed to read magazines (see Appendix B-D). At the conclusion of this 30-minute play period, the researcher returned to the room.

Before concluding, the researcher administered a categorization task, asking the children to play a game in which they should sort cards into one of two categories. Children were introduced to two pictures of novel characters, Bear and Cat. They were told that Character X likes to build things and Character Y likes to pretend and play stories. Character presentation was counterbalanced so that the position and play preferences of each character was altered across subjects. The child was asked to help the experimenter decide what types of toys the characters would like and the games each character would like to play. For each trial, the researcher asked the child to describe what is depicted on each card. Most pictures from the physical constructive category were of children using things that can be built/made (e.g., birdhouse, puzzle, tower, snowman, jack-o'-lantern, etc.). The social dramatic cards depicted activities of children

that were using toys or games that were suggestive of acting out a story or interaction

between two or more individuals (e.g., playing doctor, tea party, post office, supermarket,

etc.) If they were not able to determine the activity in the picture, the researcher assisted

(ex. "What is that they have in their hands? Can you see what that is?") If the child

needed assistance, the researcher would describe some the details in the photograph ("Is

that cheese and pepperoni they are putting on that dough? What does that look like?")

After each was adequately described, the child was asked "who would like to play this

game/play with this toy: Character X or Character Y?" Immediately following, the card

was sorted in the character's bin based on the child's choice. The child was then handed a

new card. This sorting task took place for twenty-two cards in total, with four cards

serving as training trials.

For their participation, the researcher gave the parent a t-shirt for the child, fifty-

cents reimbursement for parking, and a ten-dollar gift card to Target as small tokens of

appreciation.

Videotape Coding

Research assistants videotaped all video-viewing and free-play sessions for later

coding at the University of Massachusetts Amherst. Adobe Premiere 7.0 was used for

coding attention. This application includes a utility that marks onset and offset times of

designated behaviors (see Appendix E for attention coding scheme). Software developed

in our laboratory was used to convert behavior onset and offset times to a variety of

measures of duration including number of looks, mean length of attentional episode,

longest episode, and percentage of time spent looking to the television. For statistical

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analyses, percentage of time spent looking to the television was used as predictor for children's physical-constructive or social-dramatic play.

Play content was coded using a ten-second interval coding procedure. While viewing the 30-minute play session, research assistants made a decision every 10 seconds about the type of play content being displayed by the child along with a categorization of what type of toy they used. Physical constructive play was coded during episodes characterized by taking apart or assembly of objects, parts-of-a- whole, step-by-step processes of creation, or actual construction activities such as building, digging, manufacturing. Examples of this type of play include building with blocks or assembling a puzzle. Conversely, social narrative play was coded when children engage in fantasy or "story-like narrative play, with the child acting out a pretend story or interaction or role-play. Examples of social narrative play include playing feeding a baby doll, playing "house" with the house play set, or playing doctor. Coders also identified when children engaged in combination play, neutral play (exploring an object, holding an object), as well as periods of no play, play with a non-toy object, or clean-up behavior. An average of 180 intervals were coded for play content for the 30-minute period (with some subjects lacking intervals in rare cases that the subjects' play session was ended one or two intervals too early, n=4).

Dependent variables are proportions of time spent in physical-constructive play and time spent in social dramatic play. The numerator for constructive play was the number of intervals during which play was constructive in whole or in part. The numerator for social narrative play was the number of intervals during which children engaged in social narrative play in whole or in part. The denominator for each

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calculation was the total number of intervals during which they were engaged in play of some kind.

Performance on the card-sorting task is measured by tallying the total number of correctly sorted cards out of the total number of trials. The four training trials that children were given at the beginning of the task were dropped, leaving 18 trials to code for success or failure to correctly sort into a category.

Reliability

Research assistants were trained on coding attention to the television. Following this training, research assistants received a test tape to be compared to the work of an experienced coder to assess Inter-observer Reliability (IOR). Only at the point that their work reached an acceptable IOR level was the research assistant allowed to code subject tapes. Coders were blind to the video condition throughout the process. More than twenty-five percent of the tapes were double coded periodically by different research assistants to assure IOR consistency over time. Attention to television was measured as the percent of time spent looking during the viewing session as well as the number of looks to the screen. The intraclass correlations for percent of attention to television (r=.95) and number of looks to the screen (r = .99) were calculated, showing high levels of reliability.

Since a new play interval coding procedure was being developed for this project, several research assistants helped in the development of a coding scheme. Each research assistant completed several training tapes to familiarize with the procedure. In order to assess the reliability of play coding, a different type of IOR was used. Because of the

categorical nature of our play coding, Cohen's Kappa was used to determine the level of

coder agreement. The reliability for play content was (κ=.822) and toy choice (κ=.923).

CHAPTER III

RESULTS

Descriptive Statistics

Attention to Television. On average, children looked at the television 42 times during their TV viewing session; however, there was a great deal of variability in number of looks across children (SD = 26.42). Children spent an average of 90.01% of the TV viewing session looking at the television (SD= 9.84). A full report of descriptives on children's looking to the television during the video viewing session can be found in Table 3. The variable that is used for further analysis as a measurement of children's attention to the television is their percent looking at the television during the viewing session.

Play Content and Toy Choice. Ratios were calculated to determine the proportion of intervals children spent in constructive play and social dramatic play. The mean for proportion of constructive play across all children was .51 (SD= .28). The mean for proportion of social narrative play was .43 (SD= .29). The same was done to assess the proportion of intervals children played with constructive toys and social dramatic toys. The mean proportion of intervals children spent with constructive toys was .42 (SD= .24) and the proportion for social narrative toys was .41 (SD = .23). A full report of descriptives on children's play content and toy choice can be found in Table 2.

Card Sorting Task. Children's average score of correct responses in the card-sorting task was 10.72 (SD=2.96) out of 18 possible trials. This mean was calculated to be statistically different than a null value of 9, assuming .5 probability (t (35) = 3.48, p < .001). In order for an individual child's performance to be considered to be statistically

above chance, they would score at least a 12 out of a possible 18. Of the 36 children who participated in the task, 14 children were statistically above chance (5 boys, 9 girls) (see Table 3). The range for correct trials spanned from 5 to 17. For the purposes of analyses in this thesis, the card sorting task results are treated as a continuous predictor.

Assessing Equality of Groups on Play and Attention

Before the specific hypotheses were tested, an omnibus ANOVA with sex (male, female) and condition (physical-constructive, social-dramatic) as between subjects factors was run to see if there were any group differences in attention to the television or in the amount of total time spent in play. Results showed no significant effects for gender or condition on children's attention or overall number of intervals spent in play, $F(1,35) = .175$, $p > .05$ and $F(1, 35) = 3.46$, $p > .05$ respectively. See Tables 4 and 5 for means of looking time and play by condition and gender.

Correlation Between Play Content and Toy Choice

Prior to running a separate set of models assessing the impact of video content on children's play content and toy choice, bivariate correlations were calculated to identify whether toy choice and play content were too highly correlated to be considered separate constructs. Results suggest a strong positive correlation between the proportion of constructive play content and the proportion of constructive toy choice ($r = .699$) and a stronger positive correlation for narrative play content and narrative toy choice ($r = .886$).

