

CHILD LIFE IPAD DISTRACTION: A PSYCHOSOCIAL TOOL  
FOR CHILDREN RECEIVING  
AN INJECTION

by

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## ABSTRACT

Distraction is a common and effective type of nonpharmacological intervention that offers support to children during medical procedures. Distraction helps children shift their attention away from a procedure to something more positive and engaging. Child life specialists are health care professionals who utilize distraction as a way to promote children's coping. Child life specialists are frequently using the iPad for interventions, including distraction, yet little research has examined the iPad as an effective distraction tool in pediatric health care. Also, few studies examine the psychosocial support that is provided by child life specialists during distraction.

The purpose of this research is to assess the effectiveness of iPad distraction provided by a child life specialist on children receiving an injection at a pediatric clinic. Forty-one child participants, from 4- to 11-years-old, were randomly assigned to one of two groups: the standard iPad group and the child life iPad group. The standard iPad group received iPad distraction, but did not receive the component of child life. The child life iPad group received iPad distraction during an injection with psychosocial support from a child life specialist.

Each child engaged with the iPad prior to the injection to provide familiarity and instruction on the specified iPad activity he or she would use. Children from 4- to 7-years-old engaged in "Talking Tom" and children 8- to 11-years-old played "Cut the Rope." Once the nurse entered the room to administer the injection, children in the child life iPad group were encouraged to continue playing the selected activity and were positively redirected to the

iPad during the injection by the child life specialist. Children in the standard iPad group were not encouraged to continue engaging with the iPad, yet still had access to the iPad activity.

The findings show that child life iPad distraction did not benefit those who received psychosocial support during the injection more than those who did not receive the psychosocial support. Gender and age differences were noted on children's pain and emotions during the injection with males and older children showing less pain and emotional behavior compared to females and younger children.

## LIST OF ABBREVIATIONS AND SYMBOLS

BOPS	Behavioral Observational Pain Scale
CCLS	Certified Child Life Specialist
CEMS	Children's Emotional Manifestation Scale
FLACC	Face, Legs, Activity, Cry, Consolability Scale
$n$	Variable quantity
$p$	Probability level
$r$	Pearson product-moment correlation
$t$	Computed value of $t$ test
$X^2$	Computed value of Chi-square test
<	Less than
=	Equal to

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## CHAPTER 1

### INTRODUCTION

Children in the health care setting are exposed to numerous factors that can negatively influence their behavior, development, resiliency, and ability to cope; these factors can include the exposure to an unfamiliar environment, medical personnel, medical equipment, terminology that is difficult to understand, and invasive medical procedures (Lizasoain & Polaino, 1995). A primary concern of hospitalized children and their families is undergoing a painful medical event, as pain is a common result from injury, illness, and medical procedures (Committee on Psychosocial Aspects of Child and Family Health & Task Force on Pain in Infants, Children, and Adolescents, 2001). When a situation seems threatening or harmful to a child, he or she tends to feel a loss of control and helplessness (Adams, 1976). Due to medical procedures posing a threat, fear and anxiety are known to escalate in children when thoughts of being hurt are generated (Stephens, Barkey, & Hall, 1999).

When fear and anxiety increase, children become more vulnerable to medical procedures and are likely to exhibit difficulty managing the stress and pain they experience (i.e., difficulty coping). Children tend to show psychological upset, which includes crying, withdrawal, aggression, regression, and disruptive reactions, as a result of being hospitalized and facing medical procedures or surgeries (Li & Lopez, 2005). Not only can psychological upset or emotional distress inhibit children's coping during their hospitalization, but it can impact their well-being following discharge, which includes future medical encounters. Vernon, Foley, Sipowicz, and Schulman (1965) reviewed more than 200 articles addressing children's responses

to being hospitalized. The review concluded that emotional distress occurred during hospitalization and after discharge. Vernon, Schulman, and Foley (1966) support this finding by examining the responses of children following their hospitalization and determined that the combination of illness and hospitalization caused children to display negative responses (e.g., separation anxiety, increased sleep anxiety, and increased aggression toward authority). However, pediatric patients who are able to exert control over their hospitalization have been found to exhibit better adjustment, fewer externalizing and internalizing problems, and lower distress compared to children who lack control (Weisz, McCabe, & Dennig, 1994).

Since children are vulnerable to medical procedures and may display difficulty coping, adults and health care professionals often times need to help children exert control over their procedures and distress. The pain and anxiety that are experienced allow health care professionals an opportunity to help children manage their negative behaviors by intervening throughout the procedure (Winskill & Andrews, 2008). In today's pediatric health care, there are Certified Child Life Specialists that promote effective coping in children as well as families undergoing or experiencing challenging events that are related to the hospital or health care environment. Certified Child Life Specialists use various interventions to reduce fear, anxiety, and pain while promoting optimal growth and development and coping in children experiencing a health care visit.

### Child Life

Child life is a discipline in the health care setting that focuses on the psychosocial needs of pediatric patients and their families. The term psychosocial refers to one's psychological development in relation to how one interacts with and cognitively perceives his or her social environment. In child life programs, a Certified Child Life Specialist (CCLS) is a skilled

professional who assists children and their families in managing and coping with their health care experiences. A child life specialist carries a minimum of a bachelor's degree in child life, child development, human development, family studies, or a similar field. A child life student completes an internship of a minimum of 480 hours working under the supervision of a child life specialist and completes a certification exam administered by the Child Life Council; if the certification examination is passed, then the candidate acquires the credentials, CCLS. Throughout the coursework, internship, and other experiences working with children, a person pursuing the credentials of a CCLS will obtain an understanding of child development from birth to adolescence, be able to assess development, provide age-appropriate interventions, communicate effectively with families, and advocate for the patient and family. A child life specialist must also possess the qualities of assessing each child and family's individual needs, demonstrate expertise in diverse medical populations, display proficiency in communicating with the medical team and families, and demonstrate characteristics of teamwork (Child Life Council & Committee on Hospital Care, 2006).

A child life specialist has many roles and responsibilities within his or her clinical work. Child life specialists recognize the developmental issues or concerns particularly related to illnesses or health care experiences that children endure. Child life specialists perform this role by understanding how to alleviate fears, anxiety, fantasies, and other uncertainties through play, education, and behavior-management methods (Child Life Council & Committee on Hospital Care, 2006). Although child life specialists originally provided their services within the hospital, they are now being integrated into alternative settings, such as dental offices, pediatric clinics, ambulatory care centers, hospice care, and more (Bandstra et al., 2008). In these various settings, child life specialists work alongside physicians, psychologists, nurses, and other

medical personnel in establishing appropriate plan of cares for patients and their families (Committee on Hospital Care, 2003; Desai, Ng, & Bryant, 2002). As a member of the interdisciplinary team, child life specialists advocate for the individual patient's needs and anticipate goals to increase coping; to achieve these goals, child life specialists utilize various interventions, involving nonpharmacological pain-management techniques and communication of care information to children in developmentally appropriate language, to better the child's well-being and reduce fear and anxiety (Child Life Council & Committee on Hospital Care, 2006). A few examples of the types of psychosocial interventions that child life specialists implement to promote effective coping in children include play, education, preparation, procedural support, and self-expression activities (Sorensen, Card, Malley, & Strzelecki, 2009).

