EFFECTS OF GENDER CONSISTENCY ON STIMULUS RECOGNITION

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by

Lana Christel Preszler

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EFFECTS OF GENDER CONSISTENCY ON STIMULUS RECOGNITION

A Thesis

by

Lana Christel Preszler

Approved by:

________________________, Committee Chair
Dr. Kristen Weede Alexander

________________________, Second Reader
Dr. Juliana Raskauskas

________________________
Date

iii
Student:  Lana Christel Preszler

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__________________________,    ___________________
Susan Heredia, Department Chair        Date

Department of Graduate and Professional Studies in Education
Abstract

of

EFFECTS OF GENDER CONSISTENCY ON STIMULUS RECOGNITION

by

Lana Christel Preszler

The purpose of the current study is to expand knowledge about memory development by considering the gender consistency between a child and a stimulus. Gender schemas begin operating in children as young as two years-old, but their effects on children’s memory have not been adequately studied. The current study looked at gender consistency’s effect on the memory of three to six year-olds by measuring their recognition for photos of male or female persons presented with short vignettes. Children’s age, attachment security and emotional content of the stimulus were also examined. Results showed an effect of gender consistency on recognition for girls: Girls better remembered stimuli picturing females. Boys recognized male and female stimuli equally well. Consistent with previous literature, older children recognized more stimuli than younger children. Results suggest that gender consistency can affect what children remember, and indicate that continued study of the gender schema may be fruitful.

_______________________, Committee Chair
Dr. Kristen Weede Alexander

_______________________
Date
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Chapter 1

INTRODUCTION

Purpose of the Study

The purpose of the current study was to expand knowledge about memory development by considering the relationship between the characteristics of a stimulus and the child viewing it. Specifically, it is unclear whether children will recognize stimuli more accurately if the person depicted in the stimulus is the same gender (hereafter referred to as “gender consistent”) as the child viewing it.

Though some studies have shown no gender consistency effect in adults when recalling word lists, others have found gender effects when adults view and try to recognize sex-stereotyped pictures (Cherney, 2005; Kreiner, Price, Gross, & Appleby, 2004). The literature to date has not addressed this question with children, who may demonstrate different effects. Children may show a more exaggerated effect because they are still developing cognitively and have been shown to react differently than adults and use different mental mechanisms in memory tasks (Rhodes, Murphy, & Hancock, 2011). Conversely, children are still developing their gender schemas, so they might have a less exaggerated effect than adults (Ruble, Taylor, Cyphers, Greulich, Lurye, & Shrout, 2007).

Even amongst adults, there are age differences as to how individuals respond to memory queries (Huff, Meade, & Hutchinson, 2011; Ros & Latorre, 2010). Older adults,
for example, tend to guess more in forced recall tests than younger adults (Huff et al.). Comparing children to adults, studies show adults remember more detail and items in a set, and children sometimes remember different things than adults (Cherney, 2005; Pozzulo, Dempsey, Crescini, & Lemieux, 2009; Rhodes et al., 2011). When considering just children, older children are better able to pick an individual from a lineup than younger children (Karageorge & Zajac, 2010). Using pictures instead of the more common word lists might also help children encode more robust memories, thus increasing the probability of recall (Foos & Goolkasian, 2005). Moreover, using pictures will permit a test of preschool children who cannot participate in traditional word list tasks.

In order to examine this relationship between characteristics of stimuli and their similarity to children viewing them, the researcher used previously collected data on children’s recognition of photographic stimuli. This information was used to test the hypothesis that children are more likely to recognize stimuli when the gender of the child is consistent with that of the stimulus.

**Statement of the Problem**

A growing body of research on children’s memory has focused on memory of emotional events (Alexander, Goodman, Schaaf, Edelstein, Quas, & Shaver, 2002; Barnier, Hung, & Conway, 2004), word lists (Block, Greenberg, & Goodman, 2009), and characteristics or content of photographic stimuli (e.g., Alexander, O’Hara, Bortfeld,
Anderson, Newton, & Kraft, 2010; Cherney, 2005). These studies highlight the content of the to-be-remembered information; of equal importance are characteristics of the individual that may affect children’s interpretation and processing of that information (Alexander & O’Hara, 2009).

An individual factor that affects the way in which a person views the world is the gender schema (Bauer, 1993; Fagot & Leinbach, 1989; Kirsch & Cassidy, 1997; Melinder, Baugerud, Ovenstad & Goodman, 2013; Welch-Ross & Schmidt, 1996). Bem (1981) explained that gender schemas contain information related to the ways each gender is expected to act and behave. This can foster the creation of sex-types or expectations placed on individuals based on gender that are a result of enculturation instead of biological sex differences. Sex-Types, by extension, create individuals who exhibit sex-typed behaviors. Reinforcement of sex-typed behavior leads to individuals adopting sex-types as part of their sense of self, or self-schema (Bem). The self-schema described by Bem is similar to a portion of Attachment theory as proposed by Bowlby (1969).

Attachment theory is a framework that explains children’s emotional and cognitive development through the continued interaction with one or more caregivers (Bowlby, 1969). Attachment theory was initially developed to explain the difficulties in personality development faced by children who had been separated from their mother (Ainsworth & Bowlby, 1991). In this theory, Bowlby discussed two types of internal working models or IWMs. One of these, the organismic IWM, is very similar to the self-schema. The organismic IWM consists of goals, ideas, and behaviors that make up an
individual’s identity and belief (Bowlby; Griffith, 2004). IWMs have been shown to be linked with security of attachment, with more secure attachment styles predicting more positive IWM development (Hinnen, Sanderman & Sprangers, 2009; Steele, Steele & Croft, 2008). Therefore, examining attachment security could indirectly shed light on the self-schema.

Gender, as a construct and part of a child’s identity, has been shown to affect children’s everyday lives and experiences through their and other’s understanding of behaviors and interactions (Leman & Tenenbaum, 2011). It is not unfathomable that these different experiences could alter the ways that children view the world, themselves, and other people.

If someone is the same gender as a child (gender consistent), does that change the way that the child relates to that person? Previous research looking at gender differences in recall between participants and stimuli has given mixed results (Kreiner et al., 2004; Penningroth, 2005; Ryan, Kreiner, & Tree, 2008; Yarmy, 1993). Could gender consistency with the stimulus lead to better performance on recognition tasks as compared to cases that are gender inconsistent? Although contributions of individual differences such as age on recall and recognition have been well studied (Cherney, 2005; Huff et al., 2011; Ros & Latorre, 2010), little is known about the effects of gender consistency between the participant and stimuli on recognition performance.