Table 1.
Sample by Condition and Gender

Condition	Males	Females	Total
Physical-Constructive	11	8	19
Social-Dramatic	11	9	20
Total	22	17	

Table 2.
Descriptive Statistics for Outcome Variables (Play and Toy Choice)

	Mean	SD	Min.	Max.
(n=39)				
Physical Constructive Play	.516	.279	.03	1.00
Social Dramatic Play	.433	.285	.00	.97
Physical Constructive Toy Choice	.418	.239	.07	.92
Social Dramatic Toy Choice	.413	.233	.06	.89

Table 3.
Descriptive Statistics for Independent Variables

	Mean	SD	Min.	Max.
(n=39/36*)				
Percent Looking at TV	90.01	9.84	64.51	99.51
Card Sort Task Results*	10.72	2.96	5.00	17.00

*Note: 36 subjects were included in the analysis

Table 4.
Play and Attention Means and Standard Deviations by Condition

Condition	n	Constructive Play Ratio	Dramatic Play Ratio	Percent of Looking
Constructive	19	.566 (.279)	.358 (.274)	93.56 (7.52)
Dramatic	20	.469 (.278)	.505 (.283)	86.64 (10.74)

Table 5.
Play and Attention Means and Standard Deviations by Gender

Gender	n	Constructive Play Ratio	Dramatic Play Ratio	Percent of Looking
Male	22	.553 (.248)	.388 (.268)	90.80 (9.48)
Female	17	.469 (.317)	.492 (.304)	88.98 (10.48)

For this reason, this thesis will focus on an analysis of the effects of video content on children's play content rather than toy choice.

Analytic Strategy

A multivariate outcomes model was used to predict children's time spent in physical-constructive versus social-dramatic play categories. The rationale for using HLM is that these analyses concern the use of multiple related outcomes (Barnett, Marshall, Raudenbush, & Brennan, 1993; Brennan, Kim, Wenz-Gross, Siperstein, 2001). For example, if a participant spends a higher than average proportion of their time in constructive play, one would assume that the amount of time they spent in social-dramatic play would be lower than average. Like MANOVA or MANCOVA, a multivariate outcomes model takes into account this shared-variance relationship that other forms of analyses would not (Supovitz & Brennan, 1997). In addition, HLM allows us to examine many of the relationships of interest within one model rather than running a MANCOVA with follow up tests, allowing our analyses to be more parsimonious with the use of HLM. Finally, like MANCOVA, HLM allows inclusion of a continuous predictor such as attention to television with other categorical predictors. The logic behind using this type of model as opposed to MANCOVA is that the multivariate outcomes model requires fewer assumptions than MANCOVA (Maxwell & Delaney, 2004; Raudenbush & Bryk, 2002).

First, a null model was fit to allow for subsequent model comparisons that include the variables of interest. The unconditional model does not include any subject level predictors (i.e. gender, condition, attention to television). To test the significance of these types of predictors, they are added in to a conditional model and the Deviance (D)

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statistic for each of these models are compared against that from the unconditional model to test whether adding the variables improves overall model fit. The higher the D statistic for the model, the worse the overall model fit. For models that show an improvement of fit, a Chi square test checks for significance. Measurement error calculations[1] were completed for the constructive and dramatic play outcomes using IOR scores (.0043 and .0042 respectively).

For the level 1 model, play proportions of each type of play, calculated for each child, served as outcome variables. As is standard in models of this nature, the intercept was removed. The following is the equation for Level 1:

$$\text{Play}_j = \beta_1(\text{consprop}_{ij}) + \beta_2(\text{socdprop}_{ij})$$

In level 2 of the model, the Level 1 predictors (physical-constructive play and social-dramatic play) become estimated outcomes. In the unconditional model, no predictors will be included.

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + u_{2j}$$

The γ_{10} coefficient represents the grand mean for proportion of constructive play across all subjects ($\gamma_{10} = .516$). The γ_{20} estimate represents the grand mean of proportion of dramatic play across all subjects ($\gamma_{20} = .433$). Results from the unconditional model suggest that the variance components are significant, suggesting that enough variance exists to justify adding predictors to the model to account for variability in individuals ($u_{1j} = .067$, $p < .001$; $u_{2j} = .069$, $p < .001$). This unconditional model was used in

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[1] The formula for calculating measurement error is 1-(Reliability) x error variance of the measure in question.

subsequent analyses to assess whether adding additional information to the model yields a better overall fit for the data.

Predicting Children's Play Content

Before examining the impact of video content on play outcomes, children's attention to the video was included in a model to assess whether differences in children's attention alone predict differentiated play outcomes. While level 1 of the model remains identical to that of the unconditional model, level 2 becomes:

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(attTV) + u_{1j}$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}(attTV) + u_{2j}$$

The attention to the television variable was mean centered into the model so that the coefficients would be representative for the mean level of attention to the television in our sample. Children's percent looking at the television was not a significant predictor of either constructive ($\gamma_{11} = .0007, p > .05$) or narrative play ($\gamma_{21} = -.002, p > .05$). Results suggested that the conditional model with attention to television did not achieve a better model fit than the unconditional model ($\chi^2 = .46, p < .05$).

A separate model was created to assess whether children's gender predicted differentiated play content. Level 2 of the model would be nearly identical to that of the attention model, inserting the categorical predictor of gender in place of the continuous attention predictor. Results from this model show that gender is a non-significant predictor for constructive ($\gamma_{11} = -.08, p > .05$) and dramatic play ($\gamma_{21} = .10, p > .05$). The gender model does not show an overall improvement in model fit ($\chi^2 = 1.27, p < .05$). A full report of all model estimates (fixed effects and variance components) can be found in Table 6 and 7.

Table 6.
Estimations of Fixed Effects Without Card Sort Task (n=39)

Predictor	Model 1: Baseline		Model 2: Attention		Model 3: Gender		Model 4: Condition	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Constructive								
Intercept	.516**	.045	.516**	.045	.552**	.060	.565**	.061
Attention			.001	.005				
Gender					-.084	.090		
Condition							-.096	.090
Dramatic								
Intercept	.434**	.046	.434**	.046	.388**	.060	.358**	.064
Attention			-.002	.005				
Gender					.105	.092		
Condition							-0.719	.090

Note: * = significant at *p* = .05 level; ** = significant at *p* = .01 level

Table 7.
Deviance and Variance Components for Models Without Card Sort

	Coefficients For			
Component	Model 1: Unconditional	Model 2: Attention	Model 3: Gender	Model 4: Condition
Deviance	287.56	287.10	286.29	284.81
Parameters	5	7	7	7
Variance Estimates				
Constructive (u_{1j})	.07	.07	.07	.06
Dramatic (u_{2j})	.07	.07	.07	.06
χ^2		.46	1.27	2.75

Does TV content influence subsequent play content?

Because this study aims to examine whether variables like video condition and categorization knowledge are important in predicting children's subsequent play behaviors, a step-by-step process of selecting variables for the conditional model as compared to an unconditional model was chosen to achieve accurate estimates for how much they matter in predicting children's play. If all variables were added simultaneously to the conditional model, parameter estimates may be less accurate in measuring the true impact of each variable on the outcome measures.

First, a conditional model was fit to see if viewing condition alone predicted children's constructive and narrative play. Condition was not a significant predictor for either constructive or narrative play. This model also did not show an improvement of fit over the null model ($\chi^2 =,2.75$ $p > .05$).

A model was fit including attention, condition, and their interaction term. Results show that attention, condition, and the interaction term did not significantly predict either type of play (see Table 5 for fixed effects estimates). This model was not significantly better than the unconditional model in predicting children's play ($\chi^2 =5.5$, $p > .05$).

Finally, a model including gender, condition, and their interaction term was included in the model yielding non-significant effects for both constructive and dramatic play. This model also did not show an overall improvement of fit ($\chi^2 = 4.38$, $p > .05$). Interaction model fixed effects and variance components can be found in Table 8 and 9.

