

2011

## The impact of choice on child sustained attention in the preschool classroom

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THE IMPACT OF CHOICE ON CHILD SUSTAINED ATTENTION IN THE  
PRESCHOOL CLASSROOM

A Thesis

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Master of Science  
in

The School of Human Ecology

By  
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B.S., University of Kentucky, 2009  
May 2011

## **Acknowledgments**

I feel privileged to have had the opportunity to work with Dr. Cynthia DiCarlo. I could not have asked for a more dedicated major professor. Her guidance and leadership throughout the process of writing my thesis was greater than ever expected and for this, I am grateful. Throughout the journey of writing my thesis, my remaining committee members, Dr. Jennifer Baumgartner and Dr. Kenton Denny, questioned my writing and my research. I feel as if their constructive criticisms have pushed me and made me a better, person, student, and researcher. I also must thank Dr. Carrie Ota. Without her expertise and skill in the area of statistics, I would be lost.

I would like to thank my friends and family for sharing this process with me. I could not have made it through graduate school without the encouragement and inspiration they have provided me. Without their love and support, my dream of receiving my master's degree would not be possible. Thank you for being a true inspiration.

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## **Abstract**

The purpose of this study was to determine the mean duration of child attention to a self-selected toy and to determine the longest duration under which teaching condition children attend to toy play (child choice, adult choice, or adult presentation). Forty preschool-aged children were observed under each teaching condition and data were collected on the child's duration of child attention. Results indicate that children's sustained attention is significantly different across the three teaching conditions, and it was found that children attended for the longest duration of time during the child choice condition. It was also found that children attended for a longer period of time during the adult choice teaching condition as compared to the adult presentation condition. An ANOVA was used to compare the means across the three teaching conditions. Post-hoc comparisons show that the child-choice teaching condition is statistically significant from the adult presentation teaching condition.

## **Chapter 1**

### **Introduction**

#### **Statement of the Problem**

Attention is considered a necessary component of learning (Bandura, 1989). “Attention has two primary aspects: it can be focused and it is selective” (Boersma & Das, 2008, p. 2). For a child to learn appropriate skills, he must be focused on what is important and screen or ignore distractions (Boersma & Das, 2008). As increasing numbers of children are identified with attention problems, the need for attention presents an even greater challenge than ever before to educators. As of 2007, 5.4 million children were diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) (Center for Disease Control and Prevention, 2010). The inability to attend impacts a child’s ability to learn new skills in the classroom from peers, the teacher, and materials in the environment.

The term *engagement* has been used in the literature to describe the process of a child giving attention to a peer, adult, or material in the environment (McWilliam, Trivette, & Dunst, 1985). Environments where children are allowed to explore have been correlated with higher levels of child engagement (Casey & McWilliam, 2007). Environments that include learning centers that embed skills, offer opportunities for children to practice developmentally appropriate skills in a play-based format and encourage higher levels of engagement (Copple & Bredekamp, 2009). Many environmental rating scales such as Early Childhood Environmental Rating Scale-Revised (ECERS-R, Harms, Clifford, & Cryer, 2003) recommend preschool classrooms use centers and allot a period of time each day where children have free access to

learning centers, suggesting that differing materials and ample time be available for children to engage themselves in classroom activities.

In a classroom that includes learning centers, the teacher takes on the role of facilitator, ensuring all children have equal access to all materials in the room, use materials appropriately, as well as expand child play by introducing new ideas, changing materials, and modeling (Copple & Bredekamp, 2009). It is suggested that children participate in developmentally appropriate activities that place children in an active role with the subject matter (Powell, et al., 2008). Teacher-directed whole group, in which the teacher instructs and directs children on how to complete a particular task, has been correlated with lower levels of child engagement. Whole group instruction must include dynamic components (Powell, et al., 2008). Early research in childcare has demonstrated that children remain engaged for longer periods of time when they choose their own activities (Doke & Risley, 1972; LeLaurin & Risley, 1972). Because previous research has suggested that engagement/attention leads to learning, increased levels of engagement/attention should be considered desirable. Social Learning Theory (Bandura, 1989) has established the importance of attention on the learning process, and previous research (Casey & McWilliam, 2007; Doke & Risley, 1972; LeLaurin & Risley, 1972) has suggested that child choice has an impact on attention; therefore a comparison of different teaching conditions and their effects on the duration of child attention would be an important contribution the field.

## **Background**

Attention is important for both cognitive and social learning to occur (Bandura, 1989), yet there has been an increase in the identification of children with attention

problems (Center for Disease Control and Prevention, 2010). Children with attention problems generally have trouble mastering emergent academic skills (Spira & Fische, 2005), as well as stabilizing relationships and friendships (Scherts & Odom, 2004; Soesken & Alper, 2006). Though controversial (Courage & Setliff, 2009; Foster & Watkins, 2010), research does show that television and media can have a negative impact on child engagement and attention (Barr, Lauricella, Zack, & Calbert, 2010; Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008). In response to the increased child use of television and media, interventions that address increasing child attention may be desirable.

### **Research Questions**

The purpose of this study was twofold: 1) to determine the mean duration of child attention to a self-selected toy, and 2) to determine under which teaching condition children attend to toy play for the longest duration of time (child choice, adult choice, or adult presentation).

### **Hypothesis**

It was hypothesized that children would engage longer with materials of their own choosing; however, because prior research has identified that children remain engaged for longer periods of time when they are given options as opposed to no options (Tiger, Hanley, & Hernandez, 2006), it was not clear if children would discriminate between *type* of choice. Would it have to be a choice of *anything* in the classroom (child choice) or would a choice between two items provided by the teacher (adult choice) suffice.