#### Distraction

Many health care settings rely solely on pharmacological strategies in minimizing pain during certain procedures, yet nonpharmacological methods, like distraction, are being seen more in pediatric health care because they are safer and cost-effective (Sadeghi, Mohammadi, Shamshiri, Bagherzadeh, & Hossinkhani, 2013). Distraction is a type of positive procedural support and common nonpharmacological method that child life specialists offer during medical procedures. Distraction is when one's attention is refocused on a positive stimulus (i.e., something more child-friendly, attention-grabbing, and calming) other than pain perception, therefore, putting the pain at the boundary of awareness (Sparks, 2001). The term distraction can also be defined as a cognitive coping strategy that is effective in deterring attention from a painful event (Murphy, 2009). Cognitive coping strategies, such as distraction, help reframe or refocus one's thoughts from the negative event to something more positive (Uman, Chambers, McGrath, & Kisley, 2007). Cognitive coping strategies involve redirecting one's conscious

awareness and focusing it on something else. There are many types of distraction techniques that are known to be successful in promoting children's coping. These techniques include listening to music, counting objects in the room, bubble blowing, reading I Spy books, singing, talking, watching cartoons, or playing with child-friendly toys. Distraction techniques are known to work best when a toy or activity is age-appropriate, fun, and interesting to each individual child (Winskill & Andrews, 2008).

### Effectiveness of Distraction

There have been multiple studies that have demonstrated the effectiveness of various methods and tools of distraction among different types of medical procedures (Chambers, Taddio, Uman, & McMurtry, 2009; Harned & Strain, 2001; Windich-Biermeir, Sjoberg, Dale, Eshelman, & Guzzetta, 2007). Chambers et al., (2009) conducted a systematic review of 20 randomized controlled trials to determine the effectiveness that distraction had on reducing pain and distress. The findings supported that several distraction interventions were effective (e.g., breathing exercises, child-directed distraction, nurse-led distraction, and combined cognitive-behavioral interventions) in reducing pain and distress affiliated with childhood immunizations. Evidence indicates that various breathing techniques, such as blowing a party blower, bubble blowing, or simply taking deep breaths, were found to help ease the pain and distress experienced by the children who underwent immunizations. Breathing exercises, in particular, were found to be effective in reducing children's self-reported pain, observer-rated distress, and nurse-reported distress during immunizations.

French, Painter, and Coury (1994) examined the effectiveness of a simple type of intervention on children, ages 4 to 7 years, undergoing a minor, yet painful procedure (i.e., immunization). The investigators told all participants (i.e., the experimental and control groups)

what to expect when they would receive their immunization. The experimental group was provided with additional information, which consisted of educating the participants to blow out air during their immunization, as if they were blowing bubbles. Children that were trained on blowing out air during their immunization showed fewer pain behaviors and lower self-reported pain compared to the control group. It was concluded that a simple distraction technique, such as blowing or taking deep breaths, could help children cope with their pain.

Bowen and Dammeyer (1999) evaluated two distraction techniques for children, between 3 and 6 years old, receiving an immunization. The participants were assigned to one of three groups: party blower intervention, pinwheel intervention, or the control group. The intervention groups were given the distraction item and encouraged to use it, but lacked information or training on how to use it. The control group, however, was simply given standard of care and no distraction item. The study indicated that the children in the party blower intervention group rated party blowers to be more effective in reducing distress than both the pinwheel intervention group and the control group. The authors believed that the party blower was more effective in providing increased distraction due to a child being able to interact with the object in a physical, visual, and auditory way, whereas the pinwheel required a child to focus on the object at a distance.

Dahlquist et al. (2002) used a different technique in distraction concentrated on pediatric patients with chronic illnesses that underwent repeated needle sticks. Six children were followed throughout the study, and the children's ages ranged from 2 to 8 years. The repeated needle stick procedures included intramuscular injections, implanted port accesses, and intravenous (IV) placements. A graduate student therapist involved in the study trained the parents of the child participants on how to coach their children to use the distraction techniques. The therapist was



initially present for the first few needle procedures and would prompt the child to engage with the distraction item, which was an electronic toy by V-tech. As the treatments progressed over time, the parent progressively took the therapist's place in the intervention. Five out of the six children and their parents saw a reduction in the child's distress, while nurses rated four of the six participants as more cooperative throughout the procedure. This study could also show that distraction can potentially remain effective over the course of repeated procedures. However, because the study lacked a control group, the reduction of distress may be due to practice effects.

Sparks (2001) examined two forms of distraction on preschool aged children receiving a diphtheria-tetanus-pertussis (DTP) injection. Participants were randomly assigned to one of three groups. The first group received bubble blowing as their distraction tool, while the second group received touch (i.e., light stroking of the skin near the injection site) as the distractor and the third group received standard of care without any distraction tool. Nurses administered the distraction interventions used within this study, and the findings suggest that touch and bubble blowing significantly reduced the children's self-reported pain perception compared to the control group.

Fanurik, Kohl, and Schmitz (2000) examined various distraction techniques combined with EMLA cream in children, ages 2 to 16 years, undergoing an IV insertion. EMLA cream is a topical anesthetic cream that is used to numb an area of skin to prevent pain from certain medical procedures, such as needle insertions, skin grafts, etc. The children were classified by age groups (2 to 4 years, 5 to 8 years, 9 to 12 years, and 13 to 16 years) and then randomly assigned to one of two experimental groups (i.e., distraction or "typical" EMLA cream intervention). Children randomized into the distraction group received distraction implemented by a nurse throughout the procedure. The typical intervention group did not receive distraction from the

nurses. The distraction techniques that were used by the nurses involved age-appropriate toys, such as bubbles, musical sound storybooks, and headsets with choices of music. The nurses were instructed on how to use the distraction techniques with the children and engaged the child before, during, and after the IV insertion with the distractor. The findings concluded that children who received distraction combined with the EMLA cream exemplified less distress before, during, and after the procedure than those who just received EMLA cream.

Windich-Biermeir, Sjoberg, Dale, Eshelman, and Guzzetta (2007) examined the effectiveness of self-selected distractors in children and adolescents undergoing multiple cancer-related procedures, such as venipuncture and venous port accesses. Children were randomly assigned to a distraction or a control group. The intervention group chose one distraction item (i.e., self-selected) out of five items. The distractors were selected based on the reviewing of literature, age-appropriate characteristics, level of sensory input, and the ability to actively engage the child without disrupting the procedure. The distraction items consisted of bubbles, I Spy: Super Challenger book, music table, virtual reality glasses, or handheld video games. Intervention participants displayed significantly less distress as rated by the nurse and parent of the child than did comparison participants in the control group.

Harned and Strain (2001) examined distraction with 2,067 children, ranging from 0 to above 10 years of age, who were undergoing magnetic resonance imaging (MRI). The study consisted of two six-month periods; the first six-month period, which was from May to October of 1998, involved 955 children undergoing MRI procedures without the intervention of distraction (i.e., control group). The second six-month period, which was from May to October of 1999, consisted of 1,112 children undergoing MRI procedures and received distraction (i.e., intervention group). The intervention group received video goggles and headphones as their

distraction during their imaging. The video goggles and headphones allowed the children to watch and listen to a video throughout their MRI procedure. Compared to the control group, the study found that children who received the intervention of distraction showed a decrease in the need for sedation due to their cooperation and focused attention on something more positive. The decrease in the need for sedation was significant in children from 3 years of age and older.

