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Young children's implicit and explicit memory for fantasy and reality scenarios

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**YOUNG CHILDREN'S IMPLICIT AND EXPLICIT MEMORY
FOR FANTASY AND REALITY SCENARIOS**

A Thesis

Presented to

**the Faculty of the Department of Psychology
San Jose State University**

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

Michele M. Wong

May 2001

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ABSTRACT

YOUNG CHILDREN'S IMPLICIT AND EXPLICIT MEMORY

FOR FANTASY AND REALITY SCENARIOS

by Michele M. Wong

This thesis investigates the topic of children's memory for televised information. Research on this subject has indicated that children do imitate behaviors that are observed on television and that their understanding of the information they view is influenced by their cognitive capacities.

Since much of television's content is based in fantasy, this thesis examined children's ability to make the fantasy-reality distinction via television, and determined whether children would be more likely to utilize real or unreal observed scenarios in their everyday life. Children were shown two short videos of girl actors solving a problem. Two different solutions were shown in both a fantasy and a reality version. Children's memory for the scenarios was tested directly and indirectly. Memory was very good on the explicit memory measure and showed a strong trend for the reality solution on the implicit memory measure for both the experimental and control groups.

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TABLE OF CONTENTS

SECTION	PAGE
INTRODUCTION	3
METHOD	17
Research Participants	17
Design	18
Materials	18
Procedure	19
RESULTS	21
DISCUSSION	25
REFERENCES	31
APPENDICES	35
Appendix A. Signed Approval Forms	35
Appendix B. Measures.....	37

LIST OF TABLES

TABLE	PAGE
1. Descriptive Statistics for Dependent Variables	22

Running head: YOUNG CHILDREN'S IMPLICIT AND EXPLICIT MEMORY

Young Children's Implicit and Explicit Memories

for Fantasy and Reality Scenarios

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Footnote

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Abstract

Because of television's powerful impact, many researchers have studied children's cognitive responses to television content, particularly their ability to distinguish between real and unreal situations (Flavell, Flavell, Green, & Korfmacher, 1990). It has long been accepted that children do not view or understand what is seen on the television screen in the same manner as an adult (Rubinstein, 1983). Also, children have been shown to imitate behaviors that are observed on television (Steuer, Applefield, & Smith, 1971). Since much of television's content is based in fantasy, it is not only useful to study children's ability to make the fantasy-reality distinction via television, but to determine whether children will utilize real or unreal observed scenarios in their everyday life. Children were shown two short videos of girl actors solving a problem. Two different solutions were shown in both a fantasy and a reality version. By testing both implicit and explicit memory, the current study examined children's usage of the fantasy-reality distinction. Memory of the video scenarios was very good on the explicit memory measure and showed a strong trend for the reality solution on the implicit memory measure for both the experimental and control groups.

Young Children's Implicit and Explicit Memories for Fantasy and Reality Scenarios

More than 40 years have passed since television became a prominent part of American life (Cassata & Skill, 1985; Rubinstein, 1983). When television first appeared in America, it was looked at as a toy; it was predicted that once the novelty wore off, people would go on with their lives like they had before (Cassata & Skill, 1985). But, history shows that instead of decreasing, viewership has steadily increased throughout the years (Anderson, Lorch, Field, Collins, & Nathan, 1986). Television has invaded the American home, and has become a large part of child-rearing (e.g., St. Peters, Fitch, Huston, Wright, & Eakins, 1991).

Because of television's impact, many researchers (e.g., Rubinstein, 1983; Singer & Singer, 1983; Williams, 1986) have studied its effects on child development. Focus has been placed on children's cognitive responses to television content, particularly their ability to distinguish between real and unreal situations. It has long been accepted that children do not view or understand what is seen on the television screen in the same manner as adults (Rubinstein, 1983). Children's abilities to comprehend, draw conclusions, and integrate television content influences what they can gain from viewing (Huston, Wright, Rice, Kerkman, & St. Peters, 1990). Children must retain (i.e., remember) information they have viewed in order for it to have an influence on subsequent behavior. Since not all remembered content necessarily has the same influence, both memory and utilization of television content becomes an important area to research because it may show the types of information children pick up from viewing. As a start to the study of memory and utilization of television content, this study focused on

young children's tendency to utilize the fantasy-reality distinction within direct and indirect memory tests. Also, the relative memorability of and influence on subsequent behavior of fantasy as compared to reality-based episodes was assessed. To provide the background for this study, general findings on observational learning are reviewed first. Next, the findings related to the modeling of prosocial and aggressive behaviors are reviewed because both prosocial and aggressive behaviors tend to represent the hopes and fears for television effects. In addition, children's general developmental capabilities and their cognitive abilities related to television viewing, specifically the fantasy and reality distinction for television content, is also reviewed because the ability to make the distinction is necessary if the two types of content are to have different effects. Next, research on implicit and explicit memory is explored because the study employs this distinction to assess the difference between memory and utilization. Finally, the specific hypotheses of the study are presented.

Observational Learning

Important to children's acquisition and maintenance of behavior is what they are exposed to both directly and indirectly. Many researchers (e.g., Bandura, Grusec, & Menlove, 1966; Bandura, Ross, & Ross, 1963; Gewirtz, 1969) have studied the impact of experience on children's behavior. Social-learning, which involves a person's direct experiences with other people, has been shown to be an important class of human learning and accounts for many distinctive human qualities (Gewirtz, 1969). Within this area of human-learning, Gewirtz focused on the learning process of imitation. He claimed that imitative behaviors are often produced through observational learning. In

other words, after a child witnesses a response of a model, the child will often respond by imitating that behavior (Gewirtz, 1969). Researchers (e.g., Bandura, 1969; Gewirtz) have suggested that the likelihood of imitating another person's behavior comes from the reinforcement, either positive or negative, for such learning. Bandura stated that learning could result from direct experiences or vicariously, through indirect observation.