A contrast was done for the two L2 outcomes (constructive play versus social narrative play) to analyze if the proportion of time children spent in physical-constructive play was significantly different than the time spent in social-dramatic play. Results

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Table 8.
Estimations of Fixed Effects – Interaction Models (n=39)

Predictor	Model 5: Cond,Attention,Interaction		Model 6: Cond.,Gender, Interaction	
	Coefficient	SE	Coefficient	SE
Constructive				
Intercept	1.35**	.49	.59**	.08
Attention	-.012	.01		
Gender			-.06	.13
Condition	--1.63	.94	-.08	.12
Interaction	.017	.01	-.04	.18
Dramatic				
Intercept	-.363	.49	.34**	.08
Attention	.011	.01		
Gender			.05	.13
Condition	1.55	.95	.10	.12
Interaction	-.015	.01	.09	.18

Note: * = significant at *p* = .05 level; ** = significant at *p* = .01 level; Attention was mean centered in these models

Table 9.
Deviance and Variance Components - Interaction Models

	Coefficients For	
Component	Model 6: Cond., Attention, Interaction	Model 7: Cond., Gender, Interaction
Deviance	282.06	283.18
Parameters	11	11
Variance Estimates		
Constructive (u1j)	.06**	.06**
Dramatic (u2j)	.06**	.06**
χ^2	5.5	4.38

indicate that children spent significantly more time engaged in constructive play than dramatic play (χ_2 = 1249.43, $p < .001$). These results are consistent with prior research that constructive play is more common than social dramatic play for children of this age.

Does children's categorical knowledge influence the way children were primed by the content?

A separate set of models was run to assess the impact of children's categorization task performance. Three children did not complete the task, therefore a slightly smaller subset of the entire sample are included in these analyses (n=36). A new unconditional model was fit for this subset of analyses (D=264.85). Card sorting performance alone was not significant in predicting subsequent constructive play content (γ_{11}= .02; $p > .05$) and dramatic play content (γ_{21}= -.02; $p > .05$). This model did not show a significant improvement of fit (χ^2 1.43=, $p > .05$). A report of fixed effects and variance components can be found in Tables 10 and 11.

To test the theory of whether children's play would depend on the condition they were in and their ability on the card-sorting task, a model was fit including their condition, card sorting task results, and the interaction term. This model showed that condition and the interaction between condition and card-sort results were significant in predicting constructive (γ_{13}= .06 $p < .01$) and dramatic play (γ_{23}= -.07 $p < .01$). In addition the coefficients for condition were also significant in predicting constructive (γ_{11}= -.81 $p < .05$) and dramatic play (γ_{21}= .88 $p < .05$) (see Table 8 for all significant coefficients and Figures 1 and 2 for interaction plots). Though the difference in Deviance statistics as compared to the null model improved, the condition and card sort interaction

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Table 10.
Estimations of Fixed Effects for Card Sort Task Models (n=36)

	Model 1: Baseline		Model 2: Card Sort		Model 3: Condition by Card Sort	
Predictor	Coefficient	SE	Coefficient	SE	Coefficient	SE
Constructive						
Intercept	.52**	.05	.52**	.05	.90**	.15
Card Sort			.02	.02	-.004	.02
Condition					-.81**	.30
CondXCard					.064	.03*
Dramatic						
Intercept	.427	.046	.43**	.06	.007	.14
Card Sort			-.02	.02	.004	.02
Condition					.888**	.29
CondXCard					-.07**	.02

Note: * = significant at *p* = .05 level; ** = significant at *p* = .01 level; Card Sort was mean centered in models.

Table 11.
Deviance and Variance Components for Models With Card Sort

	Coefficients For		
Component	Model 1: Unconditional	Model 2: Card Sort	Model 3: Condition x Card Sort
Deviance	264.85	263.42	255.17
Parameters	5	7	11
Variance Estimates			
Constructive (u1j)	.06**	.06**	.05**
Dramatic (u2j)	.06**	.06**	.05**
χ^2		1.43	9.68

Figure 1.
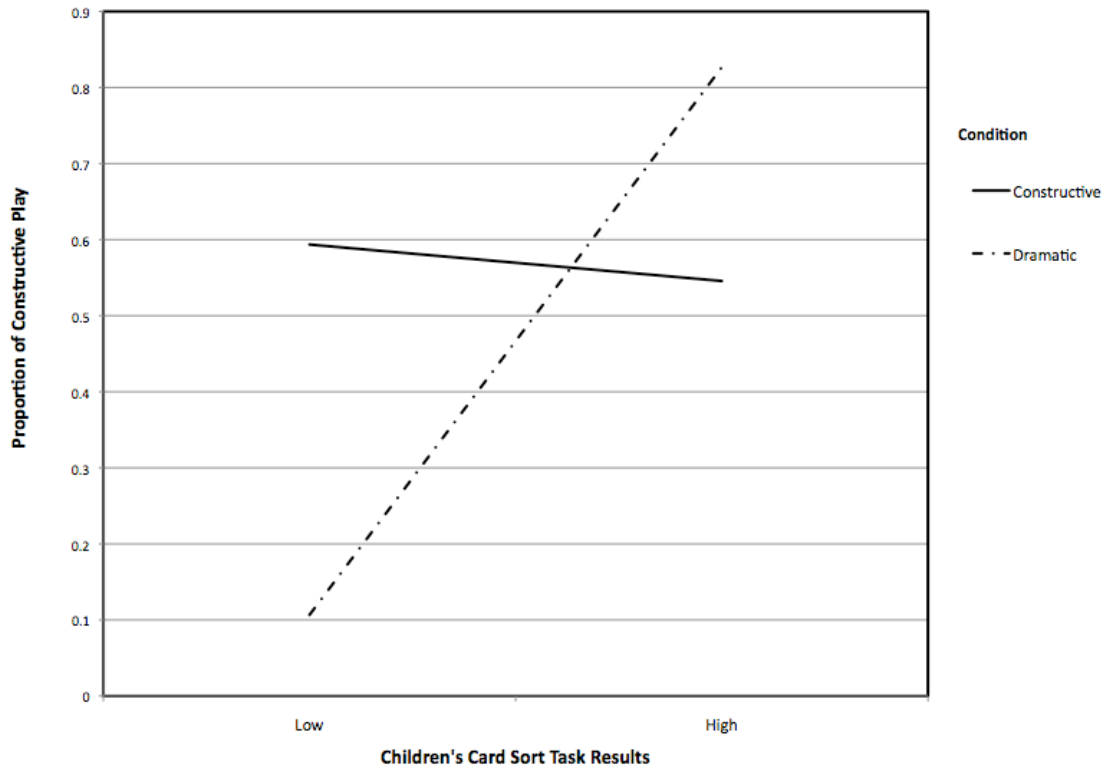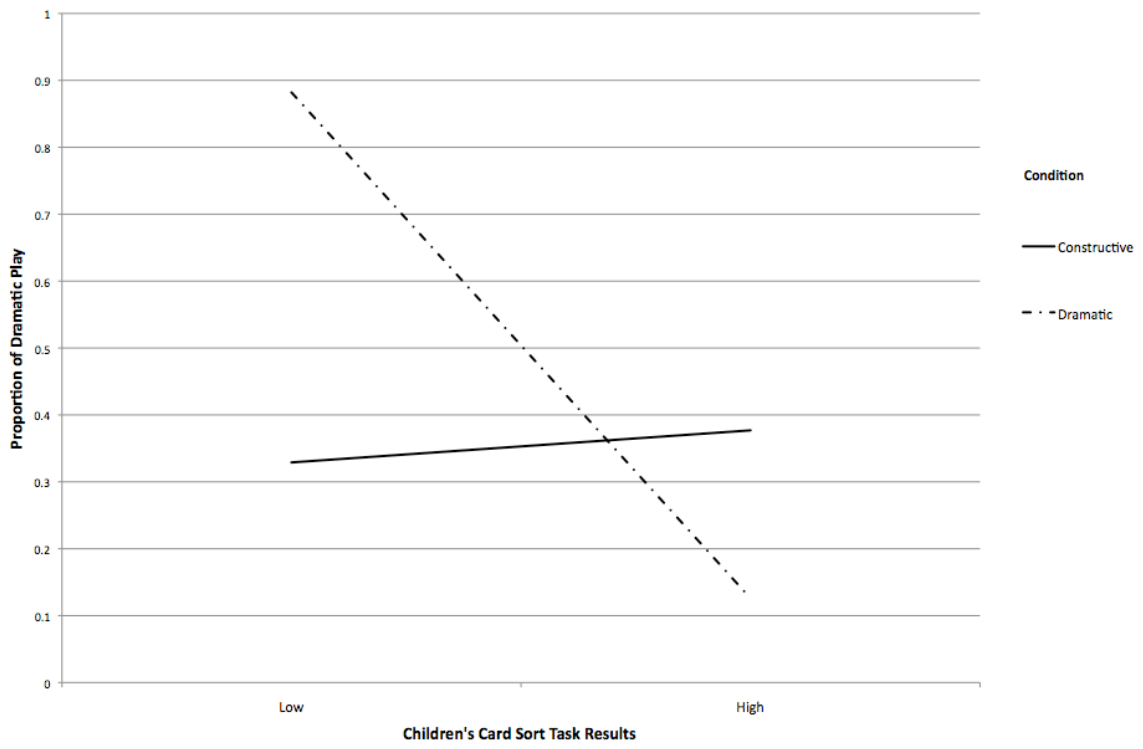*Condition by Card Sorting Results: Interaction for Constructive Play*