## **Conceptual Framework**

Attention is the first (of four) necessary components described within Bandura's Social Cognitive Theory (1989) and is the first component considered necessary in learning. Definitions and different interpretations of attention and engagement have been explored and reiterated by researchers in past literature (McWilliam, Trivette, & Dunst, 1985; Posner & Dehaene, 1994; Posner & Pettersen, 1988). This theory postulates that children cannot learn in the absence of attention.

## **Methodology**

This was an observational study of child attention across three treatment conditions of child choice, adult choice, and adult presentation. Data were collected using a duration measure. Child attention was measured within each treatment condition. One-way analysis of variance (ANOVA) was used to analyze the child sustained attention across the three teaching conditions to examine whether predicted differences between the three teaching conditions existed in the study data. ANOVA tests were selected because it allows for the comparison of group means across the three teaching conditions, and a traditional univariate test was used because there was only one dependent variable, duration of attention.

## **Limitations**

A limitation of the present study is that the sample was collected exclusively across two metropolitan cities and may not generalize to other populations. Additionally, the sample size may not be sufficient to yield statistical power.

## **Assumptions**

1. Because each teacher had prior experience with the target child it was assumed that she was able to accurately identify preferred materials used in the treatment conditions.
2. The assessment tools used to evaluate child performance were accurate in deeming children as typically developing for their chronological age.
3. The ECERS-R (Harms, Clifford, & Cryer, 2003) accurately identifies classrooms as developmentally appropriate for preschool-aged children
4. That toy play is a demonstration of child attention.

## **Summary**

Attention is an important component in learning (Bandura, 1989), and increased attention should lead to increased learning (Casey & McWilliam, 2007). Many children have attention problems (Boersma & Das, 2008), and though choice interventions have shown promise in other studies (Cunningham, 2010; Doke & Risley, 1972; Lamont, 2008; LeLaurin & Risley, 1972; Reinhartssen, 2002; Sims, 2005), this study obtained an average duration of attention for a self-selected toy and also examined the effect of teaching condition on duration of attention because of the lack of research conducted in this particular area.

## **Chapter 2**

### **Literature Review**

Attention is an essential component for learning (Bandura, 1989). Attention has been defined in the literature as a “visual fixation, manipulation, vocalization, approach, or affect” (deKruif, McWilliam, Ridley, & Wakely, 2000, p. 254), and it is required of a child or individual to be able to focus in on any one material and disregard any distractions (Boersma & Das, 2008). Because attention is critical for learning, children who are diagnosed with attention disorders are more likely to have problems in the academic as well as the social realm (Barkley, 2006; Weiss & Hechtman, 1993). Attention is a developmental process and children’s attention is expected to increase as they get older (Berk, 2003).

Early in life, infants engage with the environment and people around them through eye gazes (Bornstein & Lamb, 2005), and they become more capable of attending to objects at a more complex level as they mature (Berk, 2005). By 1-2 months of age, infants are more accomplished in controlling their own attention and are able to take in information more quickly than they were at the beginning of life (Berk, 2005). As infants progress, the activities they become engaged in are more complicated, and as these activities become more involved, their duration of attention increases (Ruff & Lawson, 1990). Older children, for example, are more capable of attending. Ruff and Capozzoli (2003) suggest that 26-month-old children are more engaged with an activity or object than 10-month-old children, and children in their preschool years, 3 1/2 year olds, become more capable of screening out distractors and focusing on the activity or

object in which they are learning. It is therefore logical to assume that as children mature, their attention and engagement levels increase.

Preschoolers lack attentional strategy, the ability to solve problems through strategy, leaving them unable to process or utilize potential problem solving strategies (Berk, 2003). The implementation of strategy “takes so much of children’s attentional resources” (Berk, 2003, p. 280), that children are left without resources to both attend to a situation and apply a relevant strategy. As children mature, they gain skill, becoming more successful and gaining control in the execution of strategies. Though children cannot necessarily apply strategies early on in life, they gain knowledge through constant application and performance (Berk, 2003), enabling them to build their attention building abilities.

Attention is dependent on the requirements of a particular environment or task (Fredricks, Blumenfeld, and Paris (2004). If a child is listening to a book, attention can be defined as looking at the teacher and/or the book being read. However, if the teacher asks the children to participate in a choral response, this would also be considered attending to the task. Because attention is so context dependent, it has been defined in the literature in a variety of ways (Ruff & Capozzoli, 2003). Attention has been referred to as *time on-task*, which is defined as the behavior student’s possess when they are completing work prevalent to what is being asked of them, following proper directions, as well as the expression of appropriate behavior (Ramsey, Jolivet, Patterson, & Kennedy, 2010). For example, a child who is sitting in his desk, pencil in hand, completing a worksheet. Attention has also been referred to as *engagement*, which is described as “the frequency with which students participate in activities that represent

effective educational practice” (Heller, Beil, Kim, & Haerum, 2010, p. 253). For example a child who is manipulating puzzle pieces in an attempt to fit them all in the puzzle. Fredricks, Blumenfeld, and Paris (2004) discuss *behavioral engagement* as relating to participation in a particular activity or occurrence. The commonality in the above research is the underlying acknowledgement that attention is a required component of learning (Bandura, 1989). Although the construct of *attention* has been defined in a variety of ways and deemed as essential for learning, there is little information on duration of attention for four-year-old children. As attention is essential for learning, techniques that increase attention would be beneficial. The review of literature will discuss 1) the effects of attention on learning, 2) the effects of attention on social interaction, 3) the effects of media on attention, and 4) interventions to increase attention.

### **Effects of Attention on Academic Learning**

Preschool serves as the foundation for a child’s future school experience. Children who face attention problems in their preschool years could potentially struggle in later years (Spira & Fischel, 2005). Research has suggested that attention can influence literacy development; and therefore, a lack of attention may instigate severe literacy problems in preschool children (Walcott, Scheemaker, & Bielski, 2010). It was also found that both phonemic awareness as well as letter recognition suffer when children exhibit inattention in preschool, and these skills continually suffered as children progressed through school (Walcott, Scheemaker, & Bielski, 2010).