In 1966, Bandura et al. studied observational learning of televised actions. Children were shown a complicated series of modeled actions on film during which they either observed attentively, vocalized the novel responses given by the model, or counted quickly during the film. A test of observational learning followed the presentation of the films. Results showed that children who were asked to repeat the verbal responses of the models performed better on the matching responses than the children who were asked to count during the film. According to social-learning theorists like Bandura (1969), the actions of powerful models will be paid attention to, practiced, and imitated even though observers have no direct interaction with them because their behavior is likely to have a high practical value (Bandura et al., 1963). In other words, it becomes apparent that observing a model's behavior can lead to imitation even if that behavior is observed indirectly (e.g., by television). Because it has been shown that children are likely to imitate observed behaviors, it is important to examine which types of behaviors they are most likely to imitate, and where they may pick up modeled behaviors.

Modeling of Prosocial and Aggressive Behaviors

Since children have been shown to imitate televised actions, the issue of modeling has become increasingly important with the increase in television viewing. In particular,

researchers (e.g., Huesmann, 1986; Kaiser, Snyder, & Rogers, 1995; Steur, Applefield, & Smith, 1971) have investigated the effects of televised aggression and prosocial behaviors on children's imitative behavior. Specifically, children have been shown to imitate aggressive behaviors viewed on television (e.g., Kaiser et al., 1995). The problem of aggressive behaviors in modern society has led to studies that focus on the imitation of violent behaviors. Evidence from various studies (e.g., Huesmann, 1986; Slife & Rychlak, 1982) points to the importance of vicarious learning of aggression. According to some researchers (e.g., Berk, 1994), children engage in aggressive behavior as a result of observation and imitation of adult behaviors. The amount of television that parents allow their children to view has been correlated with the increase in more aggressive or antisocial acts performed by the children. Even children who watched programs with prosocial acts were more likely to engage in aggression if the show also included violence. Steur et al. (1971) found in their observation of preschool children at play that the children who watched the television cartoons with violence, kicked, choked, and pushed their playmates more than the children who watched non-violent television cartoon shows. Kaiser et al. (1995) found that prosocial and antisocial behaviors were increased and decreased when respective prosocial and antisocial behaviors were introduced and then removed.

In addition, Molitor and Hirsch (1994) concluded that exposure to television or film violence could cause persons to commit acts of aggression that they normally would not. This imitation of aggressive televised behaviors leads to the question of what other behaviors children might imitate. Important to the types of behaviors that may be

imitated is children's cognitive abilities. It seems that children's cognitive abilities may influence what types of televised behaviors they may imitate. As children develop cognitively, they are better able to understand which behaviors are socially acceptable and are effective in accomplishing a goal. Children's ability to understand certain television content may influence the types of televised behaviors they might imitate. In order to understand the specific role cognitive development plays in the imitation of televised behaviors, it is first important to examine children's general capabilities, before cognitive issues related to television are explored.

Children's Developmental Capabilities

Young children do not think in the same way as adolescents or adults (Wackman & Wartella, 1977). In order to understand cognitive processes, cognitive-developmental psychologists (e.g., Gelman, 1978; Piaget, 1972) have found it important to focus on how cognitive abilities develop and change across the lifespan, from infancy through adulthood. In 1972, Piaget described the development of children's thought structures. Specifically, he asserted that children's cognitive development progresses through a series of stages. Children's thinking moves from concrete to more abstract thought. Fodor (1992) also suggested that there was a considerable difference between seven-year-olds and preschoolers' problem-solving behaviors. He claimed that preschoolers do not have the ability that seven-year-olds do to apply their insights to a wide range of problems. It seemed that older children were better able to take their past experiences and apply them to successful problem solving.

No one doubts that there is mental growth and that children change the way they

think as they get older. However, some researchers (Gelman, 1978; Wackman & Wartella, 1977) have questioned whether this growth is best described as a progression through successive stages of cognition. Recently, evidence (Flavell, 1986) has suggested that children's mental growth does not proceed as neatly as a simple stage theory might lead one to expect. Piaget's work is now viewed as pointing to important developmental phenomena and indicating critical developmental change, but the specific theory has been either modified or rejected. It seems that cognitive maturity occurs earlier than Piaget had described (Payne & Wenger, 1998). Cognitive skills seem to be more complex and more sophisticated than Piaget originally thought (Fischer & Hencke, 1996). However, the consensus seems to be that an increase in processing capability allows children older than seven to form multidimensional representations of problems that younger children cannot form (Siegler & Ellis, 1996). Thus, children's thinking moves from concrete to more abstract thought; however, not in the set stages that Piaget described, but in a more variable sequence. Now that it has been determined that cognitive thought generally moves from concrete to abstract, it is useful to examine how cognition is important to television viewing.