Gursky, Kestler, and Lewis (2010) examined the impact of child life interventions, which included procedure preparation and distraction, on children between the ages of 3 and 13 years undergoing a laceration repair. A laceration repair is a procedure consisting of cleaning, preparing, and suturing (i.e., closing) a wound. Unlike the control group, which received standard care, the children having the interventions of preparation received age-appropriate information about their laceration repair and distraction during the procedure. A child life specialist provided the interventions; the preparation intervention consisted of the child life specialist using age-appropriate language and a doll to explain and demonstrate what would happen during the laceration repair, and the distraction intervention consisted of the child life specialist using age-appropriate distraction items (e.g., bubbles, singing, talking, and distraction toys) during the actual suturing. The results concluded that the psychosocial interventions of procedure preparation and distraction reduced more observed distress during the procedure of those in the intervention group compared to those children in the control group. Parents also perceived less distress of those children in the intervention group and rated the overall care and experience as significantly higher. The study did not independently examine which intervention (i.e., preparation or distraction) was most effective; therefore, these findings about distraction should be interpreted with caution. More research is needed to validate the efficacy of the interventions routinely provided by a child life specialist.

These studies suggest distraction items, such as bubbles, party blowers, music, I Spy books, virtual reality glasses, handheld video games, and breathing exercises, help children manage their procedure pain and distress (Bowen & Dammeyer, 1999; Chambers et al., 2009; Fanurik et al., 2000; French, Painter, & Coury, 1994; Sparks, 2001; Windich-Biermeir et al., 2007; Winskill & Andrews, 2008). Distraction has been found to be effective during immunizations (Chambers et al., 2009), intramuscular injections, IV insertions, port accesses (Dahlquist et al., 2002; Fanurik et al., 2000), venipuncture (Windich-Biermeir et al., 2007), and MRI procedures (Harned & Strained, 2001). Few studies examine what makes the distraction effective in reducing procedure-related distress. Future studies might examine who is most effective at providing distraction for children undergoing procedures (i.e., a parent, caregiver, nurse, child life specialist, etc.) or which distraction technique is most effective for various age groups. Child life specialists view their training and the psychosocial support they provide throughout medical procedures to be factors in what makes distraction effective.

Although these findings show contributing evidence to the effectiveness of distraction, there are limitations and issues found within these studies. Some of the studies had small sample sizes, which may not have been large enough to detect differences that may have existed, and utilized a specific population; this also makes it difficult to generalize to various populations (Bowen & Dammeyer, 1999; Dahlquist et al., 2002; Gursky, Kestler, & Lewis, 2010; Sparks, 2001; Windich-Biermeir et al., 2007). Due to the limited number of investigators and the lack of blinded raters, there was potential bias when measuring the interventions of distraction (Fanurik et al., 2000; French et al., 1994; Gursky et al., 2010). In one study, there was also difficulty controlling all variables in the clinic setting where the research was completed (French et al., 1994). Children in this study received their injections at a table where other child patients were

seated; therefore, children who were not receiving injections watched as other children were being immunized, which caused an increase in anxiety (French et al., 1994). Distraction has been found to be effective in children undergoing various medical procedures by making medical events less distressing (Bowen & Dammeyer, 1999; Fanurik et al., 2000). Future research is needed that address such limitation and evaluate the specific characteristics of distraction activities to determine which characteristics are necessary for effectiveness. In other words, what makes distraction effective?

### Psychosocial Support

Although the term distraction is commonly used when referring to controlling children's attention, it is important to note that children are not simply distracted during their medical procedure or event, but rather engaged in a focused attention activity. To help children engage in a focused attention activity, it is helpful for an adult to support children undergoing procedures. A trained adult (i.e., child life specialist) does more than just take children's mind off of the negative event; he or she focuses their attention on something that allows active participation. According to child life theory, the work of a child life specialist utilizing distraction as an intervention includes specific and individualized support for children during hospital events, such as procedures (Thompson, 2008). Child life specialists provide specific and individualized support for children by assessing children's developmental level, as well as their hospital stressors and coping needs, and then utilizing developmentally appropriate practice to best meet those needs. Child life specialists understand the psychosocial issues children face in the health care setting and appear to be viewed by the health care team as having the greatest influence on decreasing patients' distress compared to other health care professionals (Cole, Diener, Wright, & Gaynard, 2001).

Dahlquist, et al. (2007) evidenced that interactive distraction techniques are more effective at increasing coping than passive distraction techniques. Interactive distraction techniques involve children participating in an activity (e.g., playing a video game) as a distractor during a procedure. Interactive distraction also involves an adult to instruct children or model how to interact with the distractor, while also ensuring the children demonstrate knowledge on using the distractor. Passive distraction techniques are those that include children observing something (e.g., watching a movie) as a distractor. Adults typically describe to children that they will watch something, such as a movie or cartoon, during their procedure. Although both types of distraction can be effective, interactive distraction techniques are believed to engage more attention than passive distraction techniques. The increase in attentiveness on the interactive distractor restricts the children's attention on the procedure to increase coping.

Carlson, Broome, and Vessey (2000) examined interactive distraction on children, ages 4 to 18 years, undergoing venipuncture or an IV insertion. The children were assigned to one of three age groups (4 to 7 years, 8 to 12 years, 13 to 18 years) and then randomly assigned to one of two groups (i.e., experimental group and attention-control group). The experimental group received a kaleidoscope as their distraction item and was instructed in its use by the nurse in the study. The experimental group was encouraged to concentrate on the item throughout their needle procedure. The attention-control group did not receive the distraction item during their procedure and received verbal preparation of the nurse's choice. The study concluded that the intervention did not significantly reduce the children's pain affiliated with needle sticks due to the children not being actively engaged or focused throughout the procedure. An explanation to support this finding is that the nurse implementing the distraction may have simply instructed the

child on how to use the kaleidoscope rather than actively supporting them during distraction (i.e. psychosocial support).

Adults, such as parents or members of the healthcare team, and some children may be completely capable of providing distraction during medical procedures; however, their lack of the appropriate training may minimize the effectiveness of the distraction. Parents, for example, may also undergo fear and anxiety that is associated with their child's procedure; therefore, the child will be influenced by the parent's behavior and have an even greater risk of not coping appropriately (McMurtry, 2013). A child life specialist, however, actively engages a child in a focused activity (i.e., distraction) by using a distraction tool that is appropriate for the child's developmental age and level of interest. Child life specialists also position the distraction tool to limit the child's visualization of the procedure. Child life specialists have a strong foundation in how children will respond to medical procedures as well as how to support children in times of distress and pain. In addition, child life specialists convey the sequence of events and sensations that children will experience throughout the procedure by using developmentally appropriate language (i.e., anticipatory guidance). When a child life specialist engages a child in interventions, the child is more likely to cooperate, which allows the medical team to perform the procedure more quickly and effectively (Brewer, Gleditsch, Syblik, Tietjens, & Vacik, 2006; Leahy et al., 2008).

### iPad

A newer distraction tool that has been introduced to the field of child life is the iPad created by Apple. Child life specialists are using the iPad as a distraction technique during pediatric medical procedures, as it caters to the individual needs of children among all ages. The iPad includes multiple possibilities for distraction activities: games, activities, music, movies,

books, and more, all in one device. The iPad is also easy to use and manipulate during procedures, as the size is sufficient and functional for child life specialists. Also, children in today's society are interacting more with digital devices, such as the iPad; therefore, iPads may be more interesting and engaging for children.

Borges, Huber, and Lugo (2011) conducted a pilot study that took place over a nine-month period at Kravis Children's Hospital Mount Sinai Medical Center in New York where an innovative program was established to examine the use of iPads during various procedures. The child life specialists at this site found the iPad to be highly effective in helping children cope, as it promotes mastery and control of their medical experiences (i.e., sense of accomplishment, control of choices, and control of emotions and impulses), while allowing children to engage in an activity that meets individual levels of interest. While the child life specialists involved in this pilot study viewed the iPad as an effective method, the pilot study was simply a summary of the child life specialists' subjective viewpoint of the iPad's efficacy.