On this specific question, there is no previous research on gender consistency between children participants and stimuli, though there are some relevant adult studies to draw from. One study looked at how adults’ recall was affected by a word list being read
in a voice consistent with the participant’s gender versus a gender-inconsistent voice (Kreiner et al., 2004). Researchers found that there was no significant difference in recall when the gender of the voice was changed. Knowing that, however, does not necessarily imply that children will behave the same way, nor does it mean that recognition of a face would also have insignificant results. Development of children’s episodic and working memory continues through adolescence (Rhodes et al., 2011). This would certainly affect what children are likely to remember. Furthermore, children have been shown to recall fewer items in a set than adults (Cherney, 2005). In that study, the adults used auditory information as opposed to the visual stimuli that were presented in the current study. Since the visual and auditory systems work differently, the results may differ.

Significance of the Study

Expanding our knowledge of what contributes to children remembering a stimulus can better inform the work of professionals dealing with child witnesses. Prior research has focused primarily on memory of events and words, not individual differences.

One salient and easily recognizable characteristic of most individuals is their visible gender. In a study by Van Boven and Robinson (2012) female college undergraduates were asked to watch a sad film and then complete unemotional tasks for twenty minutes. Half of the participants were then asked to list ways in which they differed from the average Canadian or the average member of the opposite sex, with the second condition meant to prime gender stereotypes. The other half of participants were
asked to memorize a string of letters while answering questions about their feelings during the film clip. Those who had been primed to think about gender stereotypes were more likely to remember feeling more intense emotions during their viewing of the film. This exemplifies one of the ways that sex-types can affect what individuals think of themselves.

In a judicial setting, children are sometimes called to serve as witnesses when they have experienced or viewed a crime. It is hotly debated within the scientific community whether or not children can serve that role adequately (Harvard, Memon, Clifford, & Gabbert, 2010; Nunez, Kehn, & Wright, 2011; Pozzulo et al., 2009). A large part of this debate centers on children’s ability to remember situations and people accurately. Nunez, Khen, and Wright aimed to see how jurors were likely to perceive children eyewitnesses based on context. Specifically, they examined the credibility of child witness in child sexual assault (CSA) cases. They found that girls were seen as more trustworthy than boys and children in the CSA condition were rated as more trustworthy and more cognitively able than children in the control. This study shows that it is relatively easy to change how we look at children and their credibility based on outside factors that are not relevant to their real-world cognitive abilities and biases. By delving further into what children do accurately remember, this paper adds to that discussion.

From an academic standpoint, it is important to gather the most information possible about children and their abilities and development. Being able to show one relationship can bring others to light. By examining the relationship between children and
gender-consistent stimuli, academia will have more to build on in its search for knowledge.

Limitations

The sample size of this study was not large enough to widely generalize the results. Because the participants were recruited from a college town and no stipend was offered, the sample size of this study was small and did not include much ethnic or socioeconomic diversity among the families. Only those that could afford to offer their time for free were able to be involved. Further, some possible participants may have elected not to participate because researchers went to children’s homes. Those unfamiliar with research may have been skeptical about permitting researchers into their residence. However, entering the home may also have afforded children a comfortable and natural environment not afforded in laboratory studies. Even so, the materials in this study consisted of photographs presented on a computer screen. This does not mirror most “real-life” situations. There was also no data collected on the gender self-identification of the children. However, given that these children were very young, it is likely that they would identify with their biological gender.

Attachment for this study was measured using a parent-report measure, which may not be as accurate as projective measures traditionally used to assess attachment. Parents rated their children on numerous behaviors; however, their perspective may have been biased by their own attachment style as well as their perception of the child as a
whole. The consistency of parent self-reports have also been shown to change as children age, with parents reporting most similarly to their older children (Cremeens, Eiser, & Blades, 2006). A projective measure would have indirectly measured children’s state of mind, and might have avoided the bias of the parents’ attachment as well as any inconsistencies due to age range. Because these kinds of measures are so different, it is possible that using a projective measure might have resulted in children being catalogued differently.

The largest limitation of this study was that it was based on secondary data analysis. This means that there was not a way to change or customize anything about the data that was previously collected. The data analyzed here were designed with a specific purpose in mind by the original researcher. Though it was possible to use this data to look at the question at hand, it is possible that a clearer or more detailed answer to the questions in this study could have been reached by developing a study from scratch. Should this study be recreated with a new data set developed specifically for this question, stimuli more balanced in terms of age, and race could be used, as well as more stimuli overall. This would help give the study more power.

**Definitions of Terms**

*Attachment Theory*

Attachment theory proposes that the relationship between a child and his or her primary caregiver, usually the mother, creates an emotional bond. This bond in turn
facilitates the creation of cognitive structures known as internal working models, as proposed by Bowlby (1969).

*Internal Working Models*

Internal working models, also known as IWMs, are the cognitive structures proposed in Attachment theory that form an individual’s knowledge about the world. These guide an individual’s thinking and ideas about reality, ultimately governing expectations about relations with others and the world.

*Organismic Model*

The organismic model contains information about the individual. This information may concern attitudes, beliefs, and biases about oneself. As these attitudes, beliefs, and biases are shaped by the early bond with a caregiver, they may or may not be accurate (Bowlby, 1969).

*Gender*

Gender typically refers to biological sex, or one’s classification as male or female. In other cases, it can also refer to social roles or one’s perceived gender identity (World Health Organization, 2013). For this paper, gender will denote the biological sex of an individual, including participants and stimuli focal persons.
Gender Consistency

Gender consistency refers to whether the child participant is the same gender as the main character pictured in the stimulus slide. If the two are matched, they are referred to as gender consistent. If not, they are gender inconsistent.

Gender Schema

The gender schema is a group of ideas, beliefs, and actions held by an individual that are related to the ways each gender is expected to act and behave. A highly differentiated gender schema can foster the creation of sex-types (Bem, 1981).

Sex-Types

Sex-types are expectations placed on individuals based on gender that are a result of enculturation as opposed to biological sex differences (Bem, 1981).

