TELEVISION VIEWING, CHILDREN'S BELIEFS ABOUT SCIENTISTS, AND PREFERENCE FOR SCIENCE AS AN ACADEMIC TOPIC

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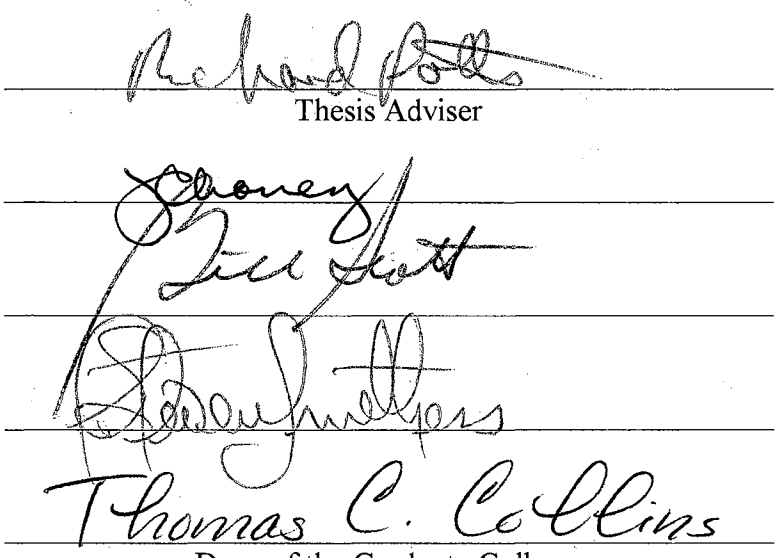

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CHAPTER I

INTRODUCTION

Recent reports indicate that the United States is declining as a world leader in scientific achievement (American Academy for the Advancement of Sciences, 1989; National Assessment of Educational Progress, 1989). In a recent international assessment of science and math knowledge, American school-children were outperformed by European and Asian school-children. Consequently, the Federal government has assigned a task force to identify ways to strengthen American school-children's performance in science and math (National Education Goals Panel, 1992). Clearly, the identification of possible contributions and detriments to children's interest and performance in math and science is of considerable importance. Furthermore, American school-children's interest and performance in science and math may influence their decisions regarding particular career choices. Other societal outcomes may also occur as a result of a limited knowledge base concerning science and math. Science and math play a key role in everyday decisions which affect jobs, health care, and routine consumer activities. With the increasing development of new technologies in school, occupations, and at home, American school-children need to be prepared to compete on a societal as well as a global level in the future.

One potentially significant contributor to children's knowledge, beliefs, and attitudes toward a variety of topics is the television medium. Numerous research efforts have demonstrated both desirable and undesirable influences of television on viewer's behavior, beliefs, and cognition (Huston et al., 1992; Pearl Bouthilet, & Lazar, 1982). Pertinent to the present discussion are findings that television often presents distorted and biased portrayals of social groups, including occupational categories such as scientists (Mead & Metraux, 1957; Basalla, 1976; Gerbner, Gross, & Signorelli, 1981; Gerbner, 1987). The impact of negative portrayals of scientists on television may be a detrimental influence on children's interest and performance in science and math. Research has shown that viewer's attitudes and beliefs about scientists are inversely correlated with amount of viewing of certain types of television programs (Gerbner, 1987; Potts & Martinez, 1994). Unfortunately, findings to date are correlational and do not allow for demonstration of a causal relationship between television scientist portrayals and children's evaluations of scientists. Therefore, further research needs to be done in this area with an emphasis on experimental laboratory studies that investigate television as a causal influence on science related beliefs. Television may be significant and possibly detrimental influence on children's performance in science and math. However, television has a great potential to remediate negative effects and inform viewer's of the rewards of scientific endeavor (Meade & Metraux, 1957; Huston et al., 1992). The precise nature of the relationship between television and children's science interest and beliefs about scientists are important topics for continued investigation.

CHAPTER II

REVIEW OF THE LITERATURE

Television and Society

Television has rapidly become an integral part of American society. Family ownership of television sets grew at an exponential rate during the 1960's and recent estimates indicate that 99% of American homes have at least one television set (Condry, 1989). On the average, conservative estimates report that American children spend between two and three hours a day watching television (Condry, 1989, Huston, et al., 1992). The amount of time that a child typically spends watching television is relatively stable over time (Huston, Wright, Rice, Kerkman, & St. Peters, 1990). It has been found that children begin watching and imitating television during infancy (Hollenbeck & Slaby, 1979; Meltzoff, 1988). Television viewing by children increases during the preschool years, tapers off at school entrance, and peaks in early adolescence. Television viewing declines during adolescence, (Comstock, Chaffee, Katzman, McCombs, & Roberts, 1978; Huston et al., 1990; Liebert & Sprafkin, 1988) but increases in adulthood to reach 4.5 hours by age 55 (Slaby & Quarfoth, 1980). Television provides a salient source of learning and entertainment about life in the real world (Huston et al., 1992). However, the content of television programs often does not portray an accurate reflection of the real

world and this may have implications for what individuals learn from television (Perry & Bussey, 1984). In the next section, theoretical approaches to understanding how television viewing is an important source of learning various beliefs and behaviors will be presented.

Social Learning Theory

Social learning theory is one of the primary theoretical frameworks utilized in understanding how television affects viewing audiences, especially the behavior of viewers (Huston et al., 1992; Condry 1989). The adequacy of the social learning perspective lies in the basic premise that individuals are able to learn particular behaviors or beliefs by observation of models (Bandura 1977; Rosenthal and Zimmerman, 1978). The scientific utility of social learning theory is that it offered greater explanatory and predictive power than that offered by behaviorism, and could encompass learning of complex human behaviors while maintaining the methodological rigor of the behaviorist tradition (Bandura, 1977; Rosenthal & Zimmerman, 1978).

Social learning theorists incorporated the role of cognition in the determination of learning and behavior change. According to social learning theory, individuals are able to imitate others and learn from the consequences of others actions via observation. By observing actions and events individuals are able to discern the utility of a particular behavior through cognitive processes. This idea was in direct contrast to the theoretical approach of behaviorism where a behavior would have to be performed in order to conclude that the behavior was learned. Social learning theorists criticized this approach because many behaviors could simply not afford to be based on trial and error learning.

For example, learning to drive a vehicle or to fly a plane would be too dangerous to learn through trial and error. Social learning theorists were also able to draw not only on psychological principles derived from laboratory studies but also anthropological sources of data to demonstrate the importance of learning by observation (Bandura, 1977). Observations of non-human primates reared in human families found that chimpanzees were able to mimic everyday human activities such as striking typewriter keys, putting on makeup, opening cans with tools, and other human behaviors without any prior direct instruction (Hayes & Hayes, 1952). Social learning theory conceptualizes learning and behavior in a reciprocal relationship involving behavior, person variables, and environmental influences. Behavior is an action comprised of motor responses in which an individual engages and results in a particular outcome. Person variables include genetic and biological influences as well as the learning history of the individual. Environmental influences are those factors present in the surrounding context which have either a direct or indirect effect on learning by virtue of the environmental factors present. Each of these influences are seen as interdependent upon the other influences. Human behavior is viewed as evolving from the interrelationship between these three factors. The outcome(s) of the reciprocal interaction between these three factors determine how behavior is learned or whether that behavior will be enacted in the future. Furthermore, the relative influence of each of these factors differ according to the setting and the behavior. At times the environment may pose a more powerful constraint on behavior where in other situations the person or behavior itself may exert a more powerful influence. Social learning theorists refer to this interaction as reciprocal determinism. The social learning perspective provides a unique view of human behavior in that it emphasizes the

importance of the cognitive aspects of an individuals' person variables. Thus, the individuals are viewed as an important agents of determining learning as much as behavioral or environmental influences. According to social learning theory, the primary process by which individuals are able to learn a variety of behaviors is observational learning.