Very few studies document iPad efficacy in pediatric health care. Shahid, Benedict, Mishra, Mulye, and Guo (2014) found that using an iPad for distraction during a child's immunization reduced the parent's perception of their child's pain and distress behavior. Although the intervention group showed a significant difference in the parents' perception compared to the control group, the study did not include measures for the children to report their pain or anxiety or examine child life specialists utilizing the iPad as a distraction method.

Dalton and Hardy (2013) also found the iPad to be effective in distracting children during induction of anesthesia. The study consisted of two groups receiving a distraction technique during IV cannulation and gaseous induction; one group received a book as a distraction technique and the second group received the iPad. The study found that the iPad group did



significantly better than the book group for improved compliance during ease of IV access and a lack of a response to the IV insertion. However, the study did not examine observed pain and emotional behaviors the children displayed during the induction process or the psychosocial support that child life specialists provide during distraction.

#### Statement of Need

Due to the lack of studies examining the role of child life specialists using iPad distraction within the medical setting, it has been a popular topic of discussion among the child life profession (Borges et al., 2011). Some medical personnel and adults are viewing iPad distraction as a method that anyone can implement, even children. However, can a child that exhibits fear and anxiety from an anticipated medical procedure focus their attention on a positive stimulus and cope effectively without the support from a child life specialist?

The psychosocial component that child life specialists provide during procedures allows distraction techniques to be individualized to children's needs. Child life specialists are trained to focus on individual children by adapting skills and foundational knowledge to help children have success with their medical event. Some studies provide support for the use of child life distraction as being an effective method in reducing behavioral distress because child life specialists are able to focus children's attention and minimize anxiety (Gursky et al., 2010; Leahy et al., 2008); however, additional evidence-based research is needed to support the psychosocial component that child life specialists provide during distraction. Also, such studies did not focus directly on iPad distraction being used by child life specialists in standard needle procedures.

## Purpose

Due to the lack of research highlighting the need for psychosocial support and the increased interest in using the iPad in the child life profession, the purpose of this study is to assess the effectiveness of iPad distraction, provided by a Certified Child Life Specialist, versus iPad distraction without the support of a Certified Child Life Specialist on children receiving an injection at a pediatric clinic. An objective of this study is to examine the psychosocial component included in child life distraction. This will be examined by observing which condition promotes better coping (i.e., less pain and negative emotional behavior) in children between the ages of 4 and 11 years old. It is hypothesized that children who receive iPad distraction from a child life specialist during their injection will show better coping (i.e. less pain and negative behavior) than those receiving standard iPad distraction.

## Hypotheses

It is anticipated that the children participating in iPad distraction with a Certified Child life Specialist (i.e., psychosocial support) will show decreased pain and emotional behavior in comparison to the children receiving iPad distraction without a Certified Child Life Specialist (i.e., no psychosocial support).

1. In comparison to the children receiving iPad distraction without a Certified Child Life Specialist, the children receiving iPad distraction with a Certified Child Life Specialist will rate lower self-reported pain during the injection as specified by the Faces Pain Rating Scale.
2. In comparison to the children receiving iPad distraction without a Certified Child Life Specialist, the children receiving iPad distraction with a Certified Child Life Specialist

will exhibit less negative emotional behavior as indicated on the Children's Emotional Manifestation Scale before and during the injection.

3. In comparison to the children receiving iPad distraction without a Certified Child Life Specialist, the children receiving iPad distraction with a Certified Child Life Specialist will show less pain behaviors as indicated by the Face, Legs, Activity, Cry, and Consolability Scale during the injection.
4. In comparison to the children receiving iPad distraction without a Certified Child Life Specialist, the children receiving iPad distraction with a Certified Child Life Specialist will exhibit less pain behaviors during the injection as identified on the Behavioral Observational Pain Scale.

## CHAPTER 2

### METHODOLOGY

#### Participants

A total of 41 children receiving an injection and their parents or primary caregivers were recruited as participants at a pediatric clinic. Children between the ages of 4 and 11 represent the typical age range of children receiving injections at the pediatric clinic. The nursing staff of the pediatric clinic was also recruited to partake in the study, as they completed an assessment of the children's behaviors during the injection. The nursing staff consisted of five nurses consented prior to the implementation of the study. The pediatric clinic is located in Tuscaloosa, Alabama at the University Medical Center. The University Medical Center is affiliated with The University of Alabama's School of Medicine and approximately 40 to 60 children visit the clinic daily. The inclusion criteria included the age of the child, presence of parent or primary caregiver, and getting an injection. The exclusion criteria included a child having a disability that prevented him or her from cognitively or physically participating.

#### Procedure

The nurses referred children and their parents or primary caregivers who met criteria; the children and parents were then approached in the patient's room and were given the opportunity to participate in the study. The researcher first approached the parents or caregivers in the patient's exam room to briefly explain the study and criteria to participate. If the parent stated he or she was interested in the study and their child met criteria, then the researcher proceeded to further describe the study's protocol. When the researcher briefly described the protocol, she

included information about the forms the participants would complete (e.g., consent, assent, and basic demographic), random assignment into groups, a description of the two groups, the assessments being gathered, and how the study would not take more time than their regular scheduled visit. Describing the protocol was a way for the researcher to inform the parent of the procedure for their consideration to provide consent. If consent was received, the researcher assented the child by asking if he or she would like to play on the iPad during the nurse's visit. The researcher did not inform the child that he or she would be receiving an injection; however, majority of children were made aware of the injection by their parents prior to the procedure.

Following the consent and assent process, the parents completed a basic demographic questionnaire while in the patient's room. The child participants were then randomly assigned, using computer software, to one of the two groups. The two groups to which a child could be randomly assigned included the standard iPad group, which did not receive psychosocial support from the child life specialist, and the child life iPad group. The nurse informed the child life specialist when the injection would be administered, and the child life specialist entered the patient's room and began engaging the child, despite age or group assignment, in the activity or game that he or she used during distraction. This interaction, which lasted for approximately three minutes, simply allowed the child to be given some instruction and become familiar with the activity or game before the actual injection took place. When the nurse entered the patient room and was ready to administer the injection, the research assistant, blind to the hypotheses, began assessing the child using the appropriate measures. Depending on the group the child was assigned, the child life specialist either simply held the iPad for the child to use (i.e., standard iPad group) or held the iPad while engaging the child in the activity or game, providing psychosocial support (i.e., child life iPad group). The research assistant assessed the child's

emotions and distress behaviors before and during the injection. The child reported his or her level of pain experienced during the injection, and the nurse, blind to the hypotheses, summarized the child's pain behaviors displayed during the injection. After the child received his or her injection and the nurse completed the form, the researcher and research assistant thanked the participants for partaking in the study. The child life specialist, nurse, and research assistant were the only people present in the room during the actual injection procedure besides the patient and his or her family members.

### *Groups*

***Standard iPad Group.*** If a child was assigned to the standard iPad group, then the child had access to the iPad to use him or herself during the injection without the psychosocial support from a Certified Child Life Specialist. A child who was 4 to 7 years of age was allowed to use "Talking Tom" as his or her distraction activity. A child who was 8 to 11 years of age was allowed to use "Cut the Rope" as his or her distraction game. The child life specialist only held the iPad for all the children in this group and did not provide any type of psychosocial support.