Figure 2.
Condition by Card Sorting Results: Interaction for Dramatic Play

model was not found to be significantly better than the null model for predicting

constructive and dramatic play ($\chi^2 = 9.68$, $p = .13$).

CHAPTER IV

DISCUSSION

Children in their preschool years have a propensity to engage in solitary constructive play rather than solitary social dramatic play (Rubin & Maioni, 1985). This may be partially attributable to recent cognitive milestones and that constructive play may be more suitable for solitary situations. The results of this study support prior findings that children of this age spend more time overall engaged in constructive play. The experimental environment in which children were encouraged to play may have also contributed to these results. Children were encouraged to play on their own while their parent attending to filling out questionnaires. By not providing them with an interactive partner, constructive play may have been more suitable for the child than dramatic play, which often benefits from social contingency.

Our models that include gender as a predictor of play support prior research that suggests that gender matters less in predicting toy play at this age as compared to older children (Freeman, 2007). Overall, it was found that the mean amount of time spent in constructive play was higher for boys than for girls ($M = .55$ and $.47$ respectively) and that girls spent more time engaged in social dramatic play than boys ($M=.49$ and $.39$ respectively) however, these proved to be non-significant differences for this sample due to substantial variability across children. These findings support prior research that suggests preschool children of this age are less affected by gender stereotypes during their toy play than older children.

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Video Predicting Play Content

Prior research suggests that television has the ability to generate imitative and priming effects for preschoolers' behavior (e.g. Tomasello, Carpenter, Call, Behne, & Moll, 2005; Josephson, 1987). The a priori hypothesis for this current project was that television has the ability to prime a child's cognitive disposition, as demonstrated through the act of toy play (Kelly-Vance, Ryalls, & Glover, 2002) and that children who viewed the physical-constructive video content would display more physically constructive play. Similarly, children who viewed the social dramatic video content would display a higher proportion of socially dramatic play. The findings from this study did not confirm these hypotheses. Viewing the videos did not significantly influence children to play more constructively or more dramatically.

In previous research, higher levels of attention to the television have been associated with increased comprehension of video content (e.g. Lorch, Anderson, & Levin 1979). In television transfer research, it has also been suggested that, in order to encourage transfer, attention should be maximized (Fisch, 2000; Fisch, Kirkorian, & Anderson, 2005). In this study, we found that, without toys in the room during the video viewing session, attention was maintained at a high level throughout the video viewing session. The results of our study support prior findings that children of this age spent a substantial amount of time paying attention to the television when no other toys are present in the room (Lorch et al., 1979). With the mean percent of attention at 90% (s =9.84), children in this study, overall, were extremely attentive to the video content. The non-significant finding for an attention by condition effect on play content may be attributable to the fact that children did not show much variability in their overall

attention to the video. Future analyses will look into whether specific differences in attention to the target content versus ancillary content makes a difference in predicting differences in play content. The present analyses show that the overall level of attention did not.

According to Fisch's Capacity Model (2000), successful transfer of learning relies on children's ability to create a flexible representation of the televised concept, and identify uses across similar contexts. In this study, it was hypothesized that children who scored higher on the categorization task would display higher levels of categorized play based on condition than those who perform less well on categorization.

After creating a model that included condition, card sort results, and their interaction term, the condition effect and the interaction effect were significant in predicting subsequent constructive and social dramatic play content (although the model including these terms did not account for significantly more variance than the null model, so the following comments should be considered tentative). These results partially support the a priori hypotheses that children's categorization abilities would be important as to whether or not they would see video content as similar, and thus being more instrumental in priming their play behavior.

However, when looking at the figure, one will see that, in predicting constructive play, children in the constructive condition overall had relatively high levels of constructive play regardless of categorization performance (see Figure 1). However, for those children in the dramatic condition: those that performed poorly on the card sort task had lower levels of constructive play than those that performed higher (see Figure 2). These results are counterintuitive to our hypothesis that children who performed higher

on the card sort task would be better primed by their constructive video. This may be because children were relatively stable in their constructive play regardless of sort task when in the constructive condition.

When predicting social dramatic play, the main effect of condition and the interaction of condition and card sort results were also significant. For children who scored poorly on the card sort task, children in the dramatic condition engaged in much higher levels of dramatic play than constructive play. For children who scored highly on card sorting, dramatic play was less frequent than constructive play. In this instance, it seems as if children who performed more poorly on the card sort task were better primed than the children who performed better.

What might be the reason why children with better categorical understanding are less likely to be primed than children with poorer categorical understanding? The answer may lie in children's development of concepts and schemas. As previously described, many researchers believe that children's attention to television is an active activity rather than a passive experience (e.g. Alwitt et al., 1980). Within this framework of discussing active processing, it has been theorized that attention is guided through the use of schemas that may then influence children's comprehension and processing of television content (e.g. Collins, 1983). Meadowcroft (1989) hypothesized that children who had developed stable story schemas would require less attentional resources than children who are still working on story schemas to process television stories. In Meadowcroft's study, children ages 5-8 years of age watched television stories and then subsequently played story games to be tested on recall. Results showed that children with more developed story schemas were more flexible in their attention to stories, recalling more

yet also paying more attention to incidental content, than children with low story schema development. Children with low story schema development relied on stimulus cues during the viewing session to identify target content, thus having to work much harder on processing. Though this thesis does not focus on children's comprehension of story structure, the implications of children's schema development are similar. It is possible that children who have better developed concept abilities are more flexible in their application of constructive or dramatic schemas, deciding how to play with each toy based more on the properties of the toy itself rather than on the prior TV content they viewed; whereas children with low concept development may be relying on cues taken from TV for how to play in the subsequent play session.