Social Learning and Modeling Processes

Observational learning is regarded as a fundamental means for the acquisition of new behaviors, attitudes, or beliefs (Bandura, 1986). Bandura proposes that four component subprocesses are involved in observational learning: attention, retention, motoric abilities, and motivational processes. Attentional processes refers to how characteristics of the modeled stimuli and the observer interact to register the occurrence of the modeled event. The observer must first attend to the model in order for the observer to learn the actions that the model might employ. Further, model attributes determine whether the model will elicit a high or low level of attention from observers. Conspicuous attributes and behavior of the model have been found to elicit more attention in children than other stimuli (Rosenthal & Zimmerman, 1978; Perry & Bussey, 1984). These include lively soundtracks in audio-visual modeling, novel visual stimuli, high activity, and aggression. Other personal attributes of the model have also been shown to elicit more attention from observers. For example, care givers as models have been shown to elicit a high degree of attention from infants (Eckerman et al., 1975). It has also been demonstrated that observers attend more strongly to models which are of the same sex (Jacklin & Macoby, 1978). Finally, the warmth and power of the model have also been

shown to be important factors which determine the amount of attention invested by observers (Grusec & Mischel, 1966; Perry & Perry, 1975; Slaby & Frey, 1975).

Retention processes refer to how well the observer is able to correctly discriminate the modeled stimuli and subsequently remember the models' actions. Social learning theorists describe this as a representational process in which the observer symbolically represents the behavior of the model into their own cognitive framework (Bandura, 1977; Bandura & Barab, 1971).

Bandura proposed that observational learning relies mainly on two representational systems: imaginal and verbal (Bandura, 1977). Visual imagery and covert verbal descriptions are strategies which have been shown to enhance retention of observed behavior. These studies have compared both covert verbal strategies and imaginal strategies to observers engaged in simple observation or observers preoccupied with some mental task (Bandura, Grusec, & Menlove, 1966; Bandura & Jeffrey, 1973; Bandura, Jeffery, & Bachicha, 1974). Imagery is noted to play an important role in observational learning during early child development because of young children's lack of basic verbal ability. The use of imagery is also important in learning complex behavioral patterns. Through the use of repeated exposure, an individual is able to retain images of the observed behavior. Later, the individual is able to mentally re-create the models' behavior which is no longer physically present and serves to guide the individuals overt behavior. Most of the cognitive processes that regulate behavior are primarily verbal (Bandura, 1977). Using verbal codes enable individuals to store a great deal of information in small form. For example, trying to remember the directions to a new location might be easily transferred to a series of right and left turns symbolized by a verbal code consisting of a

series of letters. Other mnemonics can also be used facilitate the memory of a particular event or behavioral sequence.

The retention subprocess is particularly important when examining what information children learn about television characters when viewing television programs. It has been found that formal features of popular television programs intended for children may enhance attention to the images presented on television (Anderson & Lorch, 1983; Huston & Wright,1983). As a result, these features may enhance children's learning of the images presented on television. Hence, images portrayed on television programs provide a source of information which can facilitate memory about the behavior of particular social groups or individuals.

Motor reproduction processes refers to the observer's ability to reproduce the behaviorally modeled event or sequence. Even if the event is observed, registered, and correctly recalled, the observer must possess the motoric skills necessary to translate the acquired behavior into performance. As with any physical action, practice, corrective feedback, and confidence in ability are determinants of accurate imitative behavior.

The motivational subprocess involves reinforcement determinants of whether the observer will engage in the modeled behavior. Fundamental principles of behavior suggest the presence of incentives or other reinforcing stimuli determine the observer's motivation to perform the acquired response or behavior (Bandura, 1965). An important aspect of observational learning is that people have the ability to learn from the successes and failures of others as well as their own direct reinforcement experiences. Generally, if the observed model is rewarded for engaging in a behavior, then observers will tend to act in the same way. If the model is punished for engaging in a particular behavior, then

observers will tend not to engage in that behavior. This learning mechanism is termed vicarious reinforcement. Another aspect of vicarious reinforcement is that even if a behavior was previously punished, if that behavior is later observed going unpunished, observers will enact those behaviors to the degree that the unpunished model enacts the behavior. Thus, attention, proper discrimination, encoding, organization, recall, physical ability, and incentives, function interdependently to determine if the modeled event will be learned and performed.

The social environment allows for various ways to learn new behaviors. This may occur through direct reinforcement, trial and error learning, or perhaps, observational learning. Observational learning is particularly salient when examining the social structure of families, schools, and other institutions. Parents, teachers, and public officials are all expected to serve as "role models" for children, students, and society at large. Each of these models are associated with attributes such as warmth, power, or other salient characteristics known to strengthen attentiveness and subsequent learning of behavior.

Another important aspect of social learning theory is the distinction between observational learning and imitative performance. As described previously, acquisition of a new behavior is not necessarily translated into overt imitative performance unless certain incentive conditions are present. The distinction between acquisition and performance was demonstrated in a study designed by Bandura (1965). Three groups of children viewed a film of a model engaging in aggression toward a doll. One group viewed the model being punished for aggressiveness while for another group the model was rewarded for his actions. For the third group of children, the model received no consequences. Following the modeling sequence, all children were placed in a setting similar to the

modeling situation and imitative performance of the aggressive behavior was assessed. Results indicated that the children in the rewarded model condition engaged in the most imitative behavior, the children in the punished model condition engaged in the least amount of imitation, and the children in the ignored model condition demonstrated an intermediate amount of imitative performance. After the imitative performance assessment, the experimenter then asked the children to show everything that the model had done in the film in exchange for prizes. This recall test was considered a test of observational learning. Children from all three groups showed excellent recall and equivalent recall of the models actions. Thus, although the model's behavior was learned by all child observers, certain incentive conditions were necessary before they performed the modeled behavior.

The distinction between acquisition and performance can be explained by synthesizing components of information processing theory and components of theories of reinforcement. Bandura explains acquisition as a cognitive process (attention, retention) and imitative performance as an overt behavioral response (motoric abilities, motivation) (Bandura, 1977; Rosenthal & Zimmerman, 1978). This view implies that many behaviors may be learned and stored in representational form, but not overtly performed until a considerably later time when incentive conditions are present.

Scope of Modeling Effects

Modeling has been shown to be effective in preventing certain behaviors and learning of novel behaviors. It has also been demonstrated that modeling can instigate previously punished behaviors and facilitate known behaviors (Bandura, 1977). Other

demonstrations of modeling have been effective in establishing change in judgmental orientations, language styles, conceptual schemes, cognitive operations, and in new standards of conduct (Bandura, 1971; Rosenthal & Zimmerman, 1976; Rosenthal & Zimmerman, 1978). Further, modeling has been utilized in teaching children communication skills, problem solving strategies, and reducing fear in the treatment of phobias (Perry & Bussey, 1984; Bandura, 1976; Wilson & O'Leary, 1980).

Modeling is an important mode of learning, particularly when examining it's impact via television viewing. In the next section, early studies on the effects of television on viewing audiences will be discussed. These studies provided early data on modeling, observational learning and the implications of these processes in the context of television viewing.

Early TV Studies

A major area of research conducted within the context of modeling theory concerns the effects television on viewers' behavior (Condry, 1989). Historically, much of this research concerns the relationship between television viewing and aggression, especially in child viewers (Condry, 1989). Public concern over the possibility of harmful effects of viewing violent material on children stimulated social scientists to address this issue. Laboratory research found that children who viewed live or aggressive models in film were more inclined to exhibit aggressive behavior than children who viewed non-violent films (Bandura, Ross & Ross, 1963; Walters & Thomas, 1963; Wheeler & Smith, 1967). However, early studies involving filmed models of aggression were criticized because many of stimulus programs were produced by the researchers or were selected

portions of programs and perhaps not reflective of actual television content (Klapper, 1968). In a response to this criticism, other studies were done with more ecologically valid methodologies. Liebert and Baron (1972) showed children a popular television show containing violent content and then gave them the opportunity to use a "hurt" or "help" button which children were led to believe would make other childrens' tasks more difficult or easier. The children who viewed the violent content were more likely to "hurt" other children and engage in more aggressive behavior than children who did not view the program.

Correlational studies of home television viewing and aggression have found that children who view violent content on television for extended periods of time become more aggressive as adults (Eron et al., 1972; Lefkowitz, 1977; Lefkowitz, 1972). Numerous field and experimental studies have replicated these same results in the relationship between viewing violent television content and aggressive attitudes (Leifer & Roberts, 1972; Stein & Freidrich, 1972). However, it should be noted that aggression is only one behavior which can be learned by viewing television. The range of behaviors learned through television parallel the range of behaviors which are portrayed on television.