There have been several studies that have examined how a child’s academic performance impacts levels of attention. A study conducted by Merrell and Tymms (2001) suggests that young children who exhibit hyperactive behavior and likely troubled

attention within the classroom environment tend to receive low scores in academic achievement. Comparably, research has suggested that attention is a predictor of later school achievement (Duncan et al., 2007), and that engagement within the kindergarten classroom, specifically in the areas of math, language, motor, and problem solving skills, is related to attention (Pagani, Fitzpatrick, Archambault, & Janosz, 2010).

It can be gathered that attention is important in an academic setting, and that individuals, especially young children, learn through interacting with their environment. Learning to master skills in the in the areas of literacy (Walcott, Scheemaker, & Bielski, 2010) and math (Duncan et al., 2007; Pagani, Fitzpatrick, Archambault, & Janosz, 2010; Rhoades, Warren, Domitrovich, & Greenberg, 2010), can aid children in their academic success later in life (Spira & Fischel, 2005). Though attention is imperative to learning (Bandura, 1989), cognitive learning is not the only daily human practice affected by attention. In fact, children's (and individuals' in general) social learning and interaction is also influenced by attention (Tadić, Pring, & Dale, 2009)

### **Effects of Attention on Social Interaction**

Attention positively promotes and influences a child's ability to build and maintain social relationships (Murphy, Laurie-Rose, Brinkman, & McNamara, 2007). In order for a child to be successful socially, he or she must have developed sustained attention (Murphy, Laurie-Rose, Brinkman, & McNamara, 2007). Children who suffer from attention problems are more likely to display negative social skills, interactions, and relationships with other individuals (Scherts & Odom, 2004; Soesken & Alper, 2006).

The first year of life is critical to the development of joint attention. Though infant children turn their attention toward certain interactions or events in their

environment, this does not mean the child necessarily understands the intentions of others or the happenings around them (Striano & Stahl, 2005). Bartsch, London, and Campbell (2007) found that 3-7 year-old children do not necessarily understand or respond to the beliefs of others, but rather children attend to others' emotions and desires.

Similar effects of the delay or nondevelopment of joint attention have also been linked to children disabilities (Tadić, Pring & Dale, 2009). When a child is diagnosed with a disorder such as Attention Deficit Disorder (ADD), an inability to perform successfully in school (Bernfort, Nordfeldt, & Persson, 2008) and a lack of social skills can be exhibited (Garrick Duhaney, 2003). This leaves children with ADD unable to respond appropriately to peers or to read facial cues and/or expressions (Garrick Duhaney, 2003). In turn, the ability to engage and learn from their peers may be eliminated because they are unable to properly interact. It can therefore be assumed that children with ADD may miss opportunities for incidental learning from peers, so if a child with a disability is preoccupied or has difficulty discriminating what to attend to, the opportunity to develop skills is lost.

Many children diagnosed with attention problems have trouble interacting appropriately with their peers and other individuals as well as forming and withholding positive relationships (Scherts & Odom, 2004; Soesken & Alper, 2006). Children with attentional are reported to have negative experiences when interacting socially (Amir, et al., 2009; Garrick Duhaney 2003), and sharing appropriate interactions with other individuals proves itself to be difficult and often cannot be carried out successfully (Schertz, & Odom, 2004). Those individuals affected by attention problems suffer

immensely because of their inability to properly engage and connect with the social world (Garrick Duhaney, 2003).

### **Environmental Effects of Media on Attention**

Current literature suggests that technology has become vastly popular among children, holding their attention for long periods of time (Castell & Jenson, 2004). In a study conducted by Christakis, Zimmerman, DiGiuseppe, and McCarty (2004), it was found that children exposed to excessive amounts of television (between 2.2 and 3.6 hours per day) at the young ages of 1- and 3-years-old were likely to have attention problems at age 7. Television scenes change rather rapidly, and “it can be overstimulating yet extremely interesting” (Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004, p. 708), holding the attention of young children for long periods of time; and therefore, making other activities seemingly uninteresting or boring. The American Academy of Pediatrics (AAP) exhibits concern that children spend an excessive amount of time preoccupying themselves with media sources, and that children who are exposed to too much television are exposed to violence, drugs and alcohol, as well as inappropriate sexual insinuations (American Academy of Pediatrics, 2001). In response, the AAP therefore suggests that parents and doctors alike encourage children to engage in other activities, straying away from media sources and technology (American Academy of Pediatrics, 2001).

Research shows that individuals are drawn to technology, and children, in particular, find devices such as video games intriguing because they are able to learn how to operate them quickly and without much assistance (Castell & Jenson, 2004). Television is exceptionally captivating to children; and though compelling, the attention



regulation of young children suffers when exposed to television that is considered to be adult-directed (Barr, Lauricella, Zack, & Calbert, 2010), meaning that it is not intended for children to watch. Similarly, background television can act as a distraction to children, indirectly affecting and ultimately disrupting play sessions and the child's sustained attention (Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008). Background television disrupts child-play, and, when background television is present, it can divert a child's attention. In the presence of background television, the child is less likely to engage in a single activity, but rather, is more likely to engage in several activities, limiting the child's duration of attention (Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008).