Cognitive Issues Related to Television

Since extensive viewing began during the 1950s and 1960s, researchers (e.g., Harrison & Williams, 1986) have debated whether children can learn observed behaviors from television. Many researchers (e.g., Harrison & Williams) in the field believe that a great deal of positive learning occurs with television viewing, whereas others (e.g., Kaiser et al., 1995; Steur et al., 1971) argue that only negative behaviors are acquired. Still other

researchers (e.g., Macklin, 1983) have focused on children's understanding of stimuli in television programs. Whether children are able to remember the material they watch is another point of interest (e.g., Watkins, Calvert, Huston-Stein, & Wright, 1980).

The fantasy and reality distinction. Relevant to the current study are investigations that focus on the children's cognitive abilities to distinguish between fantasy and reality, during the age range of 2½ to 7 years (e.g., Dorr, Kovaric, & Doubleday, 1990; Flavell, Flavell, Green, & Korfmacher, 1990; Wright, Huston, Reitz, & Piemyat, 1994). The distinction between fantasy and reality depends strongly on the developmental level of the child. Many researchers (e.g., Flavell, 1986; Flavell, Flavell, & Green, 1983; Johnson & Foley, 1984) have found that young children often have difficulty making the distinction between fact and fantasy. Younger children, as opposed to older children, are unable to manage simple appearance-reality tasks. An example of this was reported by Flavell et al. (1983). These researchers showed 3- and 6-year-old children a red car covered by a green filter, which made the car look black. The car was removed from behind the filter and was given to the children to inspect. After the filter was replaced, the children were asked to indicate the color of the car. Most of the 3-year-olds stated that the car was black, whereas the six-year-olds were able to say that the car was red. Many 3-year-olds seem to possess little or no understanding of the distinction. The researchers asserted that the older children were more knowledgeable about the distinction they were asked to make. This was believed to be the result of the older children's more highly developed cognitive skills. In contrast to young children of 3 and 4 years of age, 6- and 7-year-olds manage simple appearance-reality tasks with ease

(Flavell, 1986). Thus, children's ages are indicative of their ability to make the distinction between appearance and reality (Flavell, 1993).

The fantasy and reality distinction for television. This discrimination between fantasy and reality has also been an important focus of television research (e.g., Flavell et al., 1983; Flavell et al., 1990). Prawat, Anderson, and Hapkiewicz (1983) stated that the ability to distinguish fantasy from reality develops slowly in children and may not be fully developed even in adolescence. Studies (e.g., Flavell et al., 1990) have also shown that children's ability to make the appearance-reality distinction for television programs follow the same developmental pattern as illustrated in Flavell et al., (1983). Children older than 4-years-old were better able to perform simple appearance reality tasks. According to Wackman and Wartella (1977), children of different ages respond differently to the same stimuli. Between the ages of 3 and 12, children gradually develop a comprehension of the distinctions between real and fictional television content (Flavell et al., 1990; Hawkins, 1977).

Three studies with 3- and 4-year-olds were conducted to investigate young children's interpretations of television images as either pictorial depictions of objects or as actual, concrete objects (Flavell et al., 1990). Utilizing transparent refrigerator boxes as "television sets," the researchers asked the children a reality and affordance (dealing with actions toward something) question for each of the five items (e.g., a bowl of popcorn) they saw. The reality questions asked whether the object was real or merely a picture. The affordance questions asked whether the object seen could be acted upon. Specifically, could the object seen be touched or be removed if the set was turned upside

down. Thus, the children were asked to hypothesize whether the object could fall out of the set if it is shaken.

Nearly all of the 4-year-olds demonstrated the understanding that the things they saw on the television screen were not actual concrete, three-dimensional objects inside the set. Answering the reality questions, they indicated that they only saw pictures on the screen rather than real objects. In addition, when they responded to the affordance questions, they stated that they could not touch the object they saw and that it would not fall out if the set were removed. On the other hand, 3-year-olds seemed to think of the objects as real and concrete. These errors were believed to result from the 3-year-olds' inability to clearly make the distinction between the reality status and affordances of the images they saw. Thus, Flavell et al. (1990), indicated that the developmental difference between younger and older children's understanding of the mind influenced how they responded to the images they saw on the television screen.

Wright et al. (1994) conducted further study of children's understanding of television reality. The research focused on 5- and 7-year-old children's abilities to determine television reality. Specifically, the children were questioned about the factuality and social realism of their favorite television shows. Also, children were shown short clips of television programs (four factual clips paired with four closely related fictional clips). Two of the factual clips were live broadcasts of news events: a.) the space shuttle launch, paired with a scene from *Space Academy* and b.) Prince Charles and Princess Diana's wedding, paired with scenes from *The Royal Wedding*. The other two factual clips were documentaries: c.) a documentary about a *Dr. Who* convention,

paired with a *Dr. Who* drama and d.) a documentary about the making of *The Wizard of Oz*, paired with the actual scenes from *The Wizard of Oz*. For both the children's favorite television programs and the short television clips, the children were asked whether the content was real and whether the characters on the shows were similar to real people. Wright et al. found that the older children were more accurate about factuality than younger children. The researchers also found that older children better understood that fictional shows are run by scripts and are rehearsed and that the fictional characters did not maintain their roles in real life.

Research (Flavell et al., 1990; Wright et al., 1994) seems to indicate that children's understanding of the factuality of television programs increases with age. Important to this investigation is how the perception of reality of television can influence children's emotional responses and understanding of the content (Huston, Wright, Alvarez, Truglio, Fitch, & Piemyat, 1995). For young preschool children who still have a difficult time understanding the difference between appearance and reality or between real and vicarious experience, television can affect emotion (Huston et al., 1995). Thus, the developmental level of children has been shown to predict the extent of emotional reactions to television.