Social learning theory provides a strong theoretical base explaining how television characters influence viewing audiences. Social learning theory also provides researchers with a relatively straightforward way to test hypotheses about the effects of television on viewers. As discussed previously, laboratory experiments can be devised to parallel simulated or actual television content and subsequent effects on viewers. These types of studies provide control of relevant independent and dependent variables and enable

researchers to make causal inferences about the relationship between viewing particular types of television content and behavior.

Cultivation

Social learning theory is not the only heuristic paradigm available when studying the effects of television viewing. Researchers from mass communication disciplines have explored other ways to assess the effects of television on viewers. Specifically, cultivation theory provides a theoretical framework in which portrayals, images, and messages depicted on television and subsequent effects on viewing audiences are addressed (Signorielli & Morgan, 1990). This type of research provides further data on the effects of television which accentuates empirical findings utilized in the social learning theoretical framework.

Cultivation theory investigates how the social beliefs of viewing audiences are formed and maintained. Cultivation analysis takes into account the amount of television viewed, demographic variables of the viewers, and other media habits. A comparison between infrequent and frequent viewers is made after controlling for other variables and a "cultivation differential" is derived. Information that is obtained from respondents has included the National Opinion Research Center's General Social Survey which is comprised of questions that relate to aspects of the real world as well as the television world (Signorielli & Morgan, 1990). However, the questions do not mention television viewing as a motivation of the studies conducted to prevent any bias on the part of the respondent. As a result of this method, relationships between amount of television viewing and respondents beliefs, values, and judgements about the societal issues can be

illuminated further. This cultivation differential serves as an index of the amount of "effect" that television viewing has on viewer's beliefs, attitudes, and values.

Cultivation effects occur when repeated exposure to a consistent theme in television programs leads frequent viewers to incorporate those images, distorted or not, into their own representation of social reality. Cultivation analysis proposes that infrequent viewers are exposed to more varied and diverse information about social reality than frequent viewers, who obtain a disproportionate amount of social information from television. Thus, pervasive content themes, such as stereotyped portrayals of minorities and women, lead frequent viewers, in contrast with infrequent viewers, to believe that those portrayals are accurate depictions of reality. For example, content analyses of television portrayals of ethnic and gender roles have found that negative attributes are often associated with those social groups (Baptista-Fernandez, Greenburg, & Atkin, 1980; Berry & Mitchell-Kernan, 1982; Davis, 1990; Poindexter & Stroman, 1980), although recently the medium has shown some change towards more favorable portrayals (Huston et al., 1992). Cultivation effects have also been demonstrated in how people perceive the "real world". In general, people who watch more television tend to express an increased perception of living in a "mean world of danger and mistrust and alienation and gloom" (Gerbner et al., 1980).

Another aspect of cultivation effects is the process of mainstreaming. Mainstreaming refers to how the beliefs and value systems of frequent viewers of television are similar, even when viewers come from different demographic backgrounds and experiences. Mainstreaming is the result of frequent viewing of pervasive themes and images depicted on television which tends to counteract other variables that might

produce group differences in social beliefs. For example, one investigation found that children who viewed television frequently reported increased perceptions of danger, a finding which remained significant across groups with dissimilar demographic backgrounds (Gerbner et al., 1977). In a more robust display of mainstreaming, Gerbner and his associates compared frequent and infrequent viewers across lower, middle, and upper class income levels on reported "fear of crime". Expected results across incomes were that as income level rose, these respondents would have less fear of crime. This finding is consistent with FBI reports that low income neighborhoods have a greater incidence of crime. Gerbner's findings indicated that infrequent viewers showed significant differences on fear of crime across all income levels. However, in the frequent viewer category no significant differences in fear of crime were found between the income levels. This "homogenization" of the respondents from all three income levels on "fear of crime" is the result of a mainstreaming effect (Gerbner, 1977).

In sum, cultivation theory enables researchers to draw inferences about how the frequency of television viewing contributes to viewers' perceptions of social reality. Furthermore, cultivation findings are quite robust in that even when groups of viewers differ on socioeconomic or other variables, high television viewing frequency cultivates similar perceptions of social reality between two distinct groups. Furthermore, content analyses of popular television fare conducted by researchers verify that common misperceptions or beliefs held by different groups are those espoused by television (Defleur & Defleur, 1967; Signorielli & Morgan, 1990; Gerbner, 1987).

Integration of Observational Learning and Cultivation Analysis

Social learning theory and cultivation analysis are two important theoretical frameworks in studying the effects of television on children. Both theoretical approaches demonstrate credibility through numerous findings and research accounts. It is important to integrate these two perspectives to better understand how both processes co-occur as television images subsequently manifest in the attitudes, beliefs, values, and behaviors of viewing audiences.

As previously discussed, social learning theorists posit an observational learning process composed of cognitive and behavioral subprocesses. Information derived via observation of a model is acquired by the observer and, depending on the outcome of the various subprocesses, the modeled behavior is performed by the observer. Cultivation theorists explain that repeated exposure to consistent themes "cultivate" similar beliefs, values, and attitudes in viewers, even when viewers differ on demographic and other characteristics.

Cultivation theorists rely on viewer's overall viewing of television as well as overall viewing of specific types of television content to demonstrate differences between "light" and "heavy" viewers. Clearly, similarities exist between both perspectives in that both perspectives are able to provide empirical data to support hypotheses about effects of television on viewing audiences. However, the cultivation effects tend to occur over time whereas observational learning and imitative performance might occur even after only a single exposure. Moreover, differences also exist in that cultivation effects manifest in

viewer's belief and value systems and social learning occurs within these areas as well as behavior. Another aspect of cultivation theory is that it does not provide a primary means of translation from observation to imitative performance. Social learning theory, however, is able to explain this process via observational learning of the content depicted on television. Form this standpoint, cultivation can be viewed as a representational process which occurs in observational learning. Thus, cultivation of beliefs, attitudes, and values may serve to facilitate observational learning and performance of other beliefs, attitudes and behaviors. Hence, both perspectives can be viewed as facilitative for the other theoretical framework. Finally, research methodology of each perspective differs in that cultivation analysts conduct mostly correlational type research. Alternatively, social learning theorists are traditionally associated with laboratory research. Thus, respective methodologies of social learning theory and cultivation theory serve to provide empirical evidence in two congruent forms; each providing the other perspectives' data with added reliability and validity .

Scope of Television's Influence

It has been demonstrated that television has a variety of effects on viewer's behavior. Some of the effects of television have been examined in regard to viewers' aggressive and prosocial behavior. This section will review pertinent literature regarding two of the most fundamental areas of research on the effects of television on viewer's behavior.

The majority of laboratory research on the effects of violent content of television on viewers behavior has been conducted with children (Condry, 1989). Generally, early

findings in this area demonstrated that subjects who viewed violent television content in the laboratory were more likely to exhibit aggressive behavior when compared to subjects either in a non-film condition or watched arousing but non-aggressive material (Bandura, 1973; Bandura, Ross, & Ross, 1963; Berkowitz, 1973). These studies were criticized on the generalizability of findings on the basis that the film material was lacking in actual television content. Additional studies, however, addressed this issue and found that actual television depicting violence had the effect of stimulating aggression in child subjects (Liebert & Baron, 1972; Friedrich & Stein, 1975).

Correlational studies support laboratory findings concerning the relationship between viewing violent content on television and aggressive behavior. Overall, a positive correlation exists between viewing violent television content and aggressive behavior (Condry, 1989). However, there has always been some skepticism by networks about the direction of the effect. The major point of contention is does televisions' violent content cause viewers to become violent or do violent individuals prefer to watch violent content on television? Most researchers believe the former alternative, particularly when cross-lagged research has demonstrated this same outcome (Murray, 1980; Condry, 1989). Cross-lagged correlational studies allow researchers to determine inferences about the causal direction of the relationship between television viewing of violent content and aggressive behavior. The most important finding in these studies was a statistically positive relationship between preference for viewing violent television at eight years of age and peer rated aggression scores ten years later (Eron et al., 1972; Huesmann et al., 1984). These same results have been found in cross-lagged correlational studies conducted by Belson, (1978). Based on the numerous studies on the link between

television viewing and aggression, television appears to a be a causal agent of influence on viewer's aggressive behavior (Singer & Singer, 1981; Friedrich & Stein, 1973; Stein & Friedrich, 1972).