### **Interventions to Increase Attention**

Professional organizations, such as NAEYC, advocate for an early childhood curriculum that is predominantly child directed (National Association for the Education of Young Children, 2008). Additionally, there is the recognition that when a child is able to choose an activity for him/herself (child directed), the child will be able to apply the knowledge gained from that activity to his/her life on a personal level (Cunningham, 2010). The disability literature acknowledges that though child directed activities are encouraged, children diagnosed with disabilities may be in need of guidance (Hunt, Soto, Maier, Libiron & Bae, 2004), which could also be applied to children without a formal diagnosis who have difficulty mastering certain skills. It is common practice when working with children with disabilities to embed learning opportunities into the environment and use are prompting within a child directed framework; this allows children to make their own choices after being assisted and taught how to properly

respond or react to a situation or activity (Horn, Lieber, Li, Sandall, & Schwartz, 2000). When presented with a group of activities, children with disabilities remained engaged longer when they were free to choose their own activities as opposed to teacher chosen activities (Reinhartsen, Garfinkle, & Wolery, 2002), as well as when they were enabled to choose the order in which their activities were to be completed as opposed to when the teacher presented the task order (Smeltzer, Graff, Ahearn, & Libby, 2009). The above-mentioned research suggests that similar strategies could benefit children with attention problems in the early childhood classroom.

Early research in group child care suggests that providing children with choice in the classroom was most effective and increased children's learning (Doke & Risley, 1972; LeLaurin & Risley, 1972). The researchers applied different types of scheduling to a classroom setting and observed the influences each type of scheduling had on the children's engagement. It was found that when children had the option to choose their own activities, they remained engaged for longer periods of time (Doke & Risley, 1972). When children are given choice and teachers support a zone-defense environment, claiming responsibility to one area of the classroom rather than attending to individual children, children remain engaged for longer periods of time (LeLaurin & Risley, 1972). The research suggests that children learn best when they are permitted to choose their own activities, unaffected by teacher and schedule rules and regulations.

The desire for child attention is the rationale for a child-directed curriculum; children are more attentive to materials when they are given options (Doke & Risley, 1972). A study conducted by Doke and Risley (1972) suggests that when children take

part in an options schedule, in which they are enabled to choose from several activities rather than just one, less child-play time is wasted. Also, when teachers oversee an area or zone of the classroom, child engagement increases because children are not required to wait for their peers to complete the activity before moving onto the next (LeLaurin & Risley, 1972). Similarly, when researching children diagnosed with autism, Reinhartsen, Garfinkle, and Wolery (2002), found that children engage in activities considered to be adult choice activities in comparison to activities that were presented to the child (adult presentation). Several studies, though researching choice, have not been conducted in a classroom setting (Fenerty & Tiger, 2010; Tiger, Hanley, & Hernandez, 2006). This study will extend the early childhood literature by determining duration of child attention to a self-selected task and measuring duration under three teaching conditions of child choice, adult choice, and adult presentation.

## **Summary**

Social Learning Theory explicitly states that learning cannot occur in the absence of attention (Bandura, 1989). Not only does a lack of attention negatively impact a child's academic trajectory (Spira & Fischel, 2005; Walcott et al., 2010), but it has implications for a child's social relationships as well (Scherts & Odom, 2004; Soesken & Alper, 2006). The widespread use of media today contributes to attention problems in children (Barr, Lauricella, Zack, & Calbert, 2010; Castell & Jenson, 2004; Schmidt, Pempek, Kikorian, Lund, & Anderson, 2008). Currently, there appears to be some literature that suggests that teachers can increase child attention through offering choice (Cunningham, 2010; Simms, 2005, Doke & Risley, 1972; Lelaurin & Risley, 1972).

## **Chapter 3**

### **Method**

#### **Subjects and Setting**

Children who were enrolled in preschool and were 4 years of age were targeted for inclusion in the present study. Participants included a total of 40 children: 12 males and 28 females, 24 White children, 8 Black children, 5 Asian children, 2 Hispanic children, and 1 child of White/Russian descent. Participating children were functioning within normal limits for their chronological age as determined by either the Ages & Stages Parent Questionnaire (Bricker & Squires, 1999), or the Developing Skills Checklist (DSC) (CTB/McGraw-Hill, 1990). Because one of the research questions was to determine duration of child attention, children with identified disabilities, including children who had attention problems, were excluded from the study.

Data were collected across 11 different classrooms in 7 different schools; 4 schools were public and 3 schools were private. Public preschools in the target state were evaluated yearly using the ECERS-R (Harms, Clifford, & Cryer, 2003) and were required to obtain at least a score of five on the seven-point scale. Private school settings were assessed using the ECERS-R by the first author and were found to have a score of at least a five. All classrooms met criteria as specified by the ECERS-R (list the mean & range here), which included the requirement of having learning centers, and free-play time. All preschool teachers in the target classrooms were degreed/certified teachers. The data were collected during free choice center time across either morning (n=36) or afternoon periods (n=4). Prior to the collection of child data, Institutional Review Board approval was obtained and

informed consent was obtained for all participants (see Appendices A and B for complete consent and IRB approval forms)

### **Behavior Definitions**

**Toy play.** *Toy play* was used as a measure of child attention, as the materials introduced for the child's attention were toys found in a typical preschool classroom. Toy play is a child's manipulation of toys in the manner the toy was intended to be manipulated (Martens, Hiralall, & Bradley, 1997). Looking at a toy or talking about the toy in the absence of manipulation was considered toy play (once the child initially manipulated the toy). Only interactions with materials designated as toys are recorded as toy play. Any disruptive behavior (e.g., throwing toys that were not meant to be thrown) or aggressive behavior (e.g., hitting another child with a toy) is not considered toy play (DiCarlo, Reid, & Stricklin, 2003).