Organization of the Thesis

The next chapter is a review of the relevant literature, focusing on attachment theory, gender, and memory. This will formulate the support for the interaction between those concepts. Following that is chapter three, which describes the methods used in this study. Chapter four will contain the results, which are discussed in chapter five along with future directions for children’s memory research.
Chapter 2

BACKGROUND OF THE STUDY

This research seeks to explain the relationship among gender, attachment, emotion, and memory. To do this, gender schema theory and its implications for these four topics will be discussed in this chapter, as well as relevant theories specific to those variables. By applying a formal theory of gender to cognitive development, this paper will help illuminate how gender consistency can predict memory for stimuli.

Theoretical Approach

Gender Schema Theory

Humans have long differentiated the social roles of men and women, assigning each with stereotypes (Bem, 1981; Cherney & Ryalls, 1999; Fultcher & Coyle, 2011; Leman & Tenenbaum, 2011; Martin & Ruble, 2004; Yan, Wang, & Zhang, 2012). Though these stereotypes vary across cultures and in strength, they have been shown to affect the day-to-day lives of individuals in numerous ways (Fultcher & Coyle; Majzub, 2012; Ruble et al., 2007; Yan, Wang, & Zhang).

Stereotypes of men and women exist in society due, in part, to sex-typing (Bem, 1981; Cherney & Ryalls, 1999). Sex-typing occurs when a society or culture places expectations on individuals that are based on gender rather than biological sex differences.
An example of sex-typing can be seen in a study by Fultcher and Coyle (2011). For that study, children, adolescents, and university students were asked questions about their family and their future expectations for familial and professional lives. These included questions about parents’ work, importance of future work and family, importance of the male-breadwinner ideal, and what plans, if any, they had for a future family.

Results in this study indicated that, from childhood through emerging adulthood, men and boys typically saw themselves as becoming breadwinners. Girls and women often anticipated staying home with children, especially children who would be too young for school. This was even true of girls and boys who grew up in households where the mother worked, and often held true even when girls and women anticipated working outside the home. Women and men, and girls and boys tended to align themselves along gender lines even when their families did not conform to them (Fulcher & Coyle, 2011). Even when faced with familial examples that contradict sex-typed behavior, individuals tended to align themselves with the goals and ideals that are societally assigned to their identified gender.

The expectations and plans described by the participants in the above study can be seen collectively as evidence for a schema, or collection of associations, categories, and frameworks that guides an individual’s understanding of the world (Bem, 1981). Schemas allow individuals opportunities to make sense of the world around them by taking new information and allowing it to be sorted into relevant categories that are familiar and easily understood. For example, a typical participant in the above study had
a schema of “mothers” that included staying home with young children and taking time out of careers to do so.

Bem (1981) described the gender schema as containing information related to the ways each gender is expected to act and behave. This can foster the creation of sex-types and by extension individuals who exhibit sex-typed behaviors. Fagot and Leinbach (1989) researched the ways that the gender schema and sex-typed behaviors develop in children from 18 months to 2 years. At 18 months, 27 months, and 4 years-old, children and their parents were observed interacting in their homes for evidence of sex-typed behaviors and parents’ reactions to sex-typed play. At each stage children were also given a gender-labeling task, which measured their knowledge of gender stereotypes. At 18 months, no child passed the gender-labeling task and all children engaged in sex-typed play at roughly the same rate. At 24 months, about half of the children could pass the gender-labeling task; these children were designated as early labelers. The other children were designated as late-labelers. Late labelers tended to have parents who gave few responses, either positive or negative, to sex-typed play at both 18 and 24 months. Early labeler parents tended to give more responses to sex-typed play. At four years, all children could pass the gender labeling task and parents of early labelers and late labelers equalized in their responses to sex-typed play. However, early labelers tended to engage in more sex-typed play than their late-labeler peers (Fagot & Leinbach). This points to the time between ages two and four as being an important period for the development of the gender schema, and parental response to play as predicting some of the variance in the course of that development.
The reinforcement of sex-typed behavior by parents of early-labelers and the association of this reinforcement with greater incidence of sex-typed play later in life may also support Bem’s (1981) argument that individuals adopt gender schema into their ideas of themselves (or self-schemas) due in part to the reinforcement of sex-typed behavior by others. This reinforcement process may result in the gender schema eventually becoming instrumental to the way an individual sees him or herself (Bem). For example, 6 year-olds are more likely to falsely remember a story character engaging in sex-stereotyped behavior (Welch-Ross & Schmidt, 1996). Also, both adults and children are more likely to remember toys whose stereotypes were gender-consistent (Cherney, 2005; Cherney & Ryalls, 2009).

The current study used the notion that gender becomes a part of the self-schema to test young (between 3 and 6 years-old) children’s recognition of gender-consistent photographs. If gender has indeed become a part of their self-schemas, children may have an easier time remembering photographs that depict individuals of the same gender. Furthermore, age may play a role: younger children may be still developing a solidified gender schema and therefore may not rely on gender schema information for recognition, whereas older children may have a more solid conception of a gender schema (Ruble et al., 2007) and therefore may have an easier time remembering gender-consistent photos.

The gender schema is a part of children’s identity (Bem, 1981; Fagot & Leinbach, 1989) that may play a role in children’s memory for an event. However, other factors within the child as well as factors related to the event itself may influence memory of a particular event. In addition to children’s gender schema, age, emotion, and attachment
may predict memory. Age has long been found to predict memory performance in childhood (Anderson, Jacoby, Thomas, & Balota, 2011; Cordon et al., 2013; Todd, Evans, Morris, Lewis, & Taylor, 2011; Welch-Ross & Schmidt, 1996). Moreover, although some inconsistencies exist, the intensity of emotion elicited by an event has clear implications for children’s memory (Alexander et al., 2010; Cordon et al., 2013). Further, although gender schema is active during the majority of interpersonal interactions as well as during many individual endeavors, other self-schemas may become activated during specific types of events. A self-schema particularly relevant for studying children’s memory for emotional events is attachment. Research supporting each of these factors will be discussed in the following sections.