While a great deal of interest in television research has focused on violence and aggression, other researchers have explored the effects of television on children's prosocial behavior. Viewing prosocial content on television has been shown to increase the amount of prosocial behaviors exhibited by children. These include prosocial behaviors such as altruism, friendliness, self-control, and coping with fears (Rushton, 1982). Some of the studies conducted in this area utilized network settings and television stimuli. Friedrich & Stein (1975) found that preschoolers who were assigned to watching prosocial content demonstrated more ways of displaying affection than another group of children assigned to a neutral content condition. Furthermore, it was also found that direct training of prosocial behavior in addition to being in the prosocial content condition increased the number of helping behaviors of children in the prosocial condition than in the neutral condition.

Based on the research conducted on the effects of television on aggressive and prosocial behavior, it appears that television is an important catalyst for learning novel behaviors or augmenting previously learned behaviors. Children frequently exposed to violent television content tend to engage in more aggressive behavior. Prosocial television content also exerts an influence on how children interact with their peers as well as adult caretakers. Presumably, varied behavioral changes can occur depending on the type of television content and the behaviors learned from such content. Another issue are the various social-cognitive messages which can be learned from television. Beliefs about the

social world are important precursors to behavior, and perhaps the outcome of a particular behavior. The next section will address social-cognitive effects of television viewing and the implications which surround this issue.

Social-Cognitive Effects of Television Viewing

Gender portrayals on television and their effects on viewer's behavior is one of the most extensively researched topics (Huston et al., 1992). In general, two behavioral themes emerge: preference for male characters and degree of sex-typing. Content analytic studies have shown that males are more likely to be the main character, hold higher status jobs, and are perceived as more powerful in television programs. Studies with children have found that males are preferred when children are asked to nominate a television character whom they would most like to emulate (Miller & Reeves, 1976). However, when presented with counterstereotypes, children tend to accept these roles as well (Greenburg, 1982). Another socially important outcome of viewing television is sex-typing. Several studies have found that heavy television viewing is associated with more sex-typing and stereotypical perceptions of women (Beuf, 1974; Morgan & Rothschild, 1983; Williams, 1986). Recent observations of gender role portrayals on television indicate that some improvement has been made in this area (Huston et al., 1992), however, there is still need for more accurate and favorable portrayals of women.

In studies on the effects of television portrayals on minorities, the primary focus has concerned with minority children's reactions to such portrayals on dimensions of self-image, expectations about minorities and reactions to minorities (Greenburg, 1972). Dimas (1970) found that movies depicting successful black athletes, entertainers, and

other occupations enhanced the self concept of black children. A recent investigation on the effects of counterstereotypes effects on black and white viewers found that white viewers held more favorable attitudes toward blacks following viewing of television's "*The Cosby Show*" (Condry, 1989). In a comparison between positive and negative portrayals of blacks in cartoons, Graves (1975) found that there was a positive attitude change for black children who viewed either portrayal and for the white children who saw a positive portrayal. Another finding was that white children exposed to a negative portrayal changed the most and in a negative direction. These findings may have implications for other character or role types when television presents exaggerated or distorted portrayals of various social groups.

Perhaps most pertinent to the present study is the influences of occupational role portrayals on children. Defleur and Defleur (1967) found that television presents occupations in a highly stereotyped fashion and that children's responses were consistent with televsion's portrayals. The results of this investigation demonstrated that children receive a great deal about occupational knowledge from television and that knowledge acquired about occupations via television is highly stereotyped. More importantly, perhaps, is that a "homogenization effect" was observed, that is, young children held beliefs about occupations similar to that of older children. Retrospectively, this "homogenization effect" is strikingly similar to the "mainstreaming" effect proposed by Gerbner and other cultivation theorists which was discussed in the earlier section on cultivation. This study presents findings that not only is television an important source of knowledge about occupations for children but that television's portrayals of occupations are acquired uniformly across individuals differing on age and other social and personal

characteristics. Similar results were found by Jeffries-Fox and Signorielli (1978) in a study on mainstreaming which compared frequent to infrequent viewers in which children gave descriptions of selected occupational roles in an open-ended format. Wroblewski and Huston (1987) queried fifth and sixth grade children about occupations in television and real life, as well as occupations infrequently encountered in either television or real life. They found that children knew more about television and real life jobs than about infrequently encountered jobs, thus confirming the prediction that television serves as a source of occupational information (Wroblewski & Huston, 1987).

As can be seen, the effects of television's portrayals of race, gender, and occupations have a significant effect on viewer's attitudes beliefs, and behaviors. Each of the areas reviewed provide more evidence about how television can be viewed as a major contributor to viewers' knowledge about the "real world" and behavioral correlates of various social and occupational subgroups. The same methodological and theoretical inquiries applied in the research discussed above can also be applied to other unanswered questions about television's impact on children. In particular, are the unanswered questions regarding children's beliefs about "real world" scientists. Preliminary findings about how children "remember" or view occupational roles suggest that television is a major contributor to children's occupational knowledge (Defleur & Defleur, 1967). The following section will outline research which has addressed portrayals of scientist occupations on television and their relative influence on children's beliefs about scientists.

Scientists as Occupational Role Characters on Television

The present study examines how television portrayals of scientists may have implications for children's interest in science as an academic topic or career choice. Prior research has demonstrated that television often presents biased and distorted portrayals of scientists (Mead & Metraux, 1957; Gerbner, 1987; Potts & Martinez, 1994). Further, American school-children have been shown to have knowledge deficits in science and other related topics when compared to children of other countries (American Academy for the Advancement of Science, 1989). The relationship between television's portrayals of scientists and American school-children's performance in science is an important area for further investigation.

Images of scientists on television have been present since the televisions' inception (Hays, 1984). Speculation about possible negative effects on viewing audiences due to the media portrayals of scientists has also been a topic of concern for several decades. Only a few years after television viewing became a widespread activity, Mead and Metraux (1957) conducted a survey sponsored by the American Association for the Advancement of Science to assess high-school student's image of scientists. The findings of the study indicated that although the overall image of scientists was generally positive, an underlying negative view of scientists and their work emerged among the respondents to the survey. For example, many of the respondents described scientists as "lonely", "isolated", "working in dangerous places" and " may work for years and fail anyway". The authors speculated that the television mediums' portrayals of scientists was partially

responsible for negative view of scientists and their work. However, the results of this study were based on qualitative data derived from essays written by the respondents and the empirical relationship between television viewing and attitudes could not be concluded.

Gerbner et al. (1987) performed a content analysis of prime time programming and found that scientists were often presented as mentally ill or evil and were often associated with odd characteristics. Further findings indicated that scientists were found to hold the highest victimization rate of all occupational characters on television, meaning that they were killed more often than more frequently occurring law enforcement and military characters. Overall, the majority of scientists were not portrayed as bad characters, however, as an occupational group they did not have the success rate of other occupations (e.g. doctors).

While Gerbner's 1987 content analysis included only prime time programs, another content analysis examined the image of scientists in a sample of television programs that comprised the majority of children's weekly viewing (Potts et al., 1993). This study examined Saturday morning and weekday shows intended for child audiences as well as prime time viewing show times. The results indicated that scientists were portrayed as mentally insane four times as often as other characters, their work was usually associated with anti-social negative motivations, and they were less likely to succeed at their scientific endeavors than other characters.

Clearly, the image of the scientist on television is less than satisfactory. Speculation concerning the relative effects of such portrayals on viewing audiences have not gone unnoticed and research to date has indicated that television's portrayals of

scientists may have a profound effect on viewing audiences.