It seems that as children cognitively mature, some things tend not to upset them, whereas other things may actually disturb them more. This generalization is uniform to developmental differences in children's general fear responses (Cantor, 1996). According to Cantor, children from about 3 to 8 years of age are scared mostly by animals, the dark, and supernatural beings, like ghosts, monsters, and witches. They are

also scared by things that look strange or move abruptly. Children from 9 to 12 years of age are fearful mostly of getting hurt themselves and of their family getting hurt or dying (Cantor). Thus, it has been shown that younger children tend to be more scared by real or fantastic stimuli (e.g., animals, monsters; Cantor). On the other hand, older children have demonstrated their fear for more ordinary events (e.g., being hurt in an accident; Cantor, Wilson, & Hoffner, 1986). Understanding what types of television programs and characters children view to be real and unreal becomes even more important with the realization that certain television content can be frightening. Television shows can be organized along a fantasy-reality dimension based on the viewer's understanding of whether the content is fictional or factual.

Memory Research

Children's abilities to comprehend television content influences what they can gain from viewing (Huston et al., 1990). In addition, children's developmental capabilities influence their fear responses for televised material (Cantor et al., 1986). Because negative television material has been shown to be imitated (Molitor & Hirsch, 1994), it would seem important to determine what types of material children remember, and more importantly to find out what kinds of televised information children may use in their everyday lives. Specifically, to what degree will children use fictional or factual material in their lives? Thus, in order to understand how children utilize the content they gain from watching television, it is important to test their memory for these programs.

Implicit and explicit memory. In memory research, researchers (e.g., Roediger, 1990) have made the distinction between implicit and explicit memory. According to

Nelson, Schreiber, and McEvoy (1992), explicit memory is regarded as the intentional recall of previous material through direct reference to the incident during testing. Implicit memory, on the other hand, is the unintentional recall of the previous material (Nelson et al.). Various memory tests have been established over the years to examine implicit and explicit memory. With direct memory tests, an explicit memory is revealed. Researchers (e.g., Roediger, 1990) test explicit memory by asking the participants to remember a past experience, directly. However, with indirect tests, researchers test implicit memory for a prior experience without directly asking the participant to remember specific information. In indirect tests, the basic task is to solve a problem for which a certain past event is pertinent, but the task does not direct one to attend to that experience (Ellis & Hunt, 1993).

Little emphasis has been given specifically to implicit and explicit memory for television programs. Still important is the general performance children display for these two tests. Graf (1990) suggested that implicit memory fully develops before explicit memory. Implicit memory has been believed to develop during early preschool years and continue steadily into late adulthood, whereas explicit memory has been shown to develop during the late preschool and school ages and deteriorate in old age. Thus, children perform better on indirect memory tests than direct memory test. Such tests are important for the exploration of children's memory for television content. It would be interesting to study what information children are able to remember both explicitly and implicitly, since television content has become increasingly graphic and realistic in the depiction of negative material (Cantor, 1996).

Summary of Literature Review

Wackman and Wartella (1977) indicated that age, representative of the developmental level of the child, was a good predictor of how children of different ages will respond to the same stimuli. Thus, past research (Flavell, 1986) has indicated that children's comprehension of the events around them increases with age. In addition, children's understanding of the information they view on television is influenced by their cognitive capacities. Also, television plays at least some role in children's perception of reality (Shapiro & Lang, 1991). Because television content has become increasingly realistic in its depiction of negative material, researchers (e.g., Kaiser et al., 1995; Steur et al., 1971) have investigated the types of televised information children will imitate. However, the behaviors children imitate may not be simply everything they observe on television. It is possible that certain televised behaviors might be utilized more often than others. The developmental issues that have been presented have pointed to the research question of interest.

Purpose and hypotheses of current study. Flavell (1993) has indicated that the fantasy-reality distinction develops around 4 and 5 years of age. In addition, many 3-year-olds seem to possess little or no understanding of the distinction. Thus, children's ages are correlated with their ability to make the distinction between appearance and reality (Flavell, 1993). It would be useful to study both children who can and cannot make this distinction. Also of interest was children's likelihood of using real or unreal observed scenarios in their everyday life. In order to do this, it needs to be determined if children will implicitly use the same information that they are able to recall when

explicitly asked. Assuming that age is indicative of the ability to make the fantasy-reality distinction, and that children's ability to make this distinction may affect their implicit and explicit memory, it seems logical to study how the ability to make the fantasy-reality distinction can affect both children's explicit and implicit memory. Ideally, one would compare how the explicit and implicit memory of children of different age groups are affected by their understanding of the fantasy-reality distinction. Since children between the ages of 5 and 7 years have developed both implicit and explicit memory, it might be expected that their memory performance may depend on their ability to make the fantasy-reality distinction. In other words, the memory of those children who are able to make the fantasy-reality distinction may be more effected than the memory of those who are unable to make the distinction. It may be assumed that because older children (between 5 and 7 years of age) can make the fantasy-reality distinction, it would be expected that their explicit and implicit memory might be affected by what is fantasy and what is reality. On the other hand, the memory of younger children (under the age of 5 years) may not be effected by what is fantasy and what is reality because children within this age group do not know the difference between fantasy and reality. However, due to time constraints, the current study served as only a preliminary look at the effects of children's understanding of the fantasy-reality distinction on explicit and implicit memory performance. The current study focused on children (ages 5 to 7 years) who have probably developed the fantasy-reality distinction. Future studies will compare younger children's (ages 3 to 4 years) performance to their older counterparts.