Study Limitations and Future Directions

A number of limitations were present for the current study. First, the stimuli were created with materials from the Sesame Workshop archive; much of this content was produced in the 1970s and 1980s. For this reason, the clips themselves appear dated in comparison to the contemporary production employed in today's children's programming. In addition, many of the participants' parents reported that their children were infrequent viewers of *Sesame Street*. In anecdotal conversation, many of the parents said that their children rarely watch *Sesame Street* and do not know the characters well. One could suggest that the priming effects of media may be stronger with increased familiarity or affinity with a program's format, content, and characters. Familiarity has been found to influence attention and program engagement (Crawley et al., 2002). Additional research would be necessary to assess the impact of familiarity on television priming on toy play.

Second, the coding of play was recorded in 10-second intervals as opposed to continuous onset-offset coding of children's play episodes. This decision was made to increase reliability of our measure and to deal with the fact that preschool children's play episodes are complex with beginnings and endings not always sharply distinct. However, onset - offset coding of play episodes would provide more precise measurements of the exact amount of time children spend in each category of play.

Third, recruitment yielded a larger sample of boys than girls for this study. In order to truly understand the impact of gender on children's primed play behaviors, an even sample should be acquired. Filling out the sample to include even cells by gender is planned for the final analysis of data in this study.

Another limitation is that the card-sorting task presented to children was designed uniquely for this study. Images were tested on a panel of adults to assure that the pictures met the researcher's assumptions of constructive and narrative categories; however, the cards were not tested with a large number of children prior to this study. It was assumed at the outset of this study that a card-sorting task of this type (using a complex sorting criteria like constructive versus social dramatic behaviors) would be difficult for preschoolers of this age. In order to establish validity of a card -sorting task for pictures demonstrating constructive and social dramatic behaviors, this task should be replicated with another sample of children at an older age to test whether the concepts become clearer with age.

Last, it is possible that the effects of priming are largely driven by individual differences. Some children, who may have found the program particularly interesting, may have been better primed than other children. However, a study of this sample size

does not allow extensive analysis of individual differences. Future studies, if at all possible, should consider the possibility of a larger sample size for this reason.

Future analyses with the present data will allow for a more detailed investigation of the 30-minute play period. The results in this thesis indicate that there is an effect of TV content on children's play over the entire 30-minute period. It is possible, however, that the effect may be slightly diluted in using such a lengthy play period. It is possible that the priming effect is stronger within the first ten minutes and fades away in the last twenty minutes. Contrastingly, it may be true that children use the first five-minutes of the session to explore the toys, settle in to a ten-minute period of content concentration, then become fussy within the last fifteen-minutes. Following completion of this thesis, it is intended to break the play session up into five-minute intervals and analyze the pattern of play over time.

Children's toy choices will also be explored in future directions of this study. Similar to play content, toy touch was coded by examining toy use in 10-second intervals. As previously indicated, play content and toy choice were too highly correlated to be used for separate analyses. Because toy choice is a much more direct judgment than play content, it was unremarkable to find that toy choice was more reliable than play content. However, it is believed that we may be able to achieve a more informative measure of children's toy choice though continuous episode coding. From this, estimates of time spent with each toy for each child will be obtained.

The larger study that this thesis was based upon also includes a control group in which children were shown a video consisting of segments that were random in content, containing no overall theme with only small amounts of constructive and social-narrative

content. It is thought that these children would not be primed in any substantial way to play constructively or dramatically in the subsequent play session. Analysis of this control group will allow us to examine children's play behaviors without the effect of a priming agent. In this way, we will be able to assess the possible effects of confounding factors like toy attractiveness on the experimental conditions.

Finally, one can question how well the card sorting test predictor represents children's concept ability. Within this thesis this predictor was represented as a continuous variable; such that the interaction term would be framed by considering each additional card that children were able to sort correctly. It may be more interesting to dichotomize performance into children who performed significantly above chance (12 or more, according to a binomial distribution) and children who did not. Future analyses examining children's performance more closely will consider this idea.

Conclusion

Taken together, the results of this study tentatively indicate that TV content may prime some 3 ½-year-old children to engage in specific categories of play. During the preschool years, children are highly attentive to videos, particularly when other distractions are not present in the viewing setting. Our findings indicate that some children who may be in the process of developing schemas for constructive or dramatic behaviors may be primed to engage in constructive or dramatic play immediately following either constructive or dramatic video viewing. It is possible that this play allows children practice of play schemas thus furthering development of activity representations. Children with well-developed abilities to categorize constructive or

socially dramatic activities may be more cognitively flexible beyond how they are primed by TV content. In contrast, children with less advanced conceptual understanding may choose a toy based on its perceptual appeal and, rather than choose between two internal representatives of constructive or narrative play, these children rely on how they were primed. Taken as a whole, this study has created many more questions than definitive answers as to whether educational television can prime preschoolers' play behavior. Further work is necessary to determine the full role of children's concept development on the priming effects of educational media.

APPENDIX A

CLIP RATING SHEET

Directions: Watch the *Sesame Street* clip DVD, rating each clip based on its relation to the following definitions:

Physical Constructive: clips that exhibit the assembly of objects, parts-of-a- whole, step-by-step processes of creation, or actual construction activities such as building, digging, manufacturing, etc.

Social Dramatic: clips that exhibit fantasy or story-like narrative sequences – the telling of a story or moral through the interactions between story characters or through the use of an omniscient narrator.

Neutral: clips that do not demonstrate constructive or dramatic activities and focus on other types of learning objectives (alphabetical, numerical, nutrition, physical activity, nature, etc.)

Please rate the clips using the following scale:

1 = the clip does not demonstrate any of the content in question – seem to focus on another type of educational content entirely

2 – the clip demonstrates low levels of the content with other types of educational material being the primary focus

3 = the clip demonstrates moderate levels of the content in question but is not the primary educational objective of the clip

4 = the clip demonstrates high levels of the content in question and is the main educational objective throughout the duration of the clip

Please complete this process for all clips on the DVD. Once you have finished, please return this survey ratings sheet to the lab.

PARENT QUESTIONNAIRE

Please answer the following questions. Whenever a question asks about "your child", it is referring to the child who is participating in this study. Feel free to ask the research assistant if you have questions and to skip any questions that you do not wish to answer.

Person completing this form: Mother _____   Father_____

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: _____

What is your child's ethnicity? (*Please check all that apply.*)
_____ White/ Caucasian   _____ Latino/Latina   _____ Black/ African Am.

_____ Am. Indian/ Native Am.   _____ Asian   Other _____

Child's birth date _____

What are the ages of other children in your home? (*Please write ages in the spaces below.*)
_____ Male   _____ Male   _____ Male   _____ Male

 _____ Female   _____ Female   _____ Female   _____ Female

Does your child have any vision or hearing difficulties?   ___ YES ___ NO

Does your child normally watch television and videos at home?   ___ YES ___ NO

At what age did your child begin regularly watching television shows or videos? _____

What programs or videos does your child watch regularly at home?

Please take a look at the toys supplied in the room. Check the box next to any of the toys that your child owns at home.
(Note: a list of age appropriate toys will be provided)

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?

_____

_____

_____

Has your child ever seen the program, *Sesame Street*?   ___ YES   ___ NO

If your child has seen *Sesame Street*, how many times has your child seen it?