### **Treatment**

Data were collected across 3 teacher-scripted treatment conditions during each observation period. The initial observations (n=22) were collected in the same order: child initiated, adult choice, then adult presentation. In an attempt to minimize an order effect, the remaining observation sessions (n=18) were alternated among the three conditions. Prior to each observation session, the observer reviewed the teaching conditions with the teacher and explained that she was not to interact with the child once the teaching prompt had been delivered. During the child initiated choice condition, the teacher approached the target child and gave the prompt to "Go play". During the adult initiated choice condition, the teacher gave the target child a choice between 2 toys she had previously observed to be highly preferred toys by the target child, then give the

prompt, “Would you like to play with the (puzzle) or with the (blocks)?” During the adult presentation condition, the teacher selected a highly preferred toy (that had not been previously selected above), then gave the prompt, “Why don’t you play with the (lacing cards)?” The determination of which toys were considered *highly preferred* was left to the discretion of each child’s teacher; it was assumed that because data collection began approximately two months after school began that teachers knew the children well and could accurately identify preferred toys. Because the behavior of interest was the child’s independent attention to toys, if the teacher praised or interacted with the child within any of the treatment conditions (child choice, adult choice, or adult presentation), the data was discarded. For this reason, four of the data sheets were discarded.

### **Data Collection System**

Data were collected using duration recording (see Appendix C for complete data collection sheet). When recording duration, “the amount of time in which behavior occurs” (Cooper, Heron, & Heward, 2007, p. 79) is measured. For this study, an event began when a child engaged in toy play (see above definition), and an event ended when the child ceased to manipulate the toy for a period of 10 seconds. During the process of duration recording, the data collectors alerted the teachers as to which child was being observed and gave adults instructions to refrain from interacting with the child during the observation period. Duration recording was chosen for this study because each condition, child initiated choice, adult initiated choice, and adult presentation, were all timed and recorded as separate events in which each event had a definitive beginning point and an ending point that could be visually seen and measured (Cooper, Heron, & Heward, 2007). By recording the exact duration of each child’s toy play, the amount of time the child

engaged in toy play could be calculated within each condition, ultimately determining which condition a child engages in toy play for the longest period of time.

### **Observation Procedure**

Observers stood in a neutral, unobtrusive area of the classroom in order to minimize child distraction and observe the target child for the duration of the data collection. In order to accurately measure duration of attention, a stopwatch was used. The observer then cued the teacher on which prompt to deliver. The observer recorded the behavior of the target child using the behavior definitions described above. When toy play was recorded, the observer wrote in the name of the toy as well as how long the child engaged in the activity. After the observation, the observer approached the teacher for clarification of the name of each toy recorded for consistency. This was done to ensure that materials selected were appropriate for a preschool-aged child. All materials recorded were developmentally appropriate for this age group according to the ECERS-R (Harms, Clifford, & Cryer, 2003).

**Observer training.** A graduate student and undergraduate students enrolled in an educational assessment course served as data collectors. Observers were trained to use the data recording system through written instructions and video (using a total of four videotapes). During the viewing of the first videotape, one of the researchers focused on the definition of toy play, highlighting which child behaviors did and did not meet the written definitions. The three remaining videos depicted one of each of the treatment conditions. The students were trained to 80% reliability in order to be sure their measurements were consistent (Cooper, Heron, & Heward, 2007) prior to collecting child

data. All undergraduate student observations were dually coded and comprised twenty-two observations.

### **Experimental Design and Analysis**

This study is an exploratory quantitative study (Portney & Watkins, 1993). Child duration of attention to toys (toy play) was recorded across three treatment conditions (child-initiated, adult initiated or adult presentation). Data was analyzed using a fixed-effects model analysis of variance (ANOVA). ANOVA assesses the “mean differences between two or more treatments (or populations)” (Gravetter & Wallnau, 2009, p. 394). In this study, one-way ANOVA was used because three groups were being compared (Portney & Watkins, 1993). ANOVA is used to compare samples (teaching conditions) and demonstrates the differences between two samples or more samples (child choice, adult choice, and adult presentation) (Gravetter & Wallnau, 2009).

### **Inter-observer Reliability**

Fifty-three percent of observations were dually coded. All undergraduate student observations were dually coded, and 18% of observation sessions conducted by the graduate student were dually coded by undergraduate students. Interobserver reliability was assessed through percent agreement (97% - 99%) and interclass correlations (.97- 1.00) both indicating acceptable ranges. See Table 1 for details.

Table 1 Interobserver Reliability

	Percent Agreement	Interclass Correlations
Overall	98%	.97
Child Choice	97%	.96
Adult Choice	97%	1.00
Adult Presentation	99%	1.00



## **Chapter 4**

### **Results**

#### **Overview**

The purpose of this study was to determine how long a 4-year-old child could be expected to attend to one activity as well as determine which teaching condition (child initiated choice, adult initiated choice, adult presentation) children would attend for the longest duration of time. First, preliminary analyses were conducted to assess whether the demographic variables are related to the main study variables. Descriptive statistics were used to answer the primary research question on average duration of child attention. The primary analysis was a One-way Analysis of Variance (ANOVA) to test for differences between gender, race, and school type (private or public). A subsequent One-Way ANOVA was conducted to answer the secondary research question regarding differences in child attention among the teaching conditions of child choice, adult choice, and adult presentation.

#### **Preliminary Analyses**

Descriptive statistics for the main variables are presented in Table 2. The duration of attention varied across each teaching condition. The primary research question on average duration of attention within a child choice condition was ( $M$ ); the minimum time a child attended was 19 seconds, and the maximum was 23 minutes and 56 seconds ( $M = 7$  Minutes and 11 seconds). For the adult choice condition, the minimum time a child attended was 0 seconds, and the maximum was 18 minutes and 23 seconds ( $M = 4$  minutes and 12 seconds). For the adult presentation condition, the minimum time a child attended was 0 seconds, and the maximum was 10 minutes and 9

seconds ( $M = 2$  minutes and 54 seconds). Figure 1 shows the mean of sustained attention across all three teaching conditions.