In the current study, children in the experimental groups viewed both a fantasy

and reality solution for a problem, while children in the control group were not primed with either type of solution. Both implicit and explicit memory for fantasy and reality scenarios were tested. It was first hypothesized that because the experimental group was primed with both fantasy and reality information, while the control group did not receive this extra information, the experimental group would perform better on the direct task than the control group. Second, within the indirect memory test, it was believed that the experimental group would find a solution to the problem sooner than the control group, since the control group would not be primed with any solutions. Third, it was believed that within the indirect test, participants in both groups (the experimental and control groups) would utilize the reality solution more than the fantasy solution despite any priming. Fourth, it was hypothesized that there would be no difference in performance of both boys and girls for the memory tests. Finally, it was hypothesized that since children older than 5 years of age have probably developed the ability to distinguish fantasy from reality, for the current sample of 5 to 7 year-olds, there would be no difference in performance on the indirect and direct tests of memory as a function of age.

Method

Participants

Participants were recruited from five childcare centers in a large urban area in California. Upon their parents' consent, fifty-three 5 to 7 year olds ($M = 5.68$ years; $SD = 0.70$), 37 in the experimental group (69.8%) and 16 in the control group (30.2%) were tested. Twenty-six males (49.1%) and 27 females (50.9%) comprised the sample. A small variety of ethnic groups were represented in the study. There were 43 Whites

(81.1%), 3 Blacks (5.7%), 2 Asians (3.8%), and 5 Hispanics (9.4%). The childcare centers were compensated with \$2.50 for each child who participated in the study.

Design

The design of the experiment that was directly relevant to the hypotheses was a 2 x 2 mixed factorial design (learning context by type of memory test). However, there were two subject variables (age and gender), as well as the necessity to control for four factors (actor order, stimulus location, test order, and scenario order), resulting in a more complicated experimental design. Thus, the complete design of the study was a 2 x 2 x 2 x 2 x 2 x 2 mixed factorial design. The between-subjects factors in the design were learning context (experimental or control), the counterbalancing of actor order (actor #1 first or actor #2 first), the counterbalancing of the stimulus location (key/tray or key/beanbag), the counterbalancing of test order (indirect first or direct first), the counterbalancing of scenario order (reality first or fantasy first), age (5 to 7 years of age), and gender of the participants (male or female). The within-subjects factor was the type of memory test (direct and indirect). The dependent variables were the children's performance score on the memory tests, measured by the amount of probes needed for the participants to recall previous information, as well as accuracy of recall.

Materials

Eight video-taped stories were shown to individuals in the experimental group. Each video tape showed two girls solving the same problem independently, using two different solutions. Thus, two different outcomes for the problem were developed and resolved with either a fantasy or reality solution in order to insure that the children's

ability to distinguish between fantasy and reality was being tested rather than the scenario itself. The tapes depicted the girls attempting to open a locked chest, and finding a device to open the chest either on the top of a beanbag or in a shallow tray. Actor order, usage of either the key or wand, and location of the devices were counterbalanced.

In Video #1, Girl A accomplished the task by looking to the side of the toy box, finding a wand on top of a beanbag, and opening the box, while Girl B found a key in a tray, and used it to open the box. Video #2 showed Girl A opening the toy box with the key found in the tray, and Girl B opening the box with the wand found on the beanbag. Video #3 and Video #4 showed the same information as Video #1 and Video #2 except the actors were reversed. In Video #5, Girl A opened the box with the wand found in the tray, and Girl B opened the box with the key off the beanbag. Video #6 showed Girl A opening the box with the key found on the beanbag, and Girl B opening the box with the wand from the tray. Videos #7 and #8 depicted the same information as the prior two videos, but the order of the actors was reversed. In all videos, the girls found the toy, Mr. Potato Head.

For the control group, four videos were developed. Each video tape depicted one of the two actors opening the unlocked toy box and finding Mr. Potato Head. Although, the actors did not use a device to open the box, the key and wand were shown in the two possible locations. Location of key and wand, as well as actor order was counterbalanced.

Procedure

Each participant was tested individually. Before the scenarios were shown, the

experimenter explained to the children the task they were to do. The experimenter said, "I am going to be showing two short videos to lots of children. I need your opinion of whether or not you think other kids will enjoy watching these videos. Please watch these videos and tell me how interesting you think they are." The scenarios were then shown to the children. Participants in the experimental group saw one of the eight videotapes. The control group watched one of the four control videotapes. Each of the videos were watched by 4 participants with the exception of Videos #2-6 which were viewed by 5 participants.

In order to look at the children's long-term retention of the information presented, the children's implicit and explicit memory was tested about a week ($M = 6$ days) after the scenarios were shown. All of the participants' responses were audiotaped. The order of the tests was counterbalanced to control for possible order effects. The direct memory task (see Appendix B) explicitly asked the children to recall specific material that they viewed. After the initial recall question, the experimenter followed with two probes, one which asked the participants to indicate if they remembered seeing two girls, and how they could tell one from the other. During the general recall portion of the direct memory test, the experimenter recorded whether the participants were able to recall previously selected facts about the video. If the items were not recalled with the general recall question and the prompts, the experimenter asked the specific questions related to each item.

In the indirect test (see Appendix B), the participants implicit memory was tested. With this task, the children were presented with the problem viewed on the videotapes.