***Child Life iPad Group.*** If a child was assigned to the child life iPad group, he or she engaged in an age-appropriate game or activity on the iPad with a Certified Child Life Specialist during his or her injection. A child in the child life iPad group who was 4 to 7 years of age engaged in the activity "Talking Tom", which is a voice-activated talking cat that repeats what one says; this allowed the child to have the ability to fully engage in the activity despite the possibility of having to be held in a comfort hold (e.g., bear hug) during the injection. "Talking Tom" is developmentally appropriate for this age group due to the open-ended interaction that fosters pretend play. A child who was 8 to 11 years of age engaged in the game "Cut the Rope", which is a puzzle game. "Cut the Rope" also allows children from 8 to 11 years old to think

logically about objects and events, and fosters skills of ordering in sequence. Older children typically did not have to be held in a comforting position while receiving their injection and therefore were able to engage in a game that required one to touch the iPad screen. This is a developmentally appropriate game for older school-aged children because it promotes industry, or a sense of competence, as children problem solve to accomplish tasks.

The child life specialist in the child life iPad group held the iPad by positioning it to minimize the child's view of the injection. The child life specialist also provided psychosocial support by encouraging the child to focus his or her attention on the activity or game using developmentally appropriate language (e.g., "Lets sing a song for Tom and see if he will sing with us."). In addition, verbal support, praise, or coaching was provided (e.g., "You are doing such a good job holding still!").

#### Assessments

There were a total of four assessments, which were completed by the parents, children, research assistants, and nurses that participated in the study.

#### *Parent Scale*

**1) *Background/Demographic questionnaire.*** Once consent and assent were received, the parents or primary caregivers of the child participants were asked to fill out a basic demographic questionnaire using paper and pen while in the patient room. The purpose of the questionnaire was to collect information about the participant and his or her parents or primary caregivers; for example, it comprised of the parents' living status, occupation, gender, age, ethnicity, highest level of education, and information about the child, including age, gender, and ethnicity.

### *Child Scale*

**1) Faces Pain Rating Scale (Wong & Baker, 1988).** The Faces Pain Rating Scale is a self-report scale that includes six faces. After their injection, child participants were asked which face represented the pain they experienced during the injection. The first face depicted a very happy smiling face, whereas the sixth face was sad and tearful. The four faces in between represent varying degrees of sadness. The six faces carry a number from zero to ten, in increments of two; zero being the first face and ten being the sixth face. After the child received the injection, the child life specialist used a card that displays the Faces Pain Rating Scale and asked the child, “How much hurt did you have during your shot? Did you have no hurt, or did it hurt a little bit, a little more, even more, a whole lot, or did it hurt the worst? Can you point to which face shows how much hurt you had?” Once the child pointed to which face represented his or her pain, the research assistant recorded the corresponding score using pen and paper (Wong & Baker, 1988).

The Faces Pain Rating Scale is an appropriate measure for children between the ages of three and eighteen. Keck, Gerkensmeyer, Joyce, and Schade (1996) examined the scale’s validity and reliability by comparing the Faces Pain Rating Scale to the Word Descriptor Scale, which is another pain rating scale. It was found that both pain assessments had a significant correlation ( $r = 0.71, p < .01, n = 118$ ), suggesting construct validity in measuring pain using the Faces Pain Rating Scale. Reliability was also confirmed by comparing the score of a population of children immediately following a procedure to their score 15 minutes after the procedure. A significant correlation was found between the test and retest scores ( $r = 0.90, p < .001, n = 118$ ). The Faces Pain Rating Scale also showed to be preferred by children in reporting pain.



### *Research Assistant Scales*

**1) Children's Emotional Manifestation Scale (CEMS; Li & Lopez, 2005).** The research assistant used the CEMS to assess each child's emotional behavior before and during the injection. The child was observed on five categories that included his or her facial expression, vocalization, activity, interaction, and level of cooperation throughout the procedure. Each behavior includes five descriptions of emotional behavior that increases with a score from one to five, with five representing the child displaying more negative emotions. For example, the facial expression category includes a score of one if the child smiled most of the time during the procedure, a score of two if the child had a relaxed face and made eye contact, a score of three if the child showed a neutral facial expression during the procedure, a score of four if the child had a worried facial expression, with eyebrows lowered and mouth pursed, and a score of five if the child showed facial grimacing or twisted facial expression with cheeks raised. The five individual scores were totaled for a total score, and higher scores suggest more negative emotions the child displayed. Negative emotions refer to crying, restlessness, strong verbal protest, withdrawal and disruptive behaviors. A child who displayed less emotional behavior and anxiety during the procedure showed better cooperation and coping.

The CEMS has been tested for content and convergent validity and reliability, and has been adequate in studies' results. Li and Lopez (2005) compared the State-Trait Anxiety Inventory for Children (STAIC) to the Children's Emotional Manifestation Scale, blood pressure, and heart rate and found reliability was recognized within the scale due to the high correlation between the total scores and the item-total correlations, resulting from 0.51 to 0.90. Validity was suggested due to the positive correlation between the scores of the CEMS and STAIC ( $r = 0.76, n = 82, p < 0.01$ ), with high levels of state anxiety associated with more

negative emotional behavior. A positive correlation was also found between the CEMS and heart rate ( $r = 0.61, n = 82, p < 0.01$ ). A moderate positive correlation between the CEMS and blood pressure was found ( $r = 0.43, n = 82, p < 0.01$ ). The results indicated that more negative emotional behavior was associated with faster heart rate and higher blood pressure.

**2) Face, Legs, Activity, Cry, Consolability (FLACC) Scale (Merkel, Voepel-Lewis, Shayevitz, & Malviya, 1997).** The FLACC scale is another observational measure that was used by the research assistant, yet it focused on observing each child's pain behaviors during the injection. The research assistant was trained to circle each pain behavior the child exhibited during the injection. The five pain behaviors or categories that the child was scored on include face, legs, activity, cry, and consolability. Each category had a scoring scale from zero to two, with two being the highest. An example of the scoring is as follows: the face category suggests that a score of zero is when there was no particular expression or smile, a score of one is when the child occasionally grimaced, frowned, withdrew, or became disinterested, and a score of two represents frequent to constant frowning, clenching of the jaw, and/or a quivering chin. The score totals ranged from zero to ten, with higher scores representing more pain behaviors.

Willis, Merkel, Voepel-Lewis, & Malviya (2003) compared the FLACC scale to a type of self-report measure that was used to measure pain. A positive correlation between the self-report scale and the FLACC scores was found ( $r = 0.58, p = 0.001$ ). Although the scales did not correlate with children ages five and younger, there was a positive correlation between the scores in children older than five-years-old ( $r = 0.83, p = 0.001$ ).

#### *Nurse Scale*

**1) Behavioral Observational Pain Scale (BOPS).** The BOPS is a pain measurement scale that was established for nurses to identify, evaluate, and document children's pain. The

scale assessed three primary elements of pain behaviors: facial expression, verbalization, and body position. Nurses completed this after the injection, circling the behaviors the child displayed during the injection. The three elements were given a score of zero, one, or two, with two representing the highest pain behavior (i.e., a verbalization score of zero is normal conversation, laugh and a verbalization score of one is completely quiet or sobbing and/or complaining but not because of pain). Scores were totaled and ranged from zero to six; the higher the score, the higher the pain observed.