Table 2 Descriptive Statistics for the Three Teaching Conditions

	<i>M</i>	<i>SD</i>	Min	Max
Child Choice	7 min 11 s	7 min 35 s	0 min 19 s	23 min 56 s
Adult Choice	4 min 12 s	4 min 3 s	0 min 0 s	18 min 23 s
Adult Presentation	2 min 54 s	3 min 7 s	0 min 0 s	10 min 9 s

Before proceeding with testing hypotheses, a One-way ANOVA was used to test for mean differences between conditions on gender, race, and school type. No significant differences were found between conditions based on gender ( $p = .996$ , ns), race ( $p = .678$ , ns), and school type ( $p = .102$ , ns).

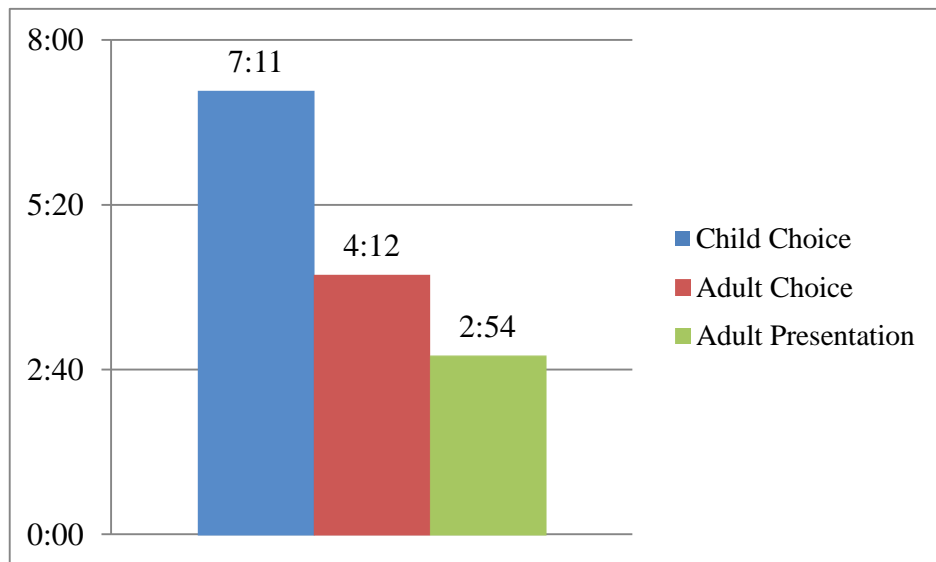


Figure 1 Sustained Attention Mean Across Three Teaching Conditions

## **Primary Data Analysis**

The analysis of the data was performed using the Statistical Package for the Social Sciences (SPSS) statistical software (SPSS Inc., 2009). The independent variable was the teaching condition (child choice, adult choice, or adult presentation) and the dependent variable was the duration of child attention. One-way analysis of variance (ANOVA) was used to analyze the child sustained attention across the three teaching conditions to examine whether predicted differences between the three conditions existed in the study data. ANOVA tests were selected because it allows for the comparison of group means across the three conditions and a traditional univariate test was used because there was only one dependent variable, duration of attention (Gravetter & Wallnau, 2009).

**Testing Assumptions of ANOVA.** Prior to analysis, data was examined to test assumptions for one-way ANOVA, including independence, normality, and homogeneity of variance. Statistical assumptions are necessary considerations when conducting statistical analyses. Distribution assumptions applicable to Analysis of Variance will be discussed in this section.

**Independence.** The first assumption when conducting an ANOVA is that the cases represent random samples from the populations; and therefore, the scores are independent and unrelated to one another (Green & Salkind, 2005). Violations of the assumption that scores are independent from one another, result in effects on both the level of significance and the power of the  $F$  statistic (Stevens, 2002). In the current study, the data was gathered independently, and as a result, the independence assumption was satisfied.

Normally Distributed Dependent Variables. When conducting an ANOVA, the second assumption is that the dependent variable is normally distributed for each factor level (Green & Salkind, 2005). A lack of normality can affect the Type I error rate, as well as the power of a study (Tabachnick & Fidell, 2007). Normality can be determined by examining skewness, the symmetry/dissymmetry of the distribution, and kurtosis, the distribution's peakedness. The variable is considered to be normally distributed if the skewness and kurtosis values are equal to zero with values greater than 1.5 considered to be non-normal (Stevens, 2002). In the current study, the normality assumption was not met. After a log transformation of the sustained child attention variable, the normality assumption was met on all three conditions (skewness range, .470 - .687; kurtosis range, -.046 - .305).

Homogeneity of Variance. The third assumption when conducting an ANOVA is that the variances of the dependent variables are equivalent for all populations (Green & Salkind, 2005). If the variances are equal or approximately equal, then the  $F$  statistic is robust. If the variances are largely unequal then the  $F$  statistic is considered to be liberal and may falsely reject the null (Stevens, 2002). The Levene's test was run to assess for homogeneity of variance. The homogeneity of variance was met after the log transformation ( $F(2,117) = .388, p = .679$ ).

**ANOVA Results.** The results of the one-way ANOVA partially supported the hypothesis of the secondary research question that preferences for methods differed significantly across the three methods,  $F(2, 117) = 4.170, p = 0.18$ . A post hoc test compares means and discovers which means are significant and which not significant (Gravetter & Wallnau, 2009). In Tukey HSD post hoc test (Portney & Watkins, 1993)

the data was compared two methods at a time. The minimum difference between methods was found, enabling the significance between methods to be determined (Gravetter & Wallnau, 2009). Post-hoc analyses (Tukey HSD) indicated that child choice differed significantly from adult presentation ( $p = .013$ ) but not significantly different from adult choice ( $p = .412$ ). Adult choice and adult presentation did not differ significantly from each other ( $p = .247$ ). See Table 3.