The experimenter asked the children whether they had seen an area like the one in front of them before, and what they would like to do with the things in the area. The participants received an implicit memory score based on how many probes the experimenter needed to use in order to get the participant to use a device to open the toy box. The researcher recorded how the participant solved the problem, and at what point the problem was solved. Participants were asked two final questions, regarding the reality of using the key or the wand in opening a locked toy box. The children were first asked whether or not a key could really be used to open a box, and then whether a wand could really be used to open a box. When the memory tests and questions were completed, the children were thanked for their participation and asked not to share their experience with the other children. Parents, children, and schools involved were provided with a debriefing letter.

Results

The main independent variable was the between subjects' manipulation of learning context, whereas the repeated measures' independent variable was the two memory tests (direct and indirect). The dependent variables were the scores on the direct and indirect memory tests. After the video viewing, the children's implicit and explicit memory was tested in order to test the main questions. Means, standard deviations, minimum and maximum are presented for each of the dependent variables in Table 1.

First, a set of one way analyses of variance (ANOVA) for main effects of the 4 control factors (actor order, stimulus location, test order, and scenario order), will be presented. Since all of the control factors had nonsignificant main effects, they were

Table 1

Descriptive statistics of dependent variables.

VARIABLE	N	Minimum	Maximum	Mean	Std Deviation
DIRECT TEST SCORE	53	5	17	10.40	3.62
INDIRECT TEST-# OF PROMPTS	53	1	4	2.87	1.00
INDIRECT TEST - CHOICE	53	1	2	1.08	.27

eliminated from the subsequent analyses. This report will be followed by the analyses which tested the hypotheses of the study.

There were no significant main effects for actor order for either the indirect memory test, $F(1, 36) = 0.115$, $MSE = 0.748$, $p = .74$, or the direct memory test, $F(1, 36) = 3.68$, $MSE = 10.811$, $p = .07$. In addition, there were no significant main effects for stimulus location for either the indirect memory test, $F(1, 36) = 0.002$, $MSE = 0.751$, $p = .97$, or on the direct memory test, $F(1, 36) = 0.43$, $MSE = 11.801$, $p = .52$. Furthermore, no significant main effects for test order were found for either the performance on the indirect memory test, $F(1, 36) = 2.33$, $MSE = 0.704$, $p = .14$, or on the direct memory test, $F(1, 36) = 0.61$, $MSE = 11.740$, $p = .44$. Finally, there were no statistically significant main effects for scenario order for either the indirect memory test, $F(1, 36) = 1.45$, $MSE = 0.721$, $p = .24$, or the direct memory test, $F(1, 36) = 2.21$, $MSE = 11.235$, $p = .15$.

The hypothesis that the experimental group would perform better on the direct memory task than the control group was supported. A one-way ANOVA revealed a significant difference between the experimental and control groups' performance on the direct memory test, $F(1, 52) = 21.23$, $MSE = 9.452$, $p < .001$. The experimental groups had a higher average direct memory score ($M = 11.68$ items remembered, $SD = 3.41$) than their control counterparts ($M = 7.44$ items remembered, $SD = 2.06$). In addition, within the indirect memory test, the hypothesis that the experimental group would find a solution for the problem with fewer prompts than the control group was supported. A one-way ANOVA found that there was a statistically significant difference between the

two groups, $F(1, 52) = 20.38$, $MSE = 0.730$, $p < .001$. In support of the hypothesis, participants in the experimental group ($M = 3.22$ prompts, $SD = 0.85$) chose a solution to the problem of opening the locked toy box with fewer prompts than the participants in the control group ($M = 2.06$ prompts, $SD = 0.85$).

Furthermore, the hypothesis that within the indirect test, the participants in both the experimental and control groups would utilize the reality solution more than the fantasy solution despite any priming was supported. Ninety-two percent of the experimental group chose the key over the wand in solving the problem and 94% of the control group utilized the key instead of the wand. These are both significantly different from chance, $\chi^2(1, N = 37) = 25.97$, $p < .001$, $\chi^2(1, N = 16) = 12.25$, $p < .001$, respectively.

The hypothesis that there would be no difference in performance for both boys and girls on the memory tests was supported for the indirect test score, but not the direct test score. A one-way ANOVA with just the experimental group showed no statistically significant difference between boys and girls for the indirect test score, $F(1, 36) = 1.45$, $MSE = 0.721$, $p = .24$. On the other hand, there was a statistically significant difference for the direct memory test score, $F(1, 36) = 5.46$, $MSE = 10.334$, $p < .03$. Girls ($M = 12.94$ items remembered, $SD = 2.84$) remembered statistically significantly more items from the videos on the direct memory test than their male counterparts ($M = 10.47$ items remembered, $SD = 3.53$).

Finally, the hypothesis that there would be no difference in performance on the indirect and direct memory tests as a function of age was supported. A one-way analysis

of variance (ANOVA) with unequal n was conducted: 5-year-olds ($n = 18$ participants), 6-year-olds ($n = 17$ years), and 7-year-olds ($n = 2$ participants). No significant difference in performance on the direct memory test was found between the participants as a function of age, $F(2, 36) = 1.40$, $MSE = 11.362$, $p = .26$. Also, no significant difference in performance for the indirect memory was found as a function of age, $F(2, 36) = .98$, $MSE = 0.730$, $p = .39$.