Scientist Portrayals on Television and Effects on Viewers

The content analytic studies described above have provided information regarding scientist portrayals on television and their behavioral/social-cognitive effects on viewing audiences. However, only two such studies have been performed to date. Gerbner (1987) examined the relationship between television viewing frequency and adults' conceptions of scientists and science topics. Results of this study indicated that the high frequency viewers tended to have more distorted and negative images of science and scientists than people who were low frequency viewers. Further, frequent viewers were more likely to hold beliefs that scientists are odd and peculiar, have few interests outside their work, have strange accents, and spend little time with their families than other occupations. More importantly, perhaps, were findings that frequent television viewers tended to believe that scientific discoveries often result in negative outcomes, are too expensive, and cause life to change to fast. The results of this study were described as the result of a cultivation process.

Potts and Martinez (1994) examined the relationship between children's home viewing patterns and their perceptions and evaluations of scientists in relation to other occupational characters. Overall, scientists were regarded by the children in the study as positive social characters. However, other findings suggested that television viewing may contribute detrimental influences to perceptions of scientists. Although children rated scientists in a generally positive manner, cartoon viewing was found to be negatively

correlated children's evaluations of scientists. These findings were consistent Gerbner's (1987) studies conducted with adult populations. The findings of this study also indicated preliminary evidence of the existence of a cultivation effect (Hawkins & Pingree, 1990) in children: The common, negative presentations of scientists in television programming lead frequent viewers to incorporate those images into their belief systems about real world scientists. That interpretation was also supported with findings demonstrating that cartoon programs were found to contain the most pervasive and the most negative portrayals of scientists in programs popular with child audiences (Potts et al., 1993).

Statement of the Problem

To date, research on the effects of television portrayals of scientists on children's beliefs has shown that exposure to stereotyped and biased portrayals of scientists is associated with adult and child viewers to hold more negative beliefs and evaluations of scientists and their activities (Potts & Martinez, 1994; Mead & Metreax, 1957; Gerbner et al., 1987). Although findings indicate a moderate negative correlation exists between television viewing of specific program content and children's beliefs about scientists a causal link has not yet been established. Experimental manipulation of relevant television content variables is a necessary step toward solidifying and expanding findings described earlier in this section. Furthermore, establishing television as a causal agent in the development of exaggerated and biased perceptions about scientists by viewer's has important implications about behavioral outcomes of viewer's participation in science related activities.

Behavioral outcomes include performance in science and other related topics, choice of science as an academic topic for study high-school and college, and career choice. To date, no investigations have undertaken this task. The purpose of this study is to provide experimental validation of previous findings which suggest that television portrayals of scientists may influence children's beliefs about scientists in real life. Further, this study will also examine if negative scientist portrayals have any effects on children's preference for academic topics.

Hypotheses

Hypothesis 1

Based on previous investigations, it is hypothesized that after children are exposed to a negative television scientist portrayal, they will report more negative evaluations of scientists compared to children exposed to positive scientist portrayal and children in a control television condition. Such a pattern of results would be consistent with both observational learning and cultivation theoretical predictions.

Hypothesis 2

It is hypothesized that subjects exposed to positive television portrayals of scientists will rank the scientist higher than subjects exposed to the negative scientist portrayal and the neutral television condition.

Hypothesis 3

Generalization of the TV effects on the scientist character to the pharmacist character may occur due to the similar characteristics of both occupations. No treatment effects are expected for the Banker and Cook characters.

Hypothesis 4

It is expected that children exposed to a negative scientist portrayal will have less preference for science as an academic topic. This will be assessed by having children rank order books that represent academic topics following exposure to either negative or positive television scientist portrayals or the control condition. Topics represented will include science, math, social studies, handwriting, and spelling.

Hypothesis 5

It is hypothesized that females will rate scientists in a less positive manner than males. Previous findings indicate that male children have more positive evaluations of scientists than females (Potts & Martinez, 1994).

Hypothesis 6

It is expected that female children will receive lower evaluations of interest in science as rated by teachers. This hypothesis is based on findings in which teachers gave boys higher interest ratings than girls (Potts & Martinez, 1994).

CHAPTER III

METHOD

Participants

Participants were seventy-seven elementary school children, forty-two boys and thirty-five girls, from first through third grades. Subjects in the study had a mean age of 7.57, SD .85. The majority of the children in this sample came from dual-parent households (80.5%) and were caucasian in ethnicity (97.4%). The mean level of parent education was 2.71 on a scale from 1 (some high-school) to 4 (college degree) indicating that the "average" parent in this sample had at least a high-school degree and some college. For detailed sample characteristic distribution see Tables 1 and 2 . The subjects were recruited from a public elementary school located in a mid-western town of approximately 6,000 residents. Subjects were recruited via parental consent forms which were distributed with permission from school officials (Appendix B). Prior to the interview process, children were given a brief description of the process and asked if they wanted to participate in the study. Only willing children proceeded to the experimental session. Recruitment and experimental procedures were in accordance with the "Ethical Principles of Psychologists and Codes of Conduct" (American Psychological Association, 1992) and approved by the Oklahoma State University Institutional Review Board for research with human subjects (Appendix H).

Materials

Television Stimulus Programs

Television stimulus programs were constructed by selectively editing portions of broadcast programs that were intended for child audiences. Programs depicted positive portrayals of scientists, negative portrayals of scientists (2 versions), and neutral content with no scientists. Programs were selected from a television program database using a coding system which has identified both positive and negative portrayals of scientists from currently broadcast programs (Potts et al., 1993). Edited stimulus programs were approximately 6-8 minute segments. One story plot depicted a scientist with negative characteristics (hostile motivations, failing at goals, etc.) in a humorous setting (e.g. *Bugs Bunny*). A second stimulus program (*The Tick*) depicted another negative scientist (invention of a destructive humanoid) in the context of a more dramatic cartoon setting than the other scientist portrayal. A third stimulus program (*Beakman's World*) included a scientist with positive characteristics (positive motivations, successful behaviors) in an educational programming context. A fourth story plot served as a control stimulus program and did not include any material relevant to scientists or science activities. All of the science-relevant stimulus programs contained male characters; this decision was necessitated by a lack of female scientist portrayals in television programs designed for children. The four stimulus programs were constructed to achieve equivalence of program material (i.e. length) except for the presence of either a positive or negative scientist portrayal.

Character Evaluation Measure

This instrument was designed to assess children's evaluations of scientists and other character types. The characters utilized in this study include a scientist, banker, pharmacist, and cook, and were depicted on 8.5 x 11 cards. Characters on the cards male and female counterparts of each of the abovementioned professions (See Appendixes C & D). Male subjects were presented with male characters and females were presented with female characters. The evaluative component consisted of eight verbally presented items which were derived from previous studies on children's perceptions of television characters (Fernie, 1981; Greenberg, 1972; Potts & Martinez, 1994). The items assessed subjects beliefs about characters personal qualities, prosocial and antisocial motivations, and occupational performance characteristics. Order of presentation of the items were counterbalanced for all subjects. The items included the following:

1) How nice is this person?

2) How happy is this person?

3) How important is this person's job?

4) How many friends does this person have?

5) How often does this person help others?

6) How often does this person hurt others?

7) How much would you like this person to be your neighbor?

8) How much would you like to be like this person?

Subjects responded to each of the items on a scale by pointing or verbalizing using a five interval response scale that depicts colored squares of increasing size accompanied by the labels "Not at all", "A little bit", "some", "A lot", and "A whole lot". This measure was scored using responses as individual item scores. The lowest score for each individual item was a 1 and the maximum score was a 5.

Science Book Choice Measure

A second instrument was used to assess subjects' preferences for standard elementary school curriculum topics. This instrument was comprised of five 3 x 4 cards depicting academic text books with the topic name printed on the card (See Appendixes C & E). Topics included science, math, social studies, handwriting, and spelling. Cards were presented to the subjects and each name was pointed to and read aloud by the experimenter. Subjects were then asked to indicate their preference by rank ordering each of the five books. The administration of these items were counterbalanced to prevent any order effects. Each of the books were scored according to the rank assigned by the respondent such that 1 was considered the highest rank and 5 was the lowest rank. The variable of interest was the rank assigned to the science book.

Science Interest Questionnaire

A measure of children's science interest in science was obtained from classroom teachers. Teachers were given a rating form with a list of 19 sample science activities and were asked to rate overall intrinsic interest in science-related activities on a single 5-point scale for each participant from their classroom (See Appendix F). Teachers were

instructed to use their judgements of children's intrinsic interest in science without regard to the children's actual classroom grades in science. Ratings were attained during the last 3 months of the school year at a time when teachers were familiar with each child's interest in academic topics.