**Memory**

Memory is a cognitive process that allows individuals to store and recall past events. There are both biological and mental mechanisms involved in this process. The mental process includes several steps: encoding (taking in the new information), storage, and finally retrieval (Barnier et al., 2004; Rhodes et al., 2011). Schemas are thought to be involved in the storage and retrieval of memories as individuals work to organize incoming information (Cherney, 2005; Miranda & Kihlstrom, 2005). By creating a sort of organization system for mnemonic information, schemas give individuals a ready place to put information when it comes in as well as a place to look when they need to pull it out (Demorest, Popovska, & Dabov, 2012; Fivush, 2006).
Memory can be retrieved, or accessed, in a variety of ways. One method is recall, which is memory that is generated by the remembering individual. Another method, the focus of this paper, is recognition, or correctly identifying information seen before (Cordon et al., 2013; Kirsh & Cassidy, 1997; Steele, Steele, & Croft, 2008). In the case of recognition, individuals do not need to generate information, but rather, upon presentation of a stimulus, complete a memory search to determine whether that stimulus has been previously experienced in the relevant context. Information about the biological nature of this search currently relies on case studies of brain injuries (Squire & Wixted, 2012). Behavioral studies on the recognition search show that many factors can predict what is or is not remembered by an individual, several of which will be discussed below.

The process of recognition can lead to an individual’s identifying a stimulus as having been seen before when it has not. This occurrence is known as a false alarm. Typically, studies of recognition must measure both false alarms and correct identifications of stimuli to ensure accurate assessment of recognition (Cordon et al., 2013). If these measures are not both accounted for, an individual who guesses “yes” or “no” on every stimulus would have a recognition score skewed either high or low. For example, if a study only measured correct recognition of a stimulus and a participant answered “yes” to every question, he or she would receive a high score when he or she was in fact doing quite poorly at the task. The current study used a measure sensitive to correct recognition and false alarms (dprime) so that this type of error could be avoided.

The biological basis of memory is primarily situated in the hippocampus (Femenia, Gomez-Galan, Linskog, & Magara, 2012). This is especially true of
recognition memory, which is seen as comprised of two processes, recollection and familiarity (Squire & Wixted, 2012). Recollection involves remembering specific elements of a previous experience. Familiarity is knowing that one has had experience with or prior knowledge of a stimulus without any other specific information about it. Recognition tasks utilize both of these processes, whereas recall only makes use of recollection. Both operations have been shown to take place in the hippocampus (Squire & Wixted). Recently, the nearby region of the amygdala has also been studied for its role in emotional memories (Cordon et al., 2013; Kensinger, Addis, Atapttu, 2011). Though these are the main places where memory resides, many other elements can and do affect how and what individuals remember.

**Gender**

One factor that has been shown to relate to memory is gender (Bauer, 1993; Bem, 1981; Cherney & Ryalls, 1999; Cherney, 2005; Fagot & Leinbach, 1989; Welch-Ross & Schmidt, 1996). Previous research looking at how gender differences between participants and stimuli influence recall and recognition has produced mixed results (Kreiner et al., 2004; Penningroth, 2005; Ryan, Kreiner, & Tree, 2008; Yarmy, 1993). In one study by Cherney, researchers examined the effects of gender schemas on both intentional and incidental memory. One hundred and eighty children and adults (age ranges 5-13 years and 18-41, respectively) were shown pictures of sex-stereotyped toys. Half of the participants were told that they would be asked to remember the pictures later (intentional condition) and half were just told to name the objects (incidental condition).
Participants were more likely to remember toys with a consistent gender stereotype when they were in the incidental memory condition, and those in the intentional condition were more likely to remember any stimuli, regardless of stereotype (Cherney). Though this study was not explicitly about gender consistency, the finding that both children and adults were more likely to remember toys with a gender-consistent stereotype in the incidental condition indicates that gender consistency with an individual in a stimulus could correspond to later recall. Other research by the same researchers explicitly looking at gender consistency in 3-6 year-olds found similar results. Children could better remember the location of toys in a room when the toys had gender-consistent stereotypes (Cherney & Ryalls).

Another study looked at how adults’ recall was affected by a word list being read in a voice consistent with the participant’s gender versus a gender-inconsistent voice (Kreiner et al., 2004). Researchers in this study presented undergraduate students with a list of 15 theme-related words read by either a male or female voice. Each list had a corresponding target word that fit the theme of the list but was not presented. It was hypothesized that listeners would falsely recall the target word more often when the speaker was the same gender as themselves. This was refuted by the findings—there was no effect of speaker gender on the recall of the target words (Kreiner et al.). However, this study did not measure overall memory or recognition, just false recall. It was not reported whether more list items overall were recalled correctly in the gender consistent condition. Also, the participants in this study were adult university students ranging from
18 to 46. Whether young children with developing mnemonic systems and gender schemas would exhibit similar results is unclear.

The gender schema has also been tested using recognition tasks (Bauer, 1993; Bem, 1981; Welch-Ross & Schmidt, 1996). If a schema is a category of information used for processing, then if the category is cued up by one piece of information, other information within the category should be easier to access. For example, Welch-Ross and Schmidt tested 4, 6, and 8 year-olds’ recognition for stories about individuals who followed either gender-consistent or gender-inconsistent roles. Researchers read children stories about a boy and a girl who had been introduced as having gender-consistent or gender inconsistent preferences and behaviors. Each story included each character exhibiting behaviors that were gender consistent, inconsistent, and neutral. After working on a puzzle for three minutes, children were asked recognition questions about the introduction, followed by a series of questions about the story, including some “distractor” questions about events that had not taken place in the story. Analyses of false alarms (responding that a distracter was a part of the story instead of correctly dismissing it) showed that 6 years-olds were more likely to falsely recognize gender-consistent events than either 4 year-olds or 8 year-olds. Four year-olds were more likely to falsely recognize any event, and 8 year-olds were better at recognition memory overall than their younger counterparts (Welch-Ross & Schmidt).

Overall, the above studies point to the likelihood that gender consistency is a predictor of memory (Cherney & Ryalls, 1999; Cherney, 2005; Cordon et al., 2013). The present study was designed to take this one step further and test the gender schema theory
using pictures combined with vignettes. These picture/vignette pairs depicted either males or females and the hypothesis tested was whether recognition of the pairs would possibly be gender-consistent.

**Age**

Age has been shown to affect children and adults’ ability to recognize information they have viewed before. Adults are better than children and adolescents at recognizing previously viewed stimuli, though there are some conditions in which children can preform almost as well (Rhodes et al., 2011). Typically, though, individuals become better at remembering information as they transition from child to adult.