Discussion

With the increasingly realistic portrayal of negative information on television, it is important to investigate what children understand from television, as well as the behaviors children will copy. The purpose of the current study was to not only examine children's grasp of the fantasy-reality distinction through direct and indirect memory tests, but to determine whether children would utilize real or fantasy information more often. Thus, it was necessary to examine if children would implicitly use the same material that they remembered explicitly. Memory of the video scenarios was very good on the explicit memory measure and showed a strong trend for the reality solution on the implicit memory measure for both the experimental and control groups. Discussion of the results includes the analyses of the control factors, followed by each of the analyses of the hypotheses, along with a brief discussion of the meaning of each result. Finally, the implications of the current study and future studies is discussed.

In order to determine whether the counterbalancing in the control factors (actor order, stimulus location, test order, and scenario order) was successful, a series of analyses were first conducted with these factors and the dependent variables. Because

there were no significant main effects of the factors, these factors were eliminated from the main analysis.

The main analysis revealed that most of the proposed hypotheses were supported. First, it had been hypothesized that because the experimental group was primed with both fantasy and reality information, while the control group did not receive this extra information, the experimental group would perform better on the direct memory task than the control group. In addition, within the indirect memory test, it was believed that the experimental group would find a solution for the problem sooner than the control group. For both the direct and indirect tests, the experimental group received higher scores than their control counterparts. Bandura (1969) indicated that the actions of powerful models will be paid attention to, practiced and imitated even though observers have no direct interaction with them because their behavior is likely to have a high practical value. The findings seemed to indicate the experimental group's performance was helped with the priming of certain information. It may be that children in the experimental group utilized the practical information they gathered from the videos to solve the problem of unlocking the box. It becomes apparent that children may in fact, imitate a model's behavior if it is useful to them, even if that behavior is observed indirectly (e.g., by television). Particularly, because the experimental group was primed with a fantasy and reality solution in the video they viewed, they were faster at finding a way to open the locked toy box in the indirect test. It seems that for the direct memory task, the participants' performance was dependent upon the utilization of information stored in memory rather than just the response to the task's demands. On the other hand, within the indirect test,

participants' utilization of prompts to pick a solution seemed dependent upon information previously stored in memory, whereas their choice of a solution seemed dependent on the task's demands. Flavell (1993) has indicated that the fantasy-reality distinction develops around 4 and 5 years of age. It seemed that the participants in this study were cognitively able to realize that the key would be able to successfully open the box, whereas the wand would not. Thus, performance measures for both the direct and indirect tasks really assess both memory and the children's ability to make the fantasy-reality distinction.

Furthermore, since the participants in this study are probably able to distinguish between fantasy and reality, within the indirect memory test, it was hypothesized that the participants in the experimental and control groups would utilize the reality solution more than the fantasy solution despite any priming. The results of the analysis supported the hypothesis. Almost all of the participants, both in the experimental and control groups utilized the reality solution more than the fantasy solution. Flavell et al. (1990) indicated that the developmental difference between younger and older children's understanding of the mind influences how they respond to images they see on the television screen. Thus, despite any priming, the participants' behavior was not just determined by what they had viewed, but also by their understanding of what they had viewed. In addition, when they were indirectly tested, the participants seemed to rely on their own understanding of fantasy and reality. From these findings, it may be concluded that being able to distinguish fantasy from reality may influence how much of an effect television programs have on children's behaviors.

In addition, it was hypothesized that there would be no difference in performance

for both boys and girls for the memory tests. The analysis with just the experimental group was conducted to examine this hypothesis. Although the hypothesis was supported for the indirect test score, it was found that the hypothesis was not supported within the direct memory test in which females remembered statistically significantly more on the direct memory test than their male counterparts. These findings seem to indicate that girls are better able to remember information that is asked of them, directly. However, both boys and girls are equally influenced by what they view on television. In other words, what boys and girls view on television will probably affect them similarly in their everyday behavior.

Finally, it had been hypothesized that since children older than 5 years of age have probably developed the ability to distinguish fantasy from reality, there would be no difference in implicit and explicit memory performance among the participants. Past research (Flavell, 1986) has indicated that the distinction between fantasy and reality depends strongly on the developmental level of the child. Research (Flavell et al., 1990; Wright et al., 1994) seems to indicate that children's understanding of the factuality of television programs increases with age. As predicted, children between the ages of 5 and 7 years did not perform differently than one another on either the direct or indirect memory tests. It was believed that these findings were indicative of the participants' ability to already make the fantasy-reality distinction. Past research (Flavell et al., 1983) indicated that children over the age of 4 years perform better on simple appearance reality tasks. In this study, all of the participants were of an age that is usually able to make the distinction, so it is not surprising that no developmental changes were observed between

5 and 7 years. However, even though the null hypothesis was not rejected, this finding is not sufficient to claim that there are no age differences in 5, 6, and 7 year olds. It remains to be determined if the relative performance on implicit versus explicit memory may change as children learn to make the fantasy-reality distinction.

Because the main hypotheses were supported, it could be concluded that children between the ages of 5 and 7 years do understand the material they view on television and are influenced by it in some way, but they do not utilize all types of information equally. When children are old enough to make the fantasy-reality distinction, they may not be strongly influenced by fantasy content. Instead, children who understand what is real and unreal, also understand that if they are placed in a situation which requires them to come up with a solution, they will look towards a real and logical means of solving the problem, as indicated by Bandura (1969). Parents and educators could help to facilitate this understanding by careful regulation of the types of television programs their children view, especially after their children are able to make the fantasy-reality distinction. It seems that when children are able to make this distinction, they are strongly influenced by realistic information. In light of the increasingly realistic portrayal of negative information on television, television viewing for children older than 5 years could be potentially detrimental. It would seem necessary for parents and educators to focus on limiting the negative content in shows that appear to be real.