___1-3 times   ___4-10 times   ___8-10 times   ___11 or more times

Does your child have any *Sesame Street* products? ___ YES   ___ NO
    If yes, please mark which products:

Toys _____
DVD/Videos _____
Clothing _____
Books _____
Other: _____

APPENDIX C

VIEWING DIARY

Your child's exposure to television programs and videos:

Children often choose to play in a room while the television is on even if they are not watching it. We would like to understand how much time your child spends with video both when he/she is and is not watching. Using the schedules on the last two pages of this questionnaire, please indicate your child's exposure to television and videos during a typical week by following the steps outlined below. Each day is divided into half-hour blocks of time from 5:00am to 11:00pm. You can use the schedule on this page as an example of how to complete this section.

1. Please indicate any large blocks of time during which your child is typically not at home (e.g., daycare).

2. Please indicate times when your child is typically in a room while a television is on, whether he/she is watching or not, under the "In room" columns for each day. You can do this by placing an "X" in each block or by drawing an arrow through several blocks.

3. In the columns labeled "Watch", please indicate times during which your child is typically in the room while the television is on AND your child is watching the program or video. You can use the same procedure that you used in Step 2.

	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
	In room	Watch	In room	Watch	In room	Watch	In room	Watch	In room	Watch	In room	Watch	In room	Watch
9:00 am														
9:30 am														
10:00 am														
10:30 am														
11:00 am														
11:30 am														
12:00 pm														
12:30 pm														
1:00 pm														
1:30 pm														
2:00pm														
2:30pm														

INFORMED CONSENTS

Consent Form

   This study explores the role of television in the lives of very young children. By participating in this project, you and your child will help us to better understand how television content influences children's toy preferences and play behaviors. We are interested in examining the immediate effects of television content and children's comprehension of television on subsequent play by young children.

   During your visit today, your child will view a children's television program for 30-minutes. Afterwards, your child will be provided with the opportunity to play with a variety of toys for 30 minutes. All toys are age-appropriate. As your child is viewing TV and playing with toys, we request that you fill out a questionnaire and a TV viewing diary. We will video-record your child's TV viewing and toy play. Lastly, we will ask your child to perform a simple card-sorting task. At the end of the session, you will receive a $10 gift card as a token of our appreciation.

   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 the influence of television on young children. All information about individuals is kept confidential. 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, you may do so without penalty. You also have the right to skip any questionnaire items that you do not feel comfortable answering. All information will be labeled only by a subject number and will be kept in a secure location that is accessible only to relevant laboratory personnel.

   If you would like to speak with one of the Principal Investigators of this study, contact Daniel Anderson, Professor of Psychology, at (413) 545-2069 (anderson@psych.umass.edu). If you would like to discuss your child's rights as a participant in our research study or wish to speak with someone not directly involved in this study, you may contact the department Chair at (413) 545-2387 (mnovak@psych.umass.edu) or 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 am providing consent for my child_____.

                 (Child's full name)

_____

Parent/guardian's name (print)

_____   _____

Signature   Date

Consent to Show Videotape

In professional presentations of the findings from this study, it may be useful to show a portion of the video of your child's behavior (your image may also be on portions of the video). If we do show the video of your child, we will not identify your child by name, but instead only by age and sex. By signing below, you give us permission to show the video of your child during a public presentation of the results of this study. If you do not sign, only the research staff directly associated with this study will ever view the video. It will never be shown to members of the general public.

I have read the above statement and consent to the showing of the video of my child's behavior in academic discussions of the results of this study.

Parent's Signature _____ **Date** _____

Child's Name _____

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ATTENTION CODING MANUAL

Coding Attention to Television
HJL 12.11, KH 1.10.11, KGH 1.19.11

While coding attention, we are looking to capture the number of looks to the television during any given viewing session as well as the duration of looks. Your job is to capture the start and end times of looks as accurately as possible down to the closest frame.

To begin coding, you can either play the tape at normal speed (push play on the control panel or press the spacebar) until you see the child look at the TV screen.
Hint – You can play at normal speed until you see the child look at the TV screen, then forward/rewind to find the exact frame for the start and end points of the look.
If the child is turning his or her head, choose the first frame where when the child first looks at the TV screen.

To choose the start point of a look – press lowercase "i". To choose the end point of a look, press the "o" key. Please check to make sure that the frame numbers of the in and out points match the frame numbers on the movie capture window. Also, make sure that the preceding looking episode does not overlap with the current episode.

If you are satisfied with start and end points, right click the movie window and select "Make sub-clip". A box will pop-up allowing you to re-name the sub-clip; just select "Ok". This will record this sub-clip as a look in your Looks bin. Repeat this process until the coding session is over. If you need to make adjustments to the start end times after you logged in the clip, see instructions for coding in adobe premiere.

Here are a few rules of thumb to follow while choosing start/end times of looks:

- If the child is turning his or her head, choose the first frame where you can see the child looking at the TV screen.

- In the Project window, you should be able to monitor the In and Out points and the total duration of each look. Please make sure that they are being recorded correctly and fix any mistakes that you may see.

If there is a period in the session where you are uncertain as to whether or not a look has occurred due to the child being off camera, follow the following guidelines:

- If the child begins a look, goes out of view, and comes back in view but is not looking, you should code the incident as a look with the look beginning at the time you see and ending half-way through the period of uncertainty.

- If the child is not looking at the TV, goes out of view, and is looking at the TV when he/she comes back into view, you should code the incident as a look with the look beginning half-way through the period of uncertainty and ending when you see the child stop looking.
- In general, a look should be considered a point of time at which the child started looking at the television (possibility half-way through a period of uncertainty) and should end at which time you know the child has stopped looking at the television (possibly half way through a period of uncertainty). The look may possibly span several periods of uncertainty, use your best judgment or ask someone for help.

- If the child goes out of view while not looking and is not looking when he/she comes back in view, the period of uncertainty should not be coded at all. It is assumed that no look occurred during the time the child was out of view. (It is only if this period of time is extremely long, on the order of minutes, during which a substantial amount of data might have been lost, that you should code the beginning and end of this period of uncertainty and a "U" should be entered in the comment section after pressing enter.)

Labeling & Saving files (for the Adobe file with the extension .prproj and for the text file):
*see Coding Digital Files with Adobe Premiere CS4 for detailed instructions on how to save a textfile.

Toy Pref Study
1) TOY30, F or M, 3 number subject ID, L or P (for looks or play), and your 3-letter initials.
   Ex: For subject #1 who is a girl for looks coding. TOY30F001LKGH
     - Save the prproj and text file: Go to Main Drive—Data—Toy Preference—Looks
     - Email final file to Kat

Priming study
2) PRI42, F or M, 3 number subject ID, L or P (for looks or play), and your 3-letter initials.
   Ex: For subject #10 is was a boy for looks coding. PRI42M010LKGH
     - Save the prproj and text file: Go to Main Drive—Data—Priming Study—Looks
     - Email final file to Heather

Final Notes

1) How to read time code: 01; 05; 32; 25 (1 hour, 5 minutes, 32 seconds, and 25 frames). Notes that there are about 29.97 frames per second.

2) Refer to the Coding Digital Files with Adobe Premiere CS4 for specifics on how to log star-end times.

3) For bathroom breaks, start when child leaves room.
   - To begin looks coding, start when video turns on.
   - To begin play coding, start three frames after end of bathroom break.
   - Make sure you note this in the log notes by writing in *BB

PLAY CODING MANUAL

Coding Play Through Point Sampling
Updated 5/24/11 HJL

By coding play through a process of point sampling, you will be looking to catalog play in 10-second intervals throughout the 30-minute play period. In other words, after every 10 seconds of tape, you will be making a decision about the content of the play and the toy category that is being used.