Hesselgard, Larsson, Romner, Stromblad, and Reinstrup (2007) examined the validity and reliability of the BOPS scale by comparing the BOPS scores to the scores on the Children's Hospital of Eastern Ontario Pain Scale (CHEOPS). The study represented interrater reliability, concurrent validity, and construct validity. The interrater reliability values for each variable were 0.86 (90%) for facial expression, 0.92 (93%) for verbalization, and 0.95 (97%) for body position. The total BOPS score was 0.93, which suggests appropriate interrater reliability. The BOPS and the CHEOPS scores had a positive correlation ( $r = 0.871, p < 0.001$ ), which represents validity.

## CHAPTER 3

### RESULTS

Descriptive and demographic characteristics for children and parents are presented in Table 1. Independent sample t-tests and chi-square tests were completed to examine any significant differences between the two groups on descriptive and demographic characteristics. No significant differences were found between the groups on descriptive and demographic characteristics of the children and parents; this suggests that the descriptives were similarly distributed between the groups.

#### Children's Pain

Children's pain was assessed in three ways: 1) children reported their pain from the injection using the Faces Pain Rating Scale, 2) the research assistant, blind to the hypotheses, utilized the FLACC Scale to rate the pain behaviors the children showed during the injection, and 3) the nurse, blind to the hypotheses, assessed the children's pain behaviors during the injection using the BOPS. An independent samples t-test examined differences between groups on each pain measure. There was no significant difference between the two groups for self-reported pain (Faces Pain Rating Scale),  $t(38) = .47, p = .64$ , pain behaviors (FLACC Scale),  $t(39) = .79, p = .44$ , and nurse-observed pain behaviors (BOPS),  $t(39) = .74, p = .46$  (See Table 2).

#### Children's Emotional Behavior

Children's emotional behavior was measured using the CEMS before and during the injection. An independent samples t-test was conducted and found no significant difference

Table 1  
*Demographic Information of Children and Parents*

Variable	Groups		<i>t</i>	<i>X</i> <sup>2</sup>	<i>p</i>
	Standard iPad	Child Life iPad			
Age	6.05 (2.63)	6.62 (2.84)	.67		.51
Gender				1.07	.30
Male	13	11			
Female	6	10			
Ethnicity				4.06	.26
Caucasian	7	10			
African American	8	10			
Hispanic	2	1			
Other	3	0			
SES				.49	.92
1 (Upper)	0	0			
2 (Middle Upper)	1	2			
3 (Middle)	4	3			
4 (Middle Lower)	3	3			
5 (Lower)	11	12			
Mother					
Age	34.20 (10.27)	31.70 (6.67)	.91		.37
Ethnicity				4.58	.21
Caucasian	9	10			
African American	7	10			
Hispanic	1	0			
Other	3	0			
Education Level				6.13	.29
Did not complete HS	1	0			
High School/GED	7	8			
Some College	8	9			
Bachelor's Degree	0	2			
Master's Degree	2	0			
PhD	1	0			
Father					
Age	35.70 (8.83)	32.47 (6.36)	1.20		.24
Ethnicity				1.61	.66
Caucasian	8	7			
African American	10	8			
Hispanic	1	0			
Other	1	0			
Education Level				3.05	.69
Did not complete HS	2	1			
High School/GED	8	7			
Some College	7	5			
Bachelor's Degree	0	1			
Master's Degree	1	0			
PhD	1	0			

between the standard iPad group and the child life iPad group on emotional behavior before the injection,  $t(37) = .37, p = .71$ . An independent samples t-test also found no significant difference between the groups on the children's observed emotional behavior during the injection,  $t(39) = .64, p = .53$  (See Table 2). These findings suggest that both groups did not display different emotional behaviors before and during the injection. A paired samples t-test was conducted to examine differences in emotional behavior between groups from before to during the injection and revealed an increase in negative emotional behaviors in both groups from before the injection to during the injection,  $t(38) = 6.27, p < .01$ . A paired samples t-test was conducted within groups on emotional behaviors and showed an increase in negative emotional behaviors from before to during the injection for the standard iPad group,  $t(19) = 4.62, p < .01$ , and the child life iPad group,  $t(18) = 4.33, p < .01$ .

Table 2  
*Summary of Measures of Pain and Emotional Behaviors*

Measures	Standard iPad	Child Life iPad	<i>t</i>	<i>p</i>
CEMS Pre Total	7.40(3.25)	7.84(4.10)	.37	.71
FLACC Total	3.10(2.92)	3.90(3.59)	.79	.44
CEMS During Total	11.65(5.35)	12.81(6.16)	.64	.53
Faces Score	4.90(4.08)	5.50(3.99)	.47	.64
BOPS Total	1.80(1.91)	2.29(2.26)	.74	.46

## Gender Differences

As an exploratory measure, gender differences were examined. Independent samples t-tests were conducted for gender differences on pain and emotional behaviors. There was a significant difference in scores between males and females' self-reported pain (Faces Pain Rating Scale),  $t(37) = 2.73, p = .01$ , emotional behaviors (CEMS) shown during the injection,  $t(38) = 2.69, p = .01$ , and observed pain behaviors (FLACC Scale) during the injection,  $t(38) = 2.14, p < .05$ . On these three assessments, females scored higher than males (See Figure 1).

For each group, an independent samples t-test was done between genders on the pain and emotional behavior assessments. A significant difference was found in the child life iPad group between males and females' self-reported pain (Faces Pain Rating Scale),  $t(18) = 3.03, p < .01$ . A significant difference was also found in the child life iPad group between males and females' observed emotional behavior (CEMS) during the injection,  $t(19) = 2.35, p < .05$ . Within the child life iPad group, females scored higher than males on self-reported pain and observed emotional behavior during the injection. No significant differences were found in the standard iPad group between genders.

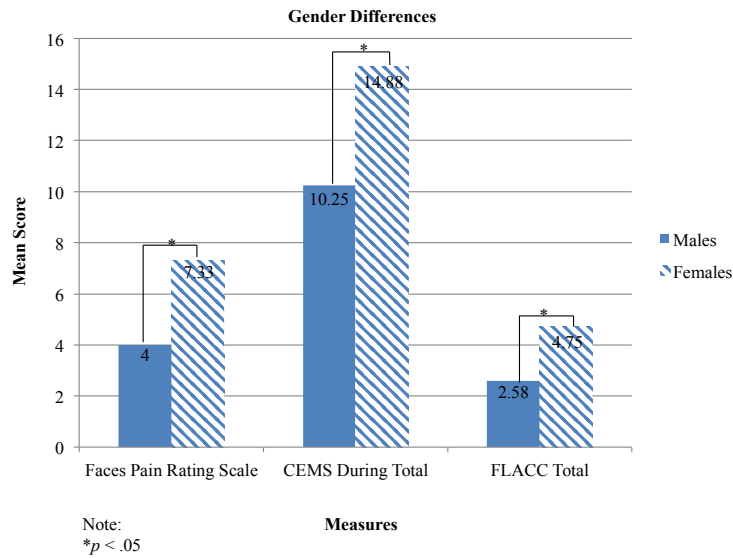


Figure 1. Gender Differences in Pain and Emotional Behavior During the Injection.

#### Age Differences

As another exploratory measure, age group differences were examined. An independent samples t-test was completed to examine differences between age groups on the pain and emotional behavior assessments. The two age groups consisted of children 4- to 7-years-old and children 8- to 11-years-old, as this is how the children were grouped in the study's procedures. There was a significant difference between children from 4 to 7 years of age and 8 to 11 years of age in self-reported pain (Faces Pain Rating Scale),  $t(38) = 2.31, p < .05$ , emotional behaviors (CEMS) shown during the injection,  $t(39) = 2.09, p < .05$ , and pain behaviors (FLACC Scale) during the injection,  $t(39) = 2.22, p < .05$ . Children from 4 to 7 years of age scored higher on



self-reported pain and observed emotional and pain behavior during the injection compared to children 8 to 11 years of age (See Figure 2).