An example is the study by Welch-Ross and Schmidt (1996) above. Their study found that 6 year-old children were more likely to remember gender-consistent information than 4 and 8 year-old children. However, it is possible that their task was best suited to that age group (Bauer, 1993; Cherney, 2005; Fagot & Leinbach, 1989). The current study used a slightly different presentation method that included pictures and shorter vignettes. These may better suit younger age groups, and have been shown to produce more robust memories in young adults than either pictures or spoken words alone in tests of memory (Foos & Goolkasian, 2005).

Another example can be seen in a study by Karageorge and Zajac (2010), where researchers found that older children were better able to accurately pick an individual from a lineup than younger children. Typically, children have trouble making a correct identification when a lineup does not include the target individual. This study tested
children 5-7 years-old and 8-11 years-old with photo lineups that included the target individual, the target individual and a “wildcard”, a “wildcard” without the target individual, and no “wildcard” or target individual. “Wildcards” were cards that depicted a silhouette superimposed with a question mark that denoted that the target individual was not present. The presence of these cards positively impacted children’s ability to correctly identify a lineup as not including the target individual, and did not change their ability to correctly identify the target individual when present. Overall, older children performed better on all tasks than younger children, showing the advantage that age brings in terms of recognition ability (Karageorge & Zajac).

Even among adults, age changes how individuals respond to free recall questions, with younger adults guessing less often than older adults (Huff et al., 2011). Comparing children to adults, studies show adults remembering more detail and items in a set, and children sometimes remember different things than adults (Cherney, 2005; Cordon et al., 2013; Pozzulo et al., 2009; Rhodes et al., 2011). There may be developmental steps that affect what children are likely to remember because children’s ability to hold relevant information in their short term memory continues to change through adolescence (Rhodes et al.).

**Emotion**

Emotionality of the stimulus has been shown to predict its probability of being remembered (Alexander et al., 2010; Cordon et al., 2013; Kensinger et al., 2011; Leclerc & Kensinger, 2011; Siddiqui & Unsworth, 2011). In a study by Cordon et al., children
and adults were shown images that had been previously rated as either neutral or emotionally unpleasant (e.g., sad, angry). The images also displayed a range in terms of emotional valence, with some being more intensely emotional than others (i.e. some caused viewers to have a more intense reaction). Children and adults did not know that they would be tested on their memory of the images, but instead believed that they were rating the pictures based on pleasantness. One week later, all individuals were asked to return and were shown a recognition set of photos. This included both the photos seen previously as well as new photos. Participants were asked to state if each photo was old or new and to give a confidence level on their judgments. Researchers found that unpleasant images were more likely than neutral images to be recognized across ages, and adults were generally better at recognizing neutral images than children. Emotional valence was found to predict recognition, with higher valences more likely to be remembered (i.e., an angry stimulus was better remembered than a neutral stimulus, and a stimulus depicting lividness was better remembered than one of frustration). However, there were not age differences in this finding.

The Cordon et al. (2013) study exemplifies how, across ages, emotional items are generally more easily recognized. The current study, which made use of vignettes in the stimulus and included positive stimuli along with negative, may expand upon the findings in Cordon et al. As there were both neutral and emotional (both positive and negative) stimuli presented in the current study, it is possible that the more emotional stimuli will prove more likely to be remembered. Since research has already shown that negative
stimuli are more likely to be remembered, so it may follow that adding another type of emotion would increase the probability of recognition further.

**Attachment**

Another possible element affecting children’s memory is their attachment security, an aspect of attachment theory as proposed by Bowlby (1969). Attachment theory posits that babies and their mothers create social and emotional bonds in the absence of the child’s ability to physically cling to the mother to ensure proper care (Bowlby). Based on early interactions with their mother and her reactions to themselves and the situation, children learn about how the world works and what to expect from life and from their mother. Bowlby called the ultimate product of these lessons an Internal Working Model (IWM) (Bowlby; Johnson, Dweck, Chen, Stern, Ok, & Barht, 2010; McCarthy & Maughan, 2010).

Internal Working Models allow individuals to guess at what they or others will do in a given situation, as well as make sense of other’s actions. This is very similar to the concept of a schema, except an IWM is a more inclusive term. Bowlby (1969) described two types of internal working models, while there are many different types of schemas dedicated to different subjects. Bowlby’s IWMs included organismic and environmental IWMs. An environmental IWM consists of goals, ideas, and behaviors that make up an individual’s belief system about the world around them. An organismic IWM is a similar set of goals, ideas, and behaviors that make up an individual’s identity and
beliefs about themselves (Bowlby; Griffith, 2004). Both environmental and organismic IWMs help individuals interpret the world around them.

IWM development coincides with attachment classification, another component to attachment theory. Classifications for attachment style were defined by Ainsworth, Blehar, Waters and Wall (1978) and include secure, insecure-avoidant, insecure-ambivalent and disorganized. Secure attachments typically provide outcomes that are beneficial to individuals’ lives (McCarthy & Maughan, 2010). As attachment security and IWM paradigms trend together, examining attachment security can indirectly shed light on the self-schema.

A child’s attachment classification can also predict the types of scenarios that he or she remembers. For example, more securely attached children are more likely to recognize a stimulus depicting a separation from a caregiver (Alexander et al., 2010). Similarly, Kirsh and Cassidy (1997) found that securely attached children are more likely to look at pictures of a mother and child and remember stories about mothers being sensitive to their children. Insecure or avoidant children often chose to look away from a picture containing a mother and child, and if they did look, it was often at two neutral adults also in the picture. This implies that not only does attachment predict memory, it affects attention (Kirsch & Cassidy). Because these pictures were attachment related and children remembered stories that were most consistent with their own style of attachment better than others, it is possible that attachment becomes a part of children’s self-schema in the same way as does the gender schema. This could make it more likely that children with more secure attachments would be activating the self-schema (where parts of the
gender schema are also located), making memory of gender-consistent information more likely.

**Hypotheses**

Based upon a review of previous literature (Bauer, 1993; Cherney, 2005; Fagot & Leinbach, 1989; Kreiner et al., 2004; Welch-Ross & Schmidt, 1996), the purpose of this study was to examine relationships among the factors of child gender, child age, stimulus gender, stimulus emotion and child attachment in a recognition memory task. The study aimed to test the following hypotheses: first, that children would more accurately recognize pictures that match their gender; that is, the gender schema being invoked accounts for some amount of variation in memory.