Table 3 ANOVA Multiple Comparisons

(I) Condition	(J) Condition	Mean Diff (I-J)	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
CI	AC	.151	.118	-.130	.432
	AP	.341*	.118	.060	.623
AC	CI	-.151	.118	-.432	.130
	AP	.190	.118	-.091	.472
AP	CI	-.341*	.118	-.623	-.060
	AC	-.190	.118	-.472	.091

Note: \*  $p < .05$ .

### Summary

Results indicated that children attend for different lengths of time depending on the teaching condition. This study shows that child choice promotes longer attention in children than adult presentation or adult choice. Children attended for an average of 7 minutes and 11 seconds during the child choice condition, an average of 4 minutes and 12 seconds during the adult choice condition, and an average of 2 minutes and 54 seconds for the adult presentation condition. During the child choice condition, children attend for a longer duration of time than the adult presentation and adult choice.

## **Chapter 5**

### **Discussion**

The purpose of this study was to determine the mean duration of child attention to a self-selected toy and to determine under which teaching condition children attend to toy play for the longest duration of time. A child's average duration of attention to self-selected materials is important in establishing baseline levels to serve as referents. This information is useful in planning for instruction and designing interventions for children who may exhibit attention problems.

The data indicates that the teaching condition of child choice elicited the longest duration of child attention. This finding is similar to Reinhartsen, Garfinkle, and Wolery (2002) in their study of two-year olds with autism, which found that when the child initiated his or her own play, the play lasted for a longer duration of time in comparison to scenarios when the child was given two choices or presented with one activity. In a meta-analysis of fifteen studies, Morgan (2006) concluded that when students are enabled to make their own choices, problem behaviors decrease, increasing their productivity and appropriate behaviors. In a study of reinforcement preferences, Fenerty and Tiger (2010) also found choice to be preferred in comparison to a no-choice condition. Children seem to prefer choice. Research suggests that children prefer to be given the opportunity to make their own choices, and, when presented with the option of choice, children almost always select the choice option (Doke & Risley, 1972; Fenerty & Tiger, 2010; LeLaurin & Risley, 1972; Reinhartsen, Garfinkle, & Wolery, 2002; Tiger, Hanley, & Hernandez, 2006).

While past literature has suggested that choice is important, the present study distinguishes between two types of choice. Consistent with previous research (Reinhartsen, Garfinkle, & Wolery, 2002), this data suggests that when children are able to make their own choice (child choice condition), they remain engaged longer than if they were given a choice between two activities (adult choice condition). Specifically, Tasky, Rudrud, Schulze, and Rapp (2008) proposed that when adults suffering from brain injury were given a choice (between several activities), their on-task behavior increased, suggesting that the present research may be beneficial across various spectrums.

### **Limitations**

A limitation of the present study is that there may have been order effects in the presentation of teaching conditions. Because of the configuration of the teacher instructions, the first 22 children's data were collected in the same order. Once this was discovered, the remaining 18 children's data were collected alternating the order of presentation. Because the majority of the observation sessions began with the child choice teaching condition, the results may have been impacted.

Another potential limitation was the teacher's ability to accurately identify child preferred materials. Because teachers so frequently offer children choices in the course of their practice, this seemed to be a reasonable treatment strategy for the adult choice teaching condition and the adult presentation teaching condition. However, previous research with children who have identified disabilities has suggested that teachers are not always accurate in the identification of preferred materials; the recommendation is to conduct preference assessments to accurately identify reinforcers (Reid, DiCarlo, Schepis, Hawkins, & Stricklin, 2003). The selection of non-preferred toys during these teaching conditions may have confounded that duration of attention.

Although all data were collected during the free choice center time in each of the classrooms, the majority were collected during the morning. Four of the 40 observations occurred in the afternoon. This may have impacted the child's attention due to fatigue from not sleeping/just waking up.

Demographic data were only collected on gender, race and presence of disability. Razza, Martin, & Brooks-Gunn (2010) suggest that poverty is negatively associated with attention. Though demographics were collected on all of the children who participated in this study, socioeconomic status was not taken into account. This additional information may show differences in attention based on the child's socio-economic status.

### **Clinical Implication**

Findings from this research suggest that teachers should attend to the design of their learning centers and materials in the classroom environment and provide ample time for children to independently explore. Child attention was found to be of the longest duration when children were allowed to choose materials freely.

### **Future Research**

Future research should examine the order effects of different teaching conditions on child attention. Teaching conditions could be counter-balanced or presented in separate observation sessions to control for effects of child fatigue. Preference assessments could be useful in identifying child preferred materials prior to examining different teaching conditions to control the possibility of teacher inaccuracy in selecting preferred materials. Time of day effects could have impacted child performance on attention. Because the majority of the observations in this study were conducted in the morning, no statistical comparison could be done to determine time of day effects.



Future research could attempt to control for time of day effects by counter balancing data collection across both morning and afternoon free play times. Demographic variables, such as poverty, could impact child attention. Future research should include child socio-economic status in order to control for this variable. This research suggests that children attend longer when they choose the materials. Future research should examine if more attention to toys leads to more learning.

### **Summary**

Past research indicates that when given the power to choose preschool children select the option of choice over the option of no choice (Doke & Risley, 1972; LeLaurin & Risley, 1972; Reinhartsen, Garfinkle, & Wolery, 2002). In addition to the assumption that children prefer choice, the present study suggests that children prefer making their own choices rather than being given a choice between two toys or activities provided by an adult. When given the opportunity to choose their own activities, children attend for a longer duration of time. A child's school readiness skills (Duncan et al., 2007) and social skills (Murphy, Laurie-Rose, Brinkman, & McNamara, 2007) are just two elements of a child's life that are influenced by attention. Unfortunately, a child's ability to attend can be damaged by the prevalence of technology in the modern world (Barr, Lauricella, Zack, & Calbert, 2010; Castell & Jenson, 2004; Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008). However, as suggested in this study, teachers can enhance children's attention and engagement skills by enabling children to choose their activities or toys within a proper and developmentally appropriate classroom.