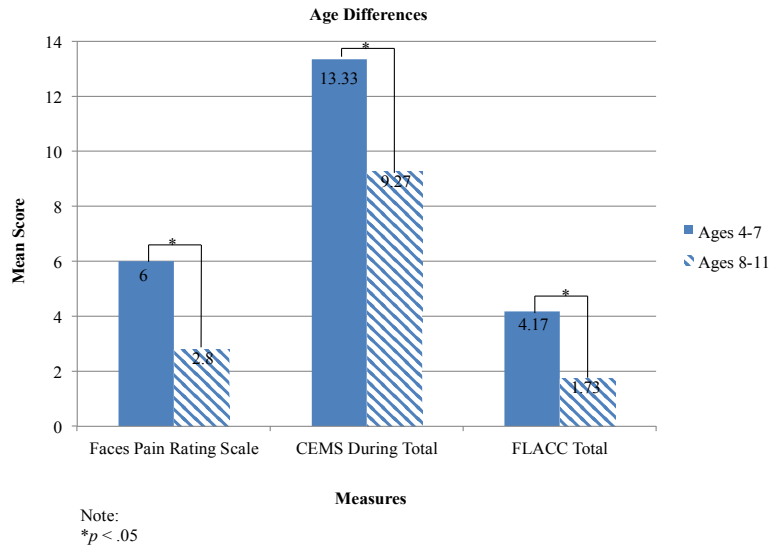


Figure 2. Age Differences in Pain and Emotional Behavior During the Injection.

For each group, an independent samples t-test examined differences between ages on the pain and emotional measures and found a significant difference within the child life iPad group. There was a significant difference between children from 4 to 7 years of age and 8 to 11 years of age in the child life iPad group for self-reported pain (Faces Pain Rating Scale),  $t(18) = 2.67, p < .05$ , emotional behaviors (CEMS) shown during the injection,  $t(19) = 3.41, p < .01$ , and the nurse-observed pain behaviors (BOPS),  $t(19) = 2.54, p < .05$ . Children from 4 to 7 years of age scored higher on self-reported pain and observed emotional and pain behavior during the injection compared to children 8 to 11 years of age in the child life iPad group. No significant differences were found in the standard iPad group between ages.

### Relationship Between Variables

Correlation analysis was performed to determine the relationship between assessments (See Table 3). For example, correlations examined the relationships between pain measures to examine reliability. In addition, correlation analysis examined if inter-rater reliability was consistent between the research assistant and nurse's observational methods for assessing pain during the injection. A significant relationship was shown between these variables of pain, suggesting reliability.

Table 3  
*Correlations Between Variables*

Variables	1	2	3	4	5
1. CEMS Pre Total		.49**	.55**	.07	.42**
2. FLACC Total			.93**	.45**	.71**
3. CEMS During Total				.44**	.72**
4. Faces Score					.26
5. BOPS Total					

*Note.* \*\* indicates a significant level  $p \leq .01$ .

## CHAPTER 4

### DISCUSSION

The purpose of this study was to examine iPad distraction provided by a child life specialist compared to iPad distraction without a child life specialist on children's coping during an injection. This study assessed whether the psychosocial support provided by a child life specialist during iPad distraction made a positive difference on children's coping with a common, yet sometimes threatening needle procedure. Distraction is a type of intervention regularly used by child life specialists, who are trained health care professionals, to help children redirect their attention from procedure related pain and distress to something more positive. The iPad is being used frequently within child life practice as a popular method of distraction because of its versatility and multiple distraction activities (e.g., games, activities, music, movies, and books) for children of all ages.

Overall, the findings did not support the study's hypotheses. Children's pain and negative emotional behaviors did not differ between the standard iPad group and the child life iPad group. The literature on the benefits of distraction during injections has mixed findings. Some studies show benefits (Chambers et al., 2009; Windich-Biermeir et al., 2007) while others do not (Cassidy et al., 2002; MacLaren & Cohen, 2005). Cassidy et al. (2002) examined audiovisual distraction in 5-year-old preschool children. Compared to a control group, the children who watched a cartoon on a television screen during their immunization did not differ on self-reported pain and two objective pain measures (i.e., Faces Pain Scale, Child Facial Coding System, and Children's Hospital of Eastern Ontario Pain Scale) or distraction measures

(i.e., time spent watching the TV screen). The study concluded that watching cartoons did not distract children or decrease their pain during the immunization.

It is important to note that the current study looked at an interactive distraction technique while Cassidy et al. (2002) examined a passive distraction technique. However, MacLaren and Cohen (2005) examined the benefits of interactive distraction in minimizing distress in young children during a needle procedure. Children played with a toy distractor or received standard care during the procedure. No differences were found between the toy distractor and the control. Although this study did not examine distraction during injections, it further suggests mixed conclusions when examining the benefits of distraction during short needle procedures.

These findings seem to contradict previous research indicating that distraction reduces pain and distress in children undergoing an injection. However, the methods of distraction utilized within these studies involved various breathing exercises as distractors (e.g., bubble blowing and party blowers) (Bowen & Dammeyer, 1999; Chambers et al., 2009; French et al., 1994; Sparks, 2001). It could be that a breathing technique is more effective than the iPad in reducing children's pain and distress behaviors during a quick needle procedure like an injection because breathing promotes relaxation by allowing muscles to decrease in tension (Sparks, 2001). Future studies may want to compare the iPad to a control or a breathing technique to examine which method is most effective for children's coping during an injection when provided by a child life specialist.

Since our study did not find significant evidence in supporting child life iPad distraction, one suggestion for future research is to examine iPad distraction with a second intervention (e.g., developmentally appropriate preparation). According to Uman, Chambers, McGrath, and Kisley (2007), combining an intervention with distraction is found to be more successful than a single

intervention alone. Gursky et al. (2010) examined the child life interventions of preparation and distraction and found both interventions combined to reduce observed distress in children from ages 3 to 13 years undergoing a laceration repair compared to a control group. Future studies should assess whether child life iPad distraction combined with preparation is effective in reducing pain and emotional behaviors in children undergoing a procedure.

Based on our findings, overall gender differences were found for the children's emotional behaviors during the injection and pain. The findings indicated that females scored higher on these assessments, which represents more pain and distress experienced in females compared to males. Carr, Lemanek, and Armstrong (1998) support this finding through which they examined children aged 3 to 12 years and investigated gender differences among children's self-reported pain using a faces scale. The children were instructed to indicate which face showed how they felt during their allergy skin testing. It was found that girls reported more pain than boys. Katz, Kellerman, and Siegel (1980) also found that females showed more observed distress behaviors than males. The study assessed children undergoing bone marrow aspirations using a procedure behavioral rating scale. The findings revealed that females were rated as being more anxious and more likely to cry, cling, and request emotional support than males. These studies suggest that girls are more likely to show outward pain and emotional behaviors, as well as have higher self-reported pain, compared to boys (Carr, Lemanek, & Armstrong, 1998; Katz, Kellerman, & Siegel, 1980).

Often it is assumed within our society that male gender norms consist of showing less pain and distress due to the ability to be tough or masculine, whereas females are more prone to being sensitive or delicate to pain and stressful situations (Myers, Riley, & Robinson, 2003). Due to existing differences between males and females, future research should focus on which

type of coping style is best suitable for certain genders and if boys tend to suppress their pain experience due to social norms. Also, future studies could focus on which type of distraction intervention provided by a child life specialist is best suitable for boys and girls.