Second, it was hypothesized that older children would be able to more accurately recognize pictures than younger children, a result that would be consistent with a large body of research (Huff et al., 2011; Karageorge & Zajac, 2010; Ros & Latorre, 2010; Welch-Ross & Schmidt, 1996). Furthermore, because children become more sex-typed with age, it was also expected that older children would be more likely to remember gender-consistent stimuli than younger children (Cherney, 2005; Pozzulo et al., 2009; Rhodes et al., 201; Welch-Ross & Schmidt, 1996).

The third hypothesis was that, across ages, pictures displaying emotion would be recognized more accurately than pictures displaying neutral stimuli. Since research has shown that negative stimuli are more memorable than neutral stimuli, it is possible that
stimuli of any emotion are more memorable than neutral stimuli (Alexander et al., 2010; Cordon et al., 2013; Kensinger, Addis, & Atapattu, 2011; Leclerc & Kensinger, 2011; Siddiqui & Unsworth, 2011).

Finally, it has been shown that attachment can be a predictor of memory for events, ideas about the self, and memory in general (Alexander et al., 2010; Kirsch & Cassidy, 1997; Melinder et al., 2013). Since prior studies have shown a possible relationship between attachment style and memory for stimuli depicting attachment-related scenarios (Kirsch & Cassidy, 1997), this study also examined a possible relationship between attachment style and recognition of other types of stimuli.
Chapter 3

METHODS

Research Question

Using data collected as part of a larger quantitative study by Dr. Kristen Weede Alexander, this study examined the relationship between attachment, gender, and memory. Does gender congruency with a picture stimulus predict picture recognition? Does attachment security? There is a large in-group bias towards one’s own gender that would point to gender congruency having a meaningful role in memory, as well as a general bias to remember others who are similar in age or gender (Pozzulo et al., 2009; Yarmey, 1993; Zosuls, Martin, Ruble, Miller, Gaertner, England, & Hill, 2011). Also, children’s memory has been shown to be predictable based on their attachment style (Alexander et al., 2010). This evidence points to both gender congruency predicting recognition, and attachment possibly contributing to recognition as well. Also, since children’s memory becomes more adult-like as they get older, it is possible that gender and attachment will play a larger role in younger children’s responses (Cherney, 2005; Pozzulo et al.; Rhodes et al., 2011).
Participants

Forty-two children between the ages of 3- and 6-years-old (M = 4.67 years, SD = 0.79 years; n=22 female) were recruited from the community through community events, after-school programs, and advertisement in the newspaper and on posters. The children were sorted into two age groups. Those 3-4 years-old made up the younger age group, and those ages 5-6 years made up the older age group. The participants selected for the study were without developmental delays and spoke English as their native language.

Measures and Materials

Memory Stimuli

A developmentally appropriate set of picture-vignette stimuli were chosen from those developed by Alexander et al. (2010) for use with older children and adolescents. Of the two sets of 15 stimuli used in the collection of data analyzed for the current study, two each depicted happy, sad, separation, reunion, and fear evoking, with five neutral scenarios. These labels were based on pilot testing using university students and children (see Alexander et al. for complete description). Each colored photograph was accompanied by a short (30 second or less) vignette about the photograph including a name for the individual depicted. Five (two neutral, one happy, one sad, and one separation) of the photo sets included only girls, four (two neutral, one sad, and one
separation) included only boys, and six (one happy, one neutral, both scared and both
separation) were unclear based on the combination of photo and vignette.

**Attachment Security**

Attachment security was measured using the Attachment q-sort (van Ijzendoor, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). This involved having parents sort a set of 90 cards representing attachment-related behaviors into ten equal piles based on the cards’ resemblances to their children’s behavior. This created two variables for children’s attachment, representative of both their secure base behavior (i.e., security) and attachment dependency.

**Recognition Memory**

Memory was assessed using a recognition task. Children were shown all 30 of the photos, one at a time on a computer screen, and asked if they had seen each before (15 shown previously, 15 from the unseen stimulus set). All children were tested in their home on a computer screen by a female researcher. Memory accuracy was calculated using d’prime analysis, which helps account for random error.

**Procedure**

The data analyzed for this study were selected from a larger pool of data collected in an earlier study conducted by Dr. Kristin Weede Alexander. Review and approval of
this earlier study was completed by the Sacramento State Institutional Review Board. During the initial session in the original study, each child was shown 15 picture-vignette stimuli (one of the two sets). Stimuli were presented in one of two semi-random orders. At this time, parents also completed the attachment measure. Approximately one hour later, after completing some individual difference measures and interacting with a parent, individual children were asked free recall questions to see what they remembered about the specific photos or vignettes, although these data were not used in the present study. After those questions, the recognition test was given, which consisted of showing all stimuli one at a time and asking children if they had seen the on-screen picture earlier. All responses, including hits (correct identifications), false-positives (incorrectly identifying a novel picture as previously seen), false-rejections (incorrectly identifying a previously seen picture as novel), and correct rejections were collected for analysis. Further description of the methods used to analyze this data as well as the results are provided in the following chapter.
Chapter 4

RESULTS

Preliminary Analyses

Preliminary analyses were conducted in which correlations amongst the key variables of Recognition, Child Gender, Child Age Group, Child Security, Stimulus Gender, and Stimulus Emotion were examined. These correlations can be seen in Table 1. As is often the case with multiple variables assessing memory, all recognition variables (i.e., male emotional stimulus recognition, male neutral stimulus recognition, female emotional stimulus recognition, female neutral stimulus recognition) were significantly positively related. Age group was also significantly related to recognition variables, showing that older children were better able to recognize all stimuli than their younger peers.