Instructions

Sign out a subject file on the "Priming Play" coder sign out sheet. Please write your first, middle, and last initials (e.g. HJL). If you are double coding a subject file, please write your initials under the "double coder" column on the sign out sheet.

Open the Play Priming Coding Sheet. Next, find the Start and End Times for the Play Priming Study on the lab clipboard. Enter the hours, minutes, and seconds in the box next to "Start Time" (e.g. 00:28:37). Once you hit enter, the rest of the times underneath should then adjust to ten second intervals. (Notice we cannot label down to the frame number in the actual Excel sheet. **Please make sure to stop the tape at the exact frame number labeled on the start/end time sheet.** At the top of your coding sheet, make a note of the frame number as a guide for your exact stopping point. Remember to re-check the frame number if the child stops for a bathroom break.) Frame numbers can play an important role in periods of transition between play episodes.

Once you make this change to the end time, print the Play Point Sampling Coding sheet. Using pencil, please begin by labeling the page with your subject number (009) and initials (e.g. HJL).

Open Adobe Premiere. Before importing your subject video, open a dummy video file and place a Post-It note over the bottom image that would show you what is playing on the TV screen. This will help us keep coding as blind as possible. Once you have done this, you may import your subject file into Adobe. Fast-forward the digital file to the start time of the play period.

For the first box next to "Start Time", you will not be able to identify what kind of play it will be; however, you can identify which category of toy they chose first. Enter an X under the Play category. Please just enter the toy category for the start time line (see below on how to categorize toys).

CODING PLAY CONTENT

After the first 10 seconds of the tape, you will be asked to make a decision about the play content being displayed by the child.

Using the knowledge you have about what is going on at that particular point in time, you should make a decision about the content (or theme) of the play at that moment. To do this, you will be using the definitions of Constructive, Narrative, Combination, and Other Play. For that time point, select the best definition that characterizes the activity happening.

The best guiding principle is to think about the child as entering or engaging in play episodes. What seems to be the focus of their activity? How are they using the toys in their possession?

Using the following definitions, characterize the point for its play content:

1 - Constructive Play: play that is characterized by any of the following: the taking apart or assembly of objects, the piecing together of parts-of-a-whole, step-by-step processes of creation, or actual construction activities such as building or creating things.

2 – Narrative Social Play: play that incorporates any acting out of character behavior, pretend scenarios, or interactions driven by assuming the role of a character or having a doll or other object assume the role of a character.

3 - Combination (Constructive & Narrative Social) Play: play that combines the properties of engaging in character acting while carrying out constructive behavior.

4 – Other Play: play that cannot be described as either constructive or dramatic (see previous definitions).

5 - No Play: the child is not engaged in play at time point

6 - Not codable: child is out of frame at this time point or activities are obstructed to the point that codable play content cannot be determined

7- Clean up behavior: code if the child seems engaged in intentional clean up behavior, putting toys back together or putting toys back the way they found them.

Select the category that best defines the play at that time point and input it into the "PLAY" column on your coding sheet.

What to do if you are unable to exactly determine the play content at a given point

If you are unable to characterize what the child is doing at that exact point (if their activity seems a bit vague or hard to see, feel free to shuttle forward or backward a

few seconds to help you make your decision. Sometimes you may have to watch the entire play episode in order to make sense of the child's behavior; this may require shuttling forward until the play episode is completed. Then, you can go back and code all the time points within that play episode. Only if the action is unclear and you need a bit more information should you use the time before or after to inform your decision.

If you feel that the child is in between play episodes or is not really focused on the toy that is in their hands, see the notes below on transitional periods to make the correct determination.

Pay attention to whether the child is involved with the toy even if they aren't touching it. For example, the child may have finished building but might be describing what he has built to his mother. They can still be involved with play when they are just talking about a toy. Also, if a parent is involved with the child-driven play episode (e.g. playing with the toy people) and the child is focused on the parent's actions, the play can still be coded following these rules. (Note: if the parent has distracted the child away from another type of play, make sure to code the parent intervention as detailed below.)

To best distinguish between clean up and constructive/narrative behavior – if the child is hanging tools on the tool bench or putting things back in the doctor's kit, if it seems like the activity is embedded in the constructive or narrative play scheme, continue to code it as that type of play. However, if the behavior seems separate from a play scheme (e.g. they return to a toy and put it back the way they found it) code it as clean up behavior.

Transitional Periods:
At times, you might run into a point where you stop the tape at your frame number and find that the child is holding one toy but seems focused somewhere else. Or, they might be holding the toy, looking at it, but not really doing much else. Here are some rules to help you decide how to code these 'transitional periods'.
- If the child is holding a toy but their attention is focused elsewhere (or 'spaced out', you should code that play point as no play.
- If the child is holding the toy but is just engaged in looking at the toy (not doing much else with it), code as neutral play.
- If there is a very brief interruption in play that seems somewhat involuntary at your time point (scratch, sneeze, itch, etc.) but the child goes right back to that toy play, code it as a continuous play episode in the same play content area.
- If the child has a brief pause in the play episode, looking somewhere else, but returns to the same play content/toy category within a 10-second window from the look away – code as a continuous play episode.

General Rule of Thumb: If the child is holding a toy but you cannot tell how to categorize the content of the play, even after looking forward, use the child's looking behavior to guide whether it is neutral play or no toy play.

To shuttle forward/back or not to shuttle: A frequent question asked is whether or not to shuttle forward to decide what the child is doing. The best rule of thumb is that you should use the time before and after only if the child is doing SOMETHING but you can't exactly tell what. However, if the child is not doing anything at the time point or you think they are about to do something but is not yet engaged in the act, do not use the time before or after to classify that time point. If the child is not engaged with a toy at your point, you should classify it as no play.

Some general notes on Combination Play: There is always going to be an element of pretend play to constructive behaviors because they are not building an actual wall, a castle, bridge, etc. However, if they just seem to be building without a narrative or have simply named the object they are building, the play should be coded as a 1. For example, a child may be stacking blocks and just names the object (e.g. "this is a bridge, this is a tower, this is a building") but it does not become dramatic play until they elaborate beyond the label of the object (e.g. "I'm a worker and I'm building this tower for you mommy so you can live in it." or "I'm a king and I'm building my castle.")

If the child has been building and, mid way through the play episode, they assume a character role (e.g. "Mom, I'm a construction guy and I'm building this house for you."), from that point on, you would code that episode as combination play. If they leave the play episode (e.g. move on to other toys, walk away), do not assume that they've continued the house-building episode unless they explicitly state it again or their behavior makes it obvious that they are continuing the play scheme.

Another example – if a child has been playing with the doctor's kit in an exploratory fashion (e.g. checking out what each of the kit tools can do) but then enters a narrative social episode (puts on the stethoscope or gives themselves/parent a shot), you should now consider the rest of the play episode social narrative until the child moves on to a new play scheme or other toys.

CODING TOY CATEGORY

As the second task for this time point, you are asked to categorize the toy use occurring at the particular time point:

1 – Constructive category toy (1 or more toolbench, puzzles, and/or blocks)
2 – Dramatic category toy (1 or more doolhouse, dolls, and/or doctor's kit)
3 – Constructive and dramatic toys (1 or more toys from both categories)
4 – Neutral category toy (1 or more Sit N'Spin, piano, books)
5 – No toy during play

6 – Non-toy object
7 – No play
8- occluded/obstructed view of object

Select a number that best represents their toy play at this time point (1-8) and write it in the "TOY CATEGORY" column on your coding sheet.