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## **Appendix A Consent Form**

**1. Study Title:**

Child Sustained Attention

**2. Performance Sites:**

LSU Laboratory Preschool

**3. Contacts:** M-F 8:30 a.m. – 3:00 p.m.

Kelly Geary, Graduate Student (504) 909-1009

Dr. Cynthia Dicarlo, Assistant Professor, (225) 578-7005

Dr. Jennifer Baumgartner

**4. Purpose of the Study:**

The purpose of the present study is to measure sustained attention of 4 year old children.

**5. Subjects:**

**A. Inclusion Criteria**

Four year old children who are functioning within normal limits for their age.

**B. Exclusion Criteria**

Children with identified developmental delays

**C. Maximum number of subjects:** 40 four year old children.

**6. Study Procedures:**

Four year old children will be observed during their regularly-scheduled free play period in their own preschool classroom. Observers will give teachers instruction not to interact with the observed child during the observation period so that the child's independently sustained attention to materials may be measured.

**7. Benefits:**

As a result of this observation, the early childhood field will be better informed about child attention.

**8. Risks/Discomforts:**

There are no known risks for participation in this study.

**9. Measures taken to reduce risk**

There are no known risks for participation in this study.



**10. Right to Refuse:**

Participation in the study is voluntary and subjects may change their mind and withdraw from the study at any time without penalty.

**11. Privacy:**

This study is confidential. Results of the study may be publicly presented for educational purposes and no identifying information will be included in the presentation. Specific information concerning a child other than their own, will not be shared with parents.

**12. Financial Information:**

No incentives will be delivered.

**13. Withdrawal:**

Subjects may withdraw at any time.

**14. Removal:**

Individuals will be removed from the study at their request.

**15. Signatures:**

‘The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Chairman, LSU Institutional Review Board, (225)578-8692. I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form if signed by me.’

My child, \_\_\_\_\_, has permission to participate in the “Child Sustained Attention” study.

Parent Signature\_\_\_\_\_

Date\_\_\_\_\_

-----

**2. Child Assent**

A researcher will read the following statement:

“Someone will watch you playing in the classroom. Is it okay if we watch you play?”

Subject Signature\_\_\_\_\_

Date\_\_\_\_\_

Students may write their name, mark an X, or give verbal assent.

Student gives verbal assent\_\_\_\_\_

Student does not give verbal assent\_\_\_\_\_

## Appendix B IRB Approval Form

### Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, ALL LSU research/projects using living humans as subjects, or samples or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.



Institutional Review Board  
Dr. Robert Mathews, Chair  
203 B-1 David Boyd Hall  
Baton Rouge, LA 70803  
P: 225.578.8692  
F: 225.578.6792  
irb@lsu.edu | lsu.edu/irb

- Applicant, Please fill out the application in its entirety and include the completed application as well as parts A-E, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB Office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at <http://www.lsu.edu/irb/screeningmembers.shtml>
- A Complete Application Includes All of the Following:
- (A) Two copies of this completed form and two copies of parts B thru E.
  - (B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1 & 2)
  - (C) Copies of all instruments to be used.
    - If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.
  - (D) The consent form that you will use in the study (see part 3 for more information.)
  - (E) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB.  
Training link: ( <http://phrp.nihtraining.com/users/login.php>.)

1) Principal Investigator: Cynthia F. DiCarlo Rank: Assistant Professor Student\*? Y/N N

Dept.: School of Human Eco Ph: 578-7005 E-mail: edicar2@lsu.edu

2) Co Investigator(s): please include department, rank, phone and e-mail for each

\* If student, please identify and name supervising professor in this space

Jennifer Baumgartner, Assistant Professor, 578-0312,  
jbaumgartner@lsuagcenter.edu

3) Project Title: Child Sustained Attention

4) LSU Proposal?(yes or no) N If Yes, LSU Proposal Number \_\_\_\_\_

Also, if YES, either ☐ This application completely matches the scope of work in the grant  
**OR**  
☐ More IRB Applications will be filed later

5) Subject pool (e.g. Psychology Students) Three & Four year old children

• Circle any "vulnerable populations" to be used: (children <18; the mentally impaired, pregnant women, the aged, other). Projects with incarcerated persons cannot be exempted.

6) PI Signature [Signature] \*\* Date 2-9-09 (no per signatures)

\*\*I certify my responses are accurate and complete. If the project scope or design is later changed I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted ☒ Not Exempted \_\_\_\_\_ Category/Paragraph 1

Reviewer Mathews Signature [Signature] Date 2/11/09

Study Exempted By:  
Dr. Robert C. Mathews, Chairman  
Institutional Review Board  
Louisiana State University  
203 B-1 David Boyd Hall  
Baton Rouge, LA 70803  
P: 225-578-8692  
F: 225-578-6792  
www.lsu.edu/irb  
Notation Expires: 2-10-2012

IRB# E4399 LSU Proposal# \_\_\_\_\_  
☐ Complete Application  
☐ Human Subjects Training

### Appendix C Data Collection Sheet

	Name of toy	Initiation	Start time	End time
Event 1		CI		
Event 2		AC		
Event 3		AP		

## **Vita**

Kelly Elizabeth Geary was born on July 1986 in New Orleans, Louisiana, and she is the daughter of Jeffery and Joan Geary. Kelly graduated from the University of Kentucky in May 2009 with a Bachelor of Science in education with a focus in interdisciplinary early childhood education. She will graduate in May 2011 from Louisiana State University with a Master of Science degree in human ecology with a concentration in early childhood education.