Hypothesis testing

To test the hypotheses, a 2 (stimulus gender: male, female) X 2 (stimulus emotion: emotional, neutral) X 2 (participant gender: boy, girl) X 2 (participant age: 3-4 years, 5-6 years) ANCOVA was conducted with stimulus gender and stimulus emotion varied within subjects and participant gender and participant age varied between subjects. Children’s attachment security was covaried. For Results, see Table 2.
### Table 1

*Pearson Correlations*  \( * = p < .05 \)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
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<td></td>
</tr>
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<td></td>
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<td></td>
</tr>
<tr>
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<td>0.08</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emo Stim</td>
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<td></td>
<td>0.53*</td>
<td>0.09</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neu Stim</td>
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<td>0.55*</td>
<td>0.25</td>
<td>0.61*</td>
<td>1.00</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neu stim</td>
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<td>0.53*</td>
<td>0.09</td>
<td>0.51*</td>
<td>0.55*</td>
<td>0.48*</td>
<td>1.00</td>
</tr>
<tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emo Stim</td>
<td>0.28</td>
<td>0.37*</td>
<td>0.14</td>
<td>0.55*</td>
<td>0.53*</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Neu stim</td>
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<td>0.53*</td>
<td>0.09</td>
<td>0.51*</td>
<td>0.55*</td>
<td>0.48*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note: The table presents Pearson correlation coefficients for the variables listed.*
The first hypothesis was that consistency between the gender pictured in the stimulus and the gender of the child would affect recognition performance. To support this hypothesis the interaction between stimulus gender and participant gender would need to be significant. Results showed this to be the case, supporting the hypothesis (see Table 2). Follow-up ANOVAs were conducted with child gender as the independent variable and recognition as a dependent variable for male stimuli and female stimuli. A significant difference was not found between girls’ and boys’ memory for male stimuli, $F(1,39) = .61, p = .44, \eta^2 = .02$; see Figure 1), but girls remembered female stimuli more accurately than boys, $F(1,39) = 4.10, p = .05, \eta^2 = .10$; see Figure 1).

The second hypothesis was that age group would affect recognition. Consistent with that expectation, there was a significant effect of age (Table 2), with children in the older age group more accurately recognizing the photographs than children in the younger age group across stimulus variations (see Figure 2). The secondary hypothesis that gender consistency would have a greater effect in the older age group was tested by looking at the three-way interaction including age group X child gender X stimulus gender. This hypothesis was not supported by the data (see Table 2).
### Table 2

**Main Effects**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
<th>$\eta^2$</th>
</tr>
</thead>
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<td>Security</td>
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<td>1.00</td>
<td>6.59</td>
<td>1.52</td>
<td>0.23</td>
<td>0.04</td>
</tr>
<tr>
<td>Child Gender</td>
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<td>9.44</td>
<td>2.17</td>
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<td>0.06</td>
</tr>
<tr>
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<td>1.00</td>
<td>65.00</td>
<td>14.97</td>
<td>0.00</td>
<td>0.29</td>
</tr>
<tr>
<td>Error</td>
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<td>37.00</td>
<td>4.34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stim Gender</td>
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<td>0.41</td>
<td>0.53</td>
<td>0.01</td>
</tr>
<tr>
<td>Stim Gender X Security</td>
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<td>1.00</td>
<td>0.83</td>
<td>0.85</td>
<td>0.36</td>
<td>0.02</td>
</tr>
<tr>
<td>Stim Gender X Child Gender</td>
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<td>1.00</td>
<td>4.02</td>
<td>4.08</td>
<td>0.05</td>
<td>0.10</td>
</tr>
<tr>
<td>Stim Gender X Age Group</td>
<td>0.34</td>
<td>1.00</td>
<td>0.34</td>
<td>0.34</td>
<td>0.56</td>
<td>0.01</td>
</tr>
<tr>
<td>Stim Gender X Child Gender X Age Group</td>
<td>1.27</td>
<td>1.00</td>
<td>1.27</td>
<td>1.29</td>
<td>0.26</td>
<td>0.03</td>
</tr>
<tr>
<td>Error (Stim Gender)</td>
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<td>37.00</td>
<td>0.99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stim Emo</td>
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<td>1.00</td>
<td>0.91</td>
<td>0.94</td>
<td>0.34</td>
<td>0.03</td>
</tr>
<tr>
<td>Stim Emo X Security</td>
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<td>1.00</td>
<td>1.03</td>
<td>1.06</td>
<td>0.31</td>
<td>0.03</td>
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<tr>
<td>Stim Emo X Gender</td>
<td>1.11</td>
<td>1.00</td>
<td>1.11</td>
<td>1.14</td>
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</tr>
<tr>
<td>Stim Emo X Age Group</td>
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<tr>
<td>Stim Emo X Gender X Age Group</td>
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<td>0.44</td>
<td>0.45</td>
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<td>0.10</td>
</tr>
<tr>
<td>Error (Stim Emo)</td>
<td>35.99</td>
<td>37.00</td>
<td>0.97</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The third hypothesis was that emotion would play a role in recognition. The data did not support this hypothesis: There was not a significant difference in memory between emotional and neutral stimuli. The final hypothesis that attachment security would be related to recognition was not supported by the data.
**Figure 1**
*Girls’ and Boys’ Recognition of Male and Female Stimuli*

* = $p < .05$
Figure 2
Age and Recognition
The purpose of this study was to examine whether and how the variables of children’s gender, stimulus gender, age, stimulus emotion, and attachment would affect children’s recognition memory. Based on previous literature, it was expected that children would better recognize pictures including individuals that matched their gender, and that older children would recognize more pictures than younger children. It was also posited that older children would be more likely to remember stimuli including individuals of their own sex than would younger children. In addition, it was hypothesized that pictures containing emotion would be recognized more accurately than neutral stimuli, across ages, and that emotional content of the stimuli would also predict recognition (Alexander et al., 2010; Bauer, 1993; Cherney, 2005; Cordon et al., 2013; Fagot & Leinbach, 1989; Huff et al., 2011; Karageorge & Zajac, 2010; Kensinger, et al., 2011; Kirsch & Cassidy, 1997; Kreiner et al., 2004; Leclerc & Kensinger, 2011; Melinder et al., 2013; Pozzulo et al., 2009; Rhodes et al., 2011; Ros & Latorre, 2010; Siddiqui & Unsworth, 2011; Welch-Ross & Schmidt, 1996). Each hypothesis will be discussed below.
Gender Consistency

It was hypothesized that gender consistency with the stimulus would yield more accurate recognition. This was shown to be the case, with a significant overall interaction between stimulus gender and child gender. This finding mirrors other research showing the importance of gender consistency to memory, especially memories that are created unintentionally, as many are (Bauer, 1993; Cherney, 2005; Cordon et al., 2013; Fagot & Leinbach, 1989). Further analyses showed that gender consistency improved recognition for girls, but did not affect the performance of boys. This could be evidence of girls’ self-schemas being activated when they see a photo of another female (Bem, 1981). It is not uncommon for a study to find that there is an effect with one gender but not the other (Bowman, 2004; Cherney & Ryalls, 1999; Hinnant & O’Bryan, 2007; Yarmy, 1996). Furthermore, adult women have been shown to be more likely to recognize gender-consistent information than adult men (Cherney & Ryalls). That the girls in this study remembered female stimuli more accurately lends credence to the gender schema theory but the lack of an effect in boys poses an unresolved question about the generalizability of this result. It is possible that the task used in this study was unintentionally biased to girls or girls in this age group have a more developed gender schema than their male peers. The developmental trajectory of the gender schema specific to each gender is an excellent opportunity for further research.
Age