Another finding of this study revealed that the younger children (4- to 7-year-olds) showed more observed pain and emotional behavior during the injection and had higher self-reported pain compared to older children (8- to 11-year-olds). This finding may suggest that older children are more capable of coping with an injection at their doctor's visit than younger children due to developmental differences. Hyson, Snyder, and Andujar (1982) found as children become older there is a decline in their negative emotions displayed during a routine check-up visit. It was also found that the context of negative emotional behavior changes with age. For example, older children may anticipate their doctor's visit with fear or anxiety, but younger children show more emotional behavior during the actual examination. Compared to younger children, older children are cognitively able to return to baseline following a check-up due to their ability to realize the worst part of the examination is over, which may translate to an injection or other medical procedure. The study concluded that children's stress reactions and coping skills vary based on differences related to cognitive, social, and emotional development.

In support of this finding, Hodgins and Lander (1997) reviewed that older children tend to have better coping skills due to more self-control and fewer overt behaviors when dealing with a stressful situation. However, it is important to keep in mind that younger children are expected to show reactions to painful and threatening stimuli and their behavior should not be labeled as primarily negative, but rather an attempt to cope with a threatening medical situation (Ainsworth, 1973; Bowlby, 1969). Also, how children's coping is assessed is an important factor. Kaddoura Cormier, and Leduc (2013) determined that child life specialists and nurses perceived a child's

crying during a procedure differently. Child life specialists viewed a child's crying as a method of coping while nurses perceived a child's crying as not coping well and as a sign of stress. The current study utilized nurses and research assistants to score the children's pain and emotional behavior using appropriate measures with consistency found across raters. Future studies may want to develop and include a formal type of measure that can be utilized by health care professionals to form a better understanding of how child life specialists assess coping and help children manage pain and distress during an injection or similar procedure. In addition, the current study utilized observational methods that assessed negative behavior compared to evaluating children's coping skills. This may not have been the most effective method of measurement and instead, should have focused on the children's attempt to actively or passively cope with the stressful situation (Seligman, 1975; Wortman & Brehm, 1975).

#### Limitations

One limitation of this study was the selection of the iPad activities by the researcher without taking into account each individual child's interest. When designing this study, the researcher wanted to control for consistency between the groups by having each 4- to 7-year-old engage in "Talking Tom" and each 8- to 11-year-old play "Cut the Rope". Although these iPad apps are appropriate and gender neutral, the child was not able to contribute to the decision of what he or she wanted as his or her distraction activity. In typical child life practice, child life specialists offer children choices in designing their coping plan. Also, child life specialists take into consideration each child's temperament and level of interest when providing distraction; for example, a 4-year-old female who is rather shy may not benefit the most from the app "Talking Tom", as it requires one to speak and interact vocally with "Tom." Future studies are needed to examine child life interventions that are individualized to each child; for example having a child



select their own iPad game or activity compared to the child life specialist or an adult selecting the activity. A future study might include random assignment of participants into one of three groups: 1) intervention group which involves a child to select an iPad activity, 2) intervention group which involves the child life specialist or adult to select an iPad activity for the child, and 3) control group. This type of study would allow researchers to examine the benefits of children having control or a choice in their distraction activity and whether or not it increases the effectiveness of distraction and coping.

A second limitation was the lack of controlling for multiple injections and nasal flu mist instead on undergoing only one injection. This study did not control for this specifically and receiving multiple injections or the nasal flu mist may have contributed to the children's increased level of pain and emotional behaviors. A third limitation within this study was the possibility of sibling influence. Siblings could be present in the patient room and their behaviors could have influenced participants' response. For example, the child life specialist noticed how some siblings, primarily older siblings, would say things that would inhibit a child to be fearful of their upcoming injection.

A final limitation of this study is the generalization to other pediatric units and procedures, as well as different aspects of the iPad. Due to this study being conducted in a pediatric clinic and with children only receiving an injection, it may be difficult to generalize to other pediatric health care settings and procedures (e.g., IV insertion in an Emergency Department). Also, the selection of iPad activities may not generalize to other iPad apps. For example, future studies may want to examine other iPad activities (e.g. breathing activity app) while children undergo a procedure.

## Conclusions

Overall, this study found that child life iPad distraction did not benefit those who received psychosocial support during their injection more than those who did not receive the component of child life. Gender and age differences were noted on children's pain and emotions during the injection with males and older children showing less pain and emotional behavior compared to females and younger children. Future studies that examine the use of the iPad should consider these findings and the study's limitations to better distinguish the iPad's role in pediatric procedures.

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APPENDIX A.

IRB Approval



Office for Research  
Institutional Review Board for the  
Protection of Human Subjects

July 30, 2014

THE UNIVERSITY OF  
**ALABAMA**  
R E S E A R C H

Sherwood Burns-Nader, Ph.D.  
Assistant Professor  
Department of Human Development & Family Studies  
College of Human Environmental Sciences  
The University of Alabama  
Box 870160

Re: IRB # 13-OR-186-ME-R1 (Revision) "Examining Distraction Using a  
Computer Tablet in Children Receiving an Injection"

Dear Dr. Burns-Nader:

The University of Alabama Institutional Review Board has reviewed the  
revision to your previously approved expedited protocol. The board has  
approved the change in your protocol.

Please remember that your approval period expires one year from the date of  
your original approval, March 21, 2014, not the date of this revision  
approval.

Should you need to submit any further correspondence regarding this  
proposal, please include the assigned IRB application number. Changes in  
this study cannot be initiated without IRB approval, except when necessary  
to eliminate apparent immediate hazards to participants.

Good luck with your research.

Sincerely,

Carpinito T. Myles, MSM, CIM, CIP  
Director & Research Compliance Officer  
Office for Research Compliance  
The University of Alabama



358 Rose Administration Building  
Box 870127  
Tuscaloosa, Alabama 35487-0127  
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13-OR-186-AE-R1

UNIVERSITY OF ALABAMA INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS  
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. Identifying information

	Principal Investigator	Second Investigator	Third Investigator
Name:	Sherwood Burns-Nader	Stephanie Atencio	
Department:	HDFS	HDFS	
College:	HES	HES	
University:	UA	UA	
Address:	Box 870160	Box 870160	
Telephone:	348-6269	256-335-2383	
FAX:	348-8153	205-348-8153	
E-mail:	sburns@ches.ua.edu	smatencio@crimson.ua.edu	

Title of Research Project: Examining Distraction using a Computer Tablet in Children Receiving an Injection

Date Printed: 7/3/2014 Funding Source:

Type of Proposal:  New  Revision  Renewal  Completed  Exempt

Attach a renewal application

Attach a continuing review of studies form

Please enter the original IRB # at the top of the page

UA faculty or staff member signature: \_\_\_\_\_

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):

Type of Review:  Full board  Expedited

IRB Action:

Rejected Date: \_\_\_\_\_

Tabled Pending Revisions Date: \_\_\_\_\_

Approved Pending Revisions Date: \_\_\_\_\_

Approved—this proposal complies with University and federal regulations for the protection of human subjects

Approval is effective until the following date: 3-20-15 *gc*

Items approved:

<input type="checkbox"/>	Research protocol:	dated
<input type="checkbox"/>	Informed consent:	dated
<input type="checkbox"/>	Recruitment materials:	dated
<input type="checkbox"/>	Other:	dated

Approval signature \_\_\_\_\_ Date 7/30/2014