Because the current study only provided a preliminary test of children's implicit and explicit memory for fantasy and reality solutions, future research would need to account for some of the limitations. First, it would be necessary to examine implicit and

explicit memory performance for fantasy and reality material for other age groups.

Specifically, since the current study was focused on older children's (ages 5 to 7 years) implicit and explicit memory for fantasy and reality scenarios, future studies would need to compare younger children's (ages 3 to 4 years) performance to their older counterparts. It would be interesting to see if children who are unable to make the fantasy-reality distinction would perform differently than children who have already developed the ability to make this distinction. With future research, it would be important to determine whether children (3 and 4 years of age), who are probably unable to make the fantasy-reality distinction, will incorporate unreal and possibly negative behaviors in their everyday lives.

Furthermore, the current study only presented scenarios of two girls solving a problem. Other research might want to determine whether the children's responses would differ, depending on the age and gender of the actor they observed. For example, it would be interesting to see if the children would perform better on the memory tests if the actor they observed was of the same age and gender. In addition, it might be interesting to manipulate the types of content children view. Negative information might influence children's implicit and explicit memory differently than the relatively neutral/positive behaviors depicted in this study. Furthermore, it may be interesting to have the participants indicate any other possible solutions to the problem than the one they acted out. This might help to determine whether children were able to come up with solutions that they did initially act out.

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Appendix A

TO: Michele M. Wong
375 S. 9th St., #1204C
San Jose, CA 95112

FROM: Nabil Ibrahim,
Acting AVP, Graduate Studies & Research

DATE: March 15, 1999

The Human Subjects-Institutional Review Board has approved
your request to use human subjects in the study entitled:

**"Young Children's Implicit and Explicit Memories
for Fantasy and Reality"**

This approval is contingent upon the subjects participating in your research project being appropriately protected from risk. This includes the protection of the anonymity of the subjects' identity when they participate in your research project, and with regard to any and all data that may be collected from the subjects. The Board's approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Nabil Ibrahim, Ph.D., immediately. Injury includes but is not limited to bodily harm, psychological trauma and release of potentially damaging personal information.

Please also be advised that all subjects need to be fully informed and aware that their participation in your research project is voluntary, and that he or she may withdraw from the project at any time. Further, a subject's participation, refusal to participate, or withdrawal will not affect any services the subject is receiving or will receive at the institution in which the research is being conducted.

If you have any questions, please contact me at
(408) 924-2480.

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APPROVED BY THE MASTER'S THESIS COMMITTEE

Dr. Robert Cooper, thesis chairperson

Dr. Arlene Asuncion

Dr. Alicia Knoedler

Appendix B

SS # _____

Direct Memory Test

"Hello, _____, my name is Michele. Thank you for helping me with my project. Before we begin, do you need to go to the bathroom?"

→ "This is subject (subject number and video number)."

"I am going to ask you some questions. Please answer them as best as you can. There are no right or wrong answers."

General Questions:

"Do you remember watching 2 short videos last week?"

YES: "Can you tell me what happened in the videos?"

→ "Is there anything else that you can remember?"

"Do you remember there were two girls?"

→ "How can you tell the difference between the girls?"

→ "One was wearing a hat and the other was not."

NO: "Remember, I showed you the videos with the girls?"

→ "One was wearing a hat and the other was not."

***** don't forget to record responses *****

Appendix B continued

Specific Questions/Facts for Direct Test:

General Prompt Specific

1.) Finding the toy box

→ **"What did the girl(s) find when they first walked into the room?"**

→ "They found a toy box."

2.) Box was locked (experimental)/ opened (control)

→ **"Was the box locked or unlocked?"** (circle one)

→ **"Was the box closed or open?"** (circle one)

→ "The box was locked/unlocked." (circle one)

Girl with hat (blonde):

3.) Opened box with wand/key (circle one)

→ **"How did the girl with the hat (blonde hair) open the box?"**

→ "She used a wand/key." (circle one)

4.) Location of wand/key (circle one)

→ **"Where did she find the wand/key?"**

→ "She found it in the tray/beanbag (circle one)

Girl without hat (brunette):

5.) Opened box with wand/key (circle one)

→ **"How did the girl without the hat (brown hair) open the box?"**

→ "She used a wand/key." (circle one)

6.) Location of the wand/key (circle one)

→ **"Where did she find the wand/key?"**

→ "She found it in the tray/beanbag (circle one)

7.) Mr. Potato Head found

→ **"What toy did the girls find?"**

→ "They found Mr. Potato Head."

Appendix B continued

SS # _____

Implicit Memory Test:

“Do you remember seeing an area like this before?”

→ “You saw this area in the video I showed you last week.”

_____ 1.) “What would you like to do with the things in this area?”

_____ 2.) “Can you find Mr. Potato Head?”

_____ 3.) “What could you use to open the box?”

_____ 4.) “How would you open the box?” (Hand them both key and wand)

***** check when they try to open the box *****

Which do they choose? (circle one)

key wand other _____

Appendix B continued

Subject # _____

Final Questions:

→ “The girl with blonde/brown hair opened the box with the key. Do you think that can really happen?”

→ “The girl with the blond/brown hair opened the box with the wand. Do you think that can really happen?”

“Thank you for your help! You did a great job! I’m glad that you helped me with my project.”