Television Viewing Questionnaire

Children's home television viewing was assessed using a self-report questionnaire based on procedures used by Ross, Wartella, and Lovelace (1982) and Tangney (1988) and previously used assessments of children's home television viewing patterns (Potts & Martinez, 1994). In those studies, children were provided with television program titles and asked whether or not they had watched them in the preceding week. In general, researchers of audience viewership behavior agree that accuracy of self-reported viewing patterns is facilitated when the respondent is given specific cues for the target behaviors (Webster & Wakshlag, 1985). For example, asking a respondent whether they watched the national news last Friday provides more accurate measurement than asking the respondent "What did you watch on television last week?" However, some research indicates that too much specificity may have drawbacks as well. Research on memory development indicates that young children have difficulty recalling specific events (Mandler, 1984; Nelson, 1983) such as viewing a particular television program on a specific day. For this reason, the present study utilized a measure to assess children's recurring or routinized habits, rather than specific viewing occurrences. It was reasoned that children should be better able to report that they watch a particular weekly television series often, sometimes,

or never, than to report that they viewed a specific episode of that program on a specific day of the preceding week.

Children were presented with titles of television programs and asked to indicate their general viewing frequency for each program using a schematic 3-point response scale accompanied by the labels almost never, sometimes, and almost always. Thirty-nine television programs were selected from 2 weekday afternoons, 2 weekday evening broadcasts, and Saturday morning (Appendix G). The titles in the list represented a variety of program categories utilizing a program categorization scheme developed by the Center for Research on the Influences of Television on Children (1983).

Relative viewing frequencies of different categories of programs could be computed by summing viewing scores from several programs with a category type. In particular, previous studies with children have reported that amount of cartoon viewing was negatively associated with evaluations of scientists (Potts & Martinez, 1994). Based on this finding, cartoon viewing frequency was assessed to determine if cartoon viewing should be included in the analysis. A cartoon viewing category score was created by summing the viewing levels (0,1,2) of the each of the cartoons programs and dividing by the number of cartoon programs (n=10) presented in the Television Viewing Questionnaire.

Family Demographics

Included in the consent forms given to each subject's parent were questions pertaining to family size (number of siblings), marital status (single vs. dual parent), and education (some high school, finished high school, some college, college degree). This

measure was included in the study to assess any demographic variables which may be related to other measures in the study (see Appendix B).

Procedure

Subjects were randomly assigned into four television stimulus conditions; positive/scientist portrayal condition (n=20), negative/humorous scientist portrayal condition (n=20), negative/dramatic scientist condition (n=19) and a control condition (no scientist) (n=18). Each child participated in an interview session lasting approximately 15-20 minutes in the school setting during normal school hours. Children were read an introductory script to acquaint them with an adult experimenter and the interview. The procedure took place in an unused school classroom. An adult experimenter presented to the child subject a television stimulus program segment on a color video monitor. Following the presentation of the television stimulus, all subjects in all conditions rated four occupational characters (scientist, pharmacist, cook, and banker) using the character evaluation questionnaire. If the children were unsure of the occupational activities of any of the characters, the experimenter gave a description of activities of the characters. Following administration of the character evaluation questionnaire, subjects were administered the academic book ranking measure. After the book choice measure was administered children indicated their preference and amount of viewing particular television programs using the television viewing questionnaire. Following the experimental procedure subjects were read a script explaining the benefits of scientific

endeavor and the importance of asking parents questions about the things they view on television. Teacher ratings of science interest were obtained after all of the subjects completed the interviewing process.

CHAPTER IV

RESULTS

Analyses and Results

Comparative Evaluation of Characters

Overall ratings of the four stimulus characters (scientist, cook, pharmacist, banker) indicated that all were rated in a generally positive direction. Mean ratings of all the characters on each evaluation item for all conditions are presented in Table 3. While each stimulus character was given mainly positive ratings on the majority of the items, examination of the pattern of the means indicated that subjects displayed the most variation on their desire "to be like" the occupation named in the measure. The scientist and the banker received the overall highest ratings on this item, followed by the pharmacist and cook.

Use of Individual Character Evaluation Items

A previous study (Potts & Martinez, 1994) using the scientist evaluation measure (with 3 additional items) reported item reliability of .67 using Cronbach's alpha coefficient; this was used as justification for collapsing the 11 items into a single summary score. In the present study, however, an item reliability analysis with 8 items was performed,

resulting in a Cronbach's alpha coefficient of only .50. This was judged to be too low for collapsing the 8 items into a composite measure; thus, scores on individual items were used in the subsequent analyses.

Use of Covariates in the Analyses

Three covariates (cartoon viewing, teacher-rated science interest, and age) were included in the following analyses based on findings from a previous study (Potts & Martinez, 1994) that frequent cartoon viewing was associated with lower evaluations of scientists. Thus, cartoon viewing frequency was included as a covariate in the multivariate analysis to examine any cartoon viewing effects on subjects' evaluations of the scientist character. Ten cartoon programs were listed in the Television Viewing Questionnaire. The overall cartoon viewing score averaged across the 10 programs was .845 (SD=.39) with an observed range of 0 to 1.6. Pearson product-moment correlations were conducted with all covariates, scientist evaluation items, and other variables of interest in the following analyses and are presented in Table 4. Due to the number of correlations tested and subsequent risk of experimentwise error rate the alpha level of significance was set at the .01 level. Cartoon viewing was found not to be significantly related to any of the dependent variables in this sample; however, it was retained as a covariate because of the possibility of shared variance revealed only after other factors were accounted for.

Teacher reports regarding subjects' intrinsic interest in science were also used as a covariate in the multivariate analysis in the assessment of subjects' evaluations of the scientist character. Interest in science related activities may serve as a mediator and thus influence children's evaluations of the television scientists. Previous studies with children

have found this measure to be positively correlated with parent education (r =.20) and negatively correlated with frequent television viewing (r = -.20) (Potts & Martinez, 1994). Science interest ratings from each teacher had an overall mean of 3.78 (SD =.91) on a scale of 1 to 5. Levene's test for homogeneity of variance indicated that the variances of groups did not significantly differ and allowed for subsequent use of an appropriate t-test technique. An independent sample t-test was conducted and indicated that males received significantly higher scores on teacher-rated science interest. Also, science interest was positively correlated with the spouse education measure (which usually reflected father education), r = .28, p <.007. Teacher rated science interest approached significance at the .01 level and was positively associated with subjects' science book choice (r= 24, p = .016) indicating that higher teacher-rated interest in science was associated children's report of the science book as a more preferred topic of study.

Age was also used as a covariate in the analysis as older children have more exposure to science related activities. Age was not significantly related to any of the dependent variables in the correlational analyses. However, as with cartoon viewing, it was included in the analyses.

Although correlational analyses did not provide empirical support at the .01 level of significance for the inclusion of age, teacher-rated science interest, and cartoon viewing, the decision was made to include these variables as covariates to fully test theoretical predictions derived from previous studies.

Analysis of Individual Scientist Character

Evaluation Items

A multivariate analysis of covariance (MANCOVA) was performed to assess differences in subjects' ratings of the scientist on the eight evaluation items. Gender was a between-group variable with 2 levels and Television treatment condition was a between-group variable with 4 levels (positive scientist, negative scientist/humorous, negative scientist/dramatic, control). The eight scientist evaluation items served as dependent variables. Age, teacher-rated science interest, and cartoon viewing frequency served as covariates in the analysis. An alpha level of .05 was used for all statistical tests. Results of the MANCOVA analysis revealed significant effects of the independent variables on the scientist evaluation items, F (24,183) = 1.72, $p < .025$. Univariate followup analyses of covariance (ANCOVA's) identified a significant main effect of TV condition, for item 6; ("How much does this person hurt others?"), F (3,66)=4.33, $p < .01$. This was qualified by a significant interaction of television condition X gender, F (3,66)=2.94 $p < .05$. Post hoc tests using Dunn's comparison method revealed that females in the negative/hostile scientist condition (M= 2.00) gave significantly higher "hurt" scores from females in the positive scientist condition (M= 1.00), the control condition (M= 1.00) and the negative/drama scientist condition (M=1.20). Females in the negative/drama condition did not differ from these in the positive scientist condition or the control condition. Post hoc comparisons revealed no significant differences among conditions for males.

A significant main effect of condition was also revealed for item 8 ("How much would you like to be this person?"), F (3,66)=3.52, $p < .05$. Post hoc multiple

comparisons using Dunn's method revealed that subjects in negative/hostile condition (M= 2.55) gave significantly lower scores than subjects in the positive scientist condition (M= 3.63), control condition (M= 3.50), and the negative/drama control condition (M=3.20). No significant differences were found between the negative/drama and both the positive scientist condition and control condition.

Analyses of the relationship between the covariates and the dependent variables indicated that cartoon viewing (p= .014) and teacher rated science interest (p= .054) were positively correlated with item 8 "How much would you like to be like this person?." Univariate ANCOVA results, means and standard deviations, and post-hoc test results of scientist evaluation items 6 and 8 are presented in Tables 5 through 8.

Analysis of Pharmacist, Banker, and Cook Character Evaluations

The pharmacist evaluation item scores were of interest based on hypotheses that characteristics of the scientists may be similar to that of the pharmacist possibly resulting in a generalization of the TV scientist portrayals to the pharmacist character.

A multivariate analysis of covariance (MANCOVA) was performed to assess the generalizability of any TV treatment effects on the pharmacist character evaluation. Gender was a between-group variable with 2 levels and Television treatment condition was a between-group variable with 4 levels (negative scientist/hostile, positive scientist, control, negative scientist/drama). The eight evaluation items served as dependent variables. Age, teacher-rated science interest, and cartoon viewing frequency served as covariates in the analysis. Results of this analysis showed no significant differences

between the groups on any of the eight evaluation items. Also, no treatment effects were noted for the evaluations of the banker or cook characters.

Analysis of Science Book Rankings

Subjects' ranking of the science book as a preferred academic topic was analyzed using an analysis of covariance (ANCOVA) to assess any effects of TV treatment. Gender was a between-group variable with 2 levels and Television treatment condition was a between-group variable with 4 levels (negative/hostile, positive scientist, control, and negative/drama). Age, teacher-rated science interest, and cartoon viewing served as covariates in the analysis. The science book ranking served as the dependent variable in this analysis. Results of this analysis revealed no effects of any treatment condition. Age, teacher-rated science interest, and cartoon viewing were not significantly related to the science book ranking.

CHAPTER V

DISCUSSION

Introduction

This study examined television as a potential contributor to children's evaluations of scientists and their interest in science as an academic topic. Previous research has shown that viewer's attitudes and beliefs about scientists are inversely correlated with amount of viewing of certain types of television programs in a home television viewing setting (Gerbner, 1987; Potts & Martinez, 1994). The purpose of this study was to provide further empirical support for previous correlational findings by using experimental methods to assess immediate causal effects of positive, neutral, and negative television portrayals of scientists on children's evaluations of scientists and preference for science as an academic topic.

Overall Regard for Scientists as Occupational Role Models

Based on mean evaluation ratings and overall evaluations in comparison with other occupational characters rated in the study, the present findings indicate that, in general, children do not perceive scientists as possessing undesirable characteristics. These findings are consistent with previous studies which examined children's evaluations of

scientists (Potts & Martinez, 1994; Trice, 1991). These findings are encouraging to academicians and teachers as they suggest that scientists are viewed as positive occupational role models. It is also encouraging that each of the young subjects in the study were able to identify the scientist character's occupational role.

Effects of the Television Treatment
on Scientist Evaluations

It was hypothesized that children exposed to negative portrayals of scientists would have more negative evaluations of scientists as compared to children exposed to a positive scientist portrayal and to a control condition; this hypothesis received partial support. In particular, females in the negative/hostile TV condition were found to report the scientist as significantly 'more hurtful' when compared to females in the positive TV condition, females in the control condition, and females in the other conditions. Thus, the patterns of beliefs about scientists were found to be affected by gender of the child, and TV treatment, in an interactive manner. Additionally, subjects in the negative/hostile scientist portrayal condition (males and females) also displayed less preference "to be like" a scientist compared to subjects in the other conditions. However, these effects were limited to children's regard for a scientist character as the TV portrayals of did not have any effect on children's preference for science as an academic topic.

In the negative/hostile condition subjects were exposed to an 'evil scientist' who was trying kill Bugs Bunny. Observational learning theories (Bandura, 1977; Bandura, 1986) would suggest that this scientist was viewed as a person who engages in activities harmful to others. Further, models engaging in harmful activities would be expected to

influence children to endorse less favorable attitudes toward the model scientist. Consistent with observational learning predictions, subjects in the negative/hostile condition were found to endorse lower evaluations on the item "be like" a scientist. This finding is interpreted as the manifestation of observational learning such that exposure to a the negative/hostile scientist portrayal affected children's preference for science as an occupational choice due to the hostile actions of the scientist displayed in the negative/hostile condition. Although the majority of the other items were rated in a generally positive direction it appears that interest in science as an occupational choice waned partially due to the negative/hostile scientist portrayal. It appears that children in this condition still hold generally positive beliefs about scientists as well as flexible aspirations regarding occupational interest in becoming a scientist.

Gender Effects on Scientist Evaluations

Both pre-existing gender differences and observational learning mechanisms are posited as possible factors in the finding that females in the negative/hostile condition rated the scientist as more hurtful compared to females in each of the other conditions, while this effect was not observed for males. Perhaps females were responding to the scientist differently than males due to observational learning as well as pre-existing gender differences regarding beliefs and attitudes about scientists. Socialization via parents, school, peers, and mass media, which may contribute to such differences, have been posited as contributors to children's interest in scientists and their activities (Shibeci, 1989). Parents who are active in their child's curriculum and science interest development outside of school may play an important role in their children's perception of science and

scientists. Peer influences may also play a role in children's development of interest in science related activities. School science curriculums and the teacher's approach to teaching science have also been shown to result in differences in science interest in and outside of the classroom. Pertinent to the present discussion is how the mass media (e.g. television) effects viewers beliefs about scientists and their activities.

Possible effects of mass media children's beliefs about scientists can be demonstrated through content analyses of children's television programming and children's literature, which have shown the majority of scientists depicted as male (Evans, 1992; Potts et al., 1993). It has also been shown that children hold sex-typed perceptions of occupations and make decisions about occupational choice based on this knowledge (Hensley & Borgus, 1981; Jacklin & Macoby, 1978; Miller, 1986; Miller & Stanford, 1987). Further, research on children's vocational aspirations has found that counterstereotyping can be effective in changing children's knowledge about occupational possibilities for females; however, it is not effective in changing their vocational choices (Bigler & Liben, 1990). These findings lend support to the idea that females may endorse less than favorable attitudes toward scientists and their activities due to their relative lack of familiarity and identification with scientists. More recently, the television industry has appeared to make changes regarding female occupational portrayals (Huston et al., 1992). However, portrayals of female scientists on television appear to be lacking (Potts et al., 1993; Potts & Martinez, 1995) and many times females in science educational programs are portrayed as pupils, apprentices, and laboratory assistants (Stenke & Long, 1995). Recent content analyses of female scientist portrayals in children's television programming

yielded no females in one study, and in another investigation, only 25% of scientists were female (Potts & Martinez, 1995).

Television portrayals of scientists may serve to alter children's perceptions of scientists such that children with different experiences will respond differently to scientists and their activities. Further, it is possible that females may be more amenable to attitude change than males to the negative/hostile scientist portrayal. The influences of television portrayals of scientists and school experiences may serve to provide females with consistent schemata regarding male scientists but with more inconsistent and thus malleable schemas regarding female scientists. Thus, it is possible that females in negative TV condition differed from males on their beliefs about the harmfulness of scientists due the malleability of their schemas regarding scientists and their activities.

Alternatively, males' schemata regarding scientists may differ from females in the respect that males are exposed to consistent same-sex portrayals of scientists and are viewed as "more fit" for science in school than females. These factors may predispose males to have higher evaluations of scientists compared to females and may thus be less influenced by negative portrayals of scientists in general. In the present study, scientist evaluations obtained from the males in the study may reflect such a phenomenon in the form of a "ceiling effect" such that males gave higher evaluations of scientists because they are familiar with same-sex TV scientists and viewed as more interested in science activities. Research on attitude formation and change has demonstrated that a process of selective attention to specific stimuli while avoidance of other stimuli may provide further explanation for these findings (Baron, Byrne, & Suls, 1989). For example, males may

have only attended to those stimuli which were consistent with their attitudes toward scientists prior to the exposure to the negative scientist.

In contrast, females may possess less stable and thus malleable schemas regarding scientists and were more strongly influenced by a negative scientists portrayal on television. Similar findings have been reported by Maoldomhnaigh and Hunt (1988) in which the extent of the stereotypical image of a scientist could be augmented or lessened following exposure to either a stereotypical or non-stereotypical story of a real-life scientist. In this study, girls were found to endorse the most extreme scores (high and low) compared to boys and the authors concluded that girls may be more "adaptable" to interventions designed to change stereotypical images of scientists.

Other Possible Factors of Influence
on Scientist Evaluations

There are several possibilities regarding the limited effects of negative television portrayals and hypotheses that children would endorse more negative evaluations of scientists compared to the control and positive conditions.

Generally positive ratings of the scientist may have been related to scientist attributes (e.g. occupational setting) displayed during the television portrayal and inferred attributes about real-world scientists such as social status, prestige, and authority. Model attributes have been found to be important in children's decision-making regarding personal and social characteristics (Hoffner & Cantor, 1985; Perry & Bussey, 1984; Slaby & Frey, 1975). Examining the impact of the social position of the scientist may provide further insight into this issue. Laupa (1991) demonstrated that social position of a model

is central to children's judgements about authority. It is possible that children rated the scientist based on the social position of the scientist in society. Perhaps, the majority of these evaluations were positive because of their perceptions were that scientists are in high social positions in their roles in society. The present evidence suggests that although children do perceive scientists to be positive role models in general, they may still be perceived as possessing some negative characteristics.

The demand characteristics of the experiment (interview conducted in a classroom) may have also been a factor in all of the children's ratings. It is possible that children interviewed in a school classroom may have been "cued" to rate the scientist as a positive role model. Thus, a pattern of positive responses emerged as the result of the salience of the school environment in which the interview took place.

TV Treatment Effects on Science Book Ranking

The hypothesis that children exposed to the negative scientist portrayals would show less interest in science as an academic topic, as measured by the book choice measure, was not supported. The non-support of this hypothesis might be due to children's evaluations of scientists having no direct relation to their interest in science as an academic topic. School science activities are far different from the activities in which scientists on television and movies are known in which to participate. Hofman (1977) concluded that children's reactions to TV portrayals of science-related activities are often outside the realm of their everyday school science activities and are thus perceived by children as non-science activities. Perhaps this finding reflects children's decisions about evaluations of scientists in relation to their interest in science as an academic topic as two

entities which operate in two separate cognitive domains. Thus, a weak or non-existent relationship between the two domains (e.g. TV viewing and scientists) may make assessment of children's evaluations regarding science difficult because children do not perceive school science activities as linked to their beliefs about scientists on television. Dynan and Fraser (1985) have noted that elementary school students often learn to operate in two domains, the domains of the science context in school and the domain of life outside of school. It is likely that students in the present study may have been operating within the context of the school setting which might partially explain why possible effects were not found between messages about TV scientists and preference for science as an academic topic.

Generalization of TV Effects to the Pharmacist Character

It was hypothesized that scientist character attributes in the TV treatment conditions might generalize to the pharmacist character due to their similar physical appearance characteristics. No significant differences were detected between the groups on the eight evaluation items. These results are encouraging in the respect that children are able to distinguish between two similar occupational images. Further, no differences between the TV groups were found on any of the items for the banker and cook occupations. These findings lend additional support to the results of the analyses of the scientist characteristics such that children were able to discriminate between the occupational characters and their activities and the social learning mechanisms resulting from the TV stimulus were of a specific nature.

Other Findings

Teacher-rated science interest was found to be significantly higher for males compared to females. It has been previously discussed that children hold sex-typed occupational knowledge, vocational aspiration, and have limited exposure to female scientists on television or visible societal role models. It has also been discussed that teacher perceptions may be skewed such that males are perceived as more interested in science. Previous research in the area of science education and gender differences suggests that science educators frequently incorporate gender bias in science curriculum (Blake, 1993; Klein, 1989). Further, teachers' perceptions of science and gender have been found to affect girls' attitudes, confidence, and participation in science activity (Butler, Parker, Rennie, & Riley, 1993). Recent publications have pointed out these discrepancies and have made several recommendations regarding 'gender and culture free' science curriculums (Blake, 1993; Mason & Kahle, 1988). Recommendations have included removing gender bias from testing and assessment materials, changing the perception that science is a masculine activity by choosing activities that are free from sexual stereotyping, giving equal feedback to females and minorities when working with science problems, and making a conscious effort to acknowledge the contributions of female and minority scientists.

Limitations of the Study

A limitation of the present study includes the external validity of the scientist evaluation measures and how these measures generalize to children's perceptions of "real

world" scientists. The scientist evaluation measure is composed of questions which assess children's beliefs and attitudes about scientists but may not discriminate between "real world" scientists and television scientists. It is possible that children in the study utilized only one frame of reference ("real world") when evaluating the scientist. For example, in a study which assessed children's development of schemas regarding real life and television occupations, Truglio, Fitch, Piemyat, Huston, and Wright (1991) concluded that children form separate role schemata for the TV world and real life. It was also surmised that differentiation was more pronounced for frequently appearing occupations. Thus, external validity of the measurement of the scientist in the present study may present difficulty in interpreting the data regarding children's evaluations of scientists.

A second limitation is that duration of the TV stimulus, (e.g. 6-8 minutes) may not be enough time for children's judgements about scientists to be altered, either positively or negatively. The frequency of television viewing have been shown to result in differential effects on viewers' attitudes, beliefs, and judgements about character portrayals on television. However, significant changes have also been noted in viewers beliefs concerning character portrayals only after a single exposure. The present study demonstrates that changes in children's attitudes toward scientists and their activities, albeit limited, are possible after one exposure. It is likely that the cumulative effects of exposure to television viewing (e.g. years) may produce significant changes in children's perceptions of scientists and their activities.

Future Directions

Based on the present findings, several recommendations can be made regarding the effects of scientist portrayals on children's television programs and children's resulting beliefs about scientists and their interest in science as an academic topic.

Future researchers in this area may want to employ methods of assessment which enable researchers to appraise more accurately children's evaluations of scientists with respect to the type of scientist that is being evaluated. This type of assessment would enable researchers to make reliable assumptions about what attributes children are utilizing and attending to when forming attitudes about scientists and their activities. Further, clearer delineation of the type of scientist (real-world vs. TV) that is being judged will provide more reliable information about what children think about both real-world and TV scientists and how they use that information. As previously discussed, it is possible that children may utilize more than one domain of knowledge regarding scientists. It would also be enlightening to learn more about children's attitudes toward science personnel by assessing their beliefs regarding science teachers in comparison to other teachers. Comparisons between each of these assessments may provide important information pertaining to children's beliefs about scientists.

The use of multi-dimensional assessments may also provide more accurate data regarding children's attitudes and behaviors towards scientists and scientific activity. Such measures might include attitudinal questions as well as assessments of where children learn information about scientists (e.g. personal, school, family, peer, TV). Identification of all possible sources of contribution and detriment to children's science interest, may assist

researchers in utilizing more efficacious avenues in which to stimulate children's interest in science. Further, simulated role-play situations in which children are asked to make decisions about scientists and their activities may also provide additional data on children's decision-making regarding scientists. Such investigations may assist researchers in determining how academic and occupational choices are formed relative to scientific pursuit.

Clearly, the television industry needs to provide the public with more positive portrayals of scientists and more female scientist portrayals. More positive male and female scientist portrayals on television may serve to expand children's perceptions of occupational knowledge and vocational aspirations. These portrayals may in turn serve to stimulate change in adult's perceptions and behaviors toward children in their community regarding scientific pursuits. As stated previously, television is a powerful medium which holds a great potential for change in people's attitudes, cognition, and