Older children were expected to recognize more pictures than younger children (Huff et al., 2011; Karageorge & Zajac, 2010; Ros & Latorre, 2010; Welch-Ross & Schmidt, 1996). This was found to be true, regardless of gender or emotional valence. This supports previous research that recognition for previously seen stimuli improves with age (Karageorge & Zajac; Pozzulo et al., 2009; Rhodes et al., 2011).

A secondary hypothesis was that gender consistency would interact with age, such that the effect would be more pronounced in older children. The data did not show this to be true. It is possible that even children in the older group were not yet sex-typed enough to demonstrate a gender-related difference in recognition. Future research could include elementary school children over age seven, as children of this age will be most likely to have a developed sense of their own gender as constant (Ruble et al., 2007).

Emotion

The third prediction, that pictures containing emotion would be recognized more accurately than neutral stimuli, across ages, was not supported (Alexander et al., 2010; Cordon et al., 2013; Kensinger et al., 2011; Leclerc & Kensinger, 2011; Siddiqui & Unsworth, 2011). This could be due to the inclusion of positive emotion stimuli in the pictures. In previous research, emotion stimuli have focused on negative rather than positive expressions of emotion; these negative stimuli have been found to be more
accurately remembered. Positive stimuli may not be as easily remembered, so including them in the stimuli may have made the potential effect too diluted to detect.

**Attachment**

The final hypothesis concerned attachment and its role in memory. It was expected that attachment would predict memory for the presented stimuli. This hypothesis was not supported. Other research has shown attachment style predicting memory for attachment-related images as well as autobiographical memory (Alexander et al., 2010; Kirsch & Cassidy, 1997; Melinder et al., 2013). Though it was expected that this effect would generalize to stimuli representing others, it did not. There are many ways to measure attachment, however (Alexander et al.; Griffith, 2004; Johnson et al., 2010; Kirsch & Cassidy). It is possible that using another method of measuring attachment might have resulted in a significant result.

**Limitations and Suggestions for Further Study**

The use of secondary data was the largest limitation of this study. Because the data analyzed in this study had been collected previously, there was not a way to change or customize any of the data collection methods to better fit the questions in the present study. The data analyzed here were collected with a somewhat different and specific purpose in mind by the original researcher. Though it was possible to use this data to look
at the question at hand, it is possible that a clearer or more detailed answer could have been reached by developing a data collection plan and a data set more suitable to the questions in this study.

Should this study be recreated with a new data set developed specifically for these questions, stimuli more balanced in terms of age, and race should be used, as well as more stimuli overall. Adding more picture/vignette pairs that more clearly depict men, women, girls and boys would enable researchers to also look at age consistency at the same time as gender consistency. Varying the visible race of those depicted in the photographs would also provide another variable to examine. Having these expanded stimuli sets and a larger group of participants would help give the study more power.

Characteristics of the participant sample also presented limitations to the study’s generalizability. Because the participants were recruited from a college town and no stipend was offered, the sample size of this study was small and did not include much ethnic or socioeconomic diversity among the families. The fact that researchers went to children’s homes to gather data may have deterred some families from participating.

The stimuli pictures used in this study consisted of photographs presented on a computer screen. These pictures did not mirror most “real-life” situations, and this may have altered the way some children approached the task, as it may have seemed unimportant.

The question of how gender consistency – or inconsistency – impacts children’s recognition was a central question in the present study. However, results related to this question must be considered in light of the fact that there was no data collected on the
gender self-identification of the children. Therefore it cannot be determined whether all participants identified with their biological sex. However, given that these children are very young, it is likely that they would identify with their biological sex.

The method used to measure attachment presented other limitations. In this study, attachment was measured using a parent-report measure, which may not have been as accurate as projective measures traditionally used to assess attachment style. Parents rated their children on numerous behaviors; however, their perspective may have been biased by their own attachment style as well as their perceptions of the child, or a desire to make the child appear ideal to the researcher. A projective measure would have indirectly measured children’s state of mind, and would not have been subject to the bias of the parents’ attachment, nor their desire to impress the researcher. Since these kinds of measures are so different, it is possible that a projective measure would have categorized children’s attachment differently.

Further study of children’s recognition memory should address the issues raised by these limitations, as well as tackle other questions brought to light by the study’s results. One such question would be, how early in life are gender-consistent biases in recognition able to be observed? The current study found effects in both age groups, with the youngest group being just three to four years-old. Identifying the floor of this effect would help to determine when the gender schema begins to develop.

Further research should also focus on boys in this age group, including studies to pinpoint at what age, if any, gender schema has an effect on their recognition abilities. Is three to six an age range when girls have a more developed gender schema overall? Or
was this task unintentionally more suited to girls? Answering these questions could help describe the development of the gender schema. Age effects on gender-consistent memory could also benefit from further study, though this relationship was not shown to be significant in the current study, research with a wider age range of children might produce differences in recognition.

The final question proposed by this study involved attachment and memory for gender-consistent information. Are these two constructs related? Is there a way to predict recognition for gender-consistent stimuli based on attachment style? Though the current study did not find that attachment was predictive of memory overall, it is still possible that development of IWMs within the self-schema may be related to stability of the gender schema. This could lead to prediction of recognition for gender-consistent stimuli based on attachment style.

**Conclusions**

The current study has furthered the collective knowledge base on the gender schema and its effects on memory for photo/vignette stimuli. Though not all results were significant, findings in this study contribute to a larger discussion about gender, memory, age, emotion, and attachment. The significant result found for girls viewing female stimuli is an indicator that continued study of the gender schema may be fruitful. From a broader perspective, results in this study suggest that gender can be a pervasive force in children’s lives, including affecting what they remember. Although the present study has
added to the discussion of these questions, further research is necessary for a more clear understanding of the relation between gender and children’s memory.
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