Toys should only be coded if there seems to be a meaningful touch with the child's hand and the toy. Two circumstances that the child may not intentionally be touching the toy would include using the toy for balance or if the toy is crowding his/her space and they are trying to get it out of the way. Unintentional bumps, brushes, trips, kicks, etc. should not be coded as meaningful toy touches.

If you code a "5" on play (no play), always code it with a "7" (no play) even if the child is still holding a toy but is not actively engaged (i.e. lacks focused attention).

If the child's play is hard to see or is partially blocked, try to use whatever contextual clues you can to decide the content and toy category. For example, if a child grabs a puzzle and brings it to the armchair, it may be partially occluded. However, if you can see the child's hands moving and hear the clacking of the puzzle pieces being placed in the board, you can infer that the child is playing constructively with the puzzle. Only when you cannot use any contextual clues to decide the play should it be coded as occluded (e.g. when they are reaching into the toy shelf but all you can see is their back).

Note: there is no combination category for constructive + neutral toys or narrative + neutral toys. If a child is holding onto both types, code either "constructive" or "narrative" toy only.

CODING PARENT INTERVENTION

There is also a third column labeled "Parent". In this column, you are to insert a 1 if the parent seems to redirect the child from play that they are already engaged in onto another type of activity. This can be things like "can you show me how you play with that x over there?" or "why don't you play with x". We want to tally every time a parent seems to re-direct the child's play and the child follows that direction. When the parent directs the child's attention away from the play scheme they are following and the child follows the parent instructions into a new play scheme, mark a "1" in the column during the 10-second interval that the intervention occurred. If there is no re-directing (most cases) just leave the column blank. As parents were instructed not to encourage play, these cases should be rare; nevertheless they occur. If you have questions about this, please see your grad supervisor.

ADDITIONAL NOTES:

- If the child takes a bathroom break, label all points in the bathroom break as X for both categories. This will indicate that these points should not be used as part of the play period.
- Please make sure your writing is legible; it will be entered into Excel by another student at a later time.

When you have finished, please place your paper coding sheet in the folder labeled "Priming Completed Play Coding". If this is a double coded file, please put it in the "Priming Play Double Coding".

Below are just a few examples to help apply the play definitions across coders. Here, you will see how each of the toys can be played with in a variety of ways. Some of the examples are very common where others show extremely novel or creative play schemes. The list is not exhaustive, but it will help you make decisions about whether the play is exclusively constructive, exclusively dramatic, both, or other.

Blocks
Ex.
- Constructive: piecing blocks together to form a tower or a wall, stacking them as high as possible before they topple
- Dramatic: using the car block to pretend drive, using the star block to pretend it is in the sky
- Combination: incorporating the dollhouse characters into the building of a structure, explicitly pretending to be a king building his castle.
- Neutral: banging the blocks together to make music, using the block bin to carry other objects

Puzzles
Ex.
- Constructive: taking puzzle apart and reassembling
- Narrative: using the dog or vehicle pieces as pretend dogs or vehicles
- Combination: assembling puzzles while role-playing with pieces (e.g. "I'm Mister Dog and I live here in this spot…."
- Neutral: using puzzle boards to carry a group of objects, banging puzzle pieces together

Workbench
Ex.
- Constructive: turning screws, pounding in nails, using tools on bench's moving parts. Storing blocks in drawer

- Narrative: walking around with tools pretending to be a worker – but not using them (i.e. just as props)
- Combination: walking around with tools pretending to be or talking about being a worker
- Neutral: storing other unrelated category toy objects in workbench (i.e. using drawer as hiding place for the stethoscope or book)

Doctor's Kit
Ex.
Constructive: misusing objects in kit as tools (i.e. reflex hammer as real hammer) or purposefully laying the doctor's tools out in a thoughtful way, re-assembling the doctor's kit with the tools in the bag for the purpose of closing the kit
Narrative: pretending to be a doctor on parent or baby doll (i.e. putting on equipment, using it on another object), or engaging in an imaginary play scheme of using the tools as a doctor
Combination: N/A (no examples at this time: consult Grad Supervisor if you think you have an example)
Neutral: hitting doctor's kit tools together to make noise; banging on the kit to make noise

Baby Dolls
Ex.
- Constructive: using dolls not as dolls but as indiscriminate objects (i.e. while building a fort, using dolls just as barriers)
- Narrative: pretending to care for the baby doll, putting toy bandage on baby doll, having two dolls interact
- Combination: pretending that the baby doll is using the hammer or screwdriver from workbench
- Neutral: using a doll as a pillow

Dollhouse
Ex.
- Constructive: using dollhouse as part of fort, reassembling furniture the way it was before if they dumped all the furniture out
- Narrative: using little characters in the house in different rooms (i.e. characters at kitchen table, character in toy bed), using little characters from doll set to act out story
- Combination: pretending that the little play set characters are building a house
- Neutral: using inside of dollhouse as hiding place or storage of unrelated materials (i.e. putting picture books inside house)

Piano
Ex.
- Constructive: using piano in an unintended way (i.e. as block or barrier while building)

- Narrative: explicitly talking about pretending to be in a band or role-playing with piano; using the little people from the dollhouse to play the piano
- Combination: pretending to be a worker building a piano
- Neutral: pushing the keys on the piano to make musical sounds without apparent role-play

Sit N'Spin
Ex.
- Constructive: using toy as part of fort, wall
- Narrative: pretending toy is spaceship, car, or other vehicle for characters
- Combination: pretending to construct spaceship or car with tools
- neutral: using toy as intended – sitting and spinning

Picture Books
Ex.
- Constructive: using the books as blocks or stackable objects
- Narrative: pretending to read a story (with words) to the mother or a baby doll
- Combination: N/A (no examples at this time; consult Grad supervisor if you have an example)
- Neutral: flipping through pages looking at pictures, asking mother to read the book to them

Other common circumstances:
- Children will often take a few seconds during a play episode to explore an object before continuing with a process (either pretending or constructing). As long as the child returns to the original play episode after 10 seconds (i.e. no longer than 1 play interval), it should still be considered a part of the original play episode. (e.g. A child is playing with the doctor's kit with their mom. They come across an unfamiliar tool and ask "what's this mommy?" After a short 3-second period of exploration, they return to using the tools in a dramatic fashion. This period would be considered dramatic play, as it is a continued play episode and the exploration was not disruptive to their overall play scheme.
- If children focus on putting toys back exactly the way they found them, it should be typically classified as clean up behavior. However, if they are merely throwing things aside to get them out of the way, it should not be clean up behavior. If the clean up seems intentional and focused on placement, it should be coded as a 7.
- Children will often just be exploring toys with a "what's this" or "what's this do" focus. This type of exploratory play is common. Unless they are already assuming a character at the time (e.g. doctor), this type of exploratory behavior should be considered neutral play.
- There is usually some sort of 'pretend' element to constructive play (e.g. building a bridge or a castle). Only if the child elaborates beyond a label of what they are building or assumes the role of a character while building should it be

combination play. **Once the act of building is over and a child is just talking about what the built, the play should be coded as narrative.**

- The key to narrative play is **assuming a character role**. This includes pretending to be a doctor, pretending to drive a car, having the little people interact in the house, pretending to be a worker fixing something. Note that a big portion of narrative play is pretending or imagining. However, please make sure that there seems to be some indication that the child is assuming the role of another person or object.
- Breaking down a wall or deconstructing a puzzle could be seen as part of a 'demolition' component to constructive play. Please consider processes of disassembly to be constructive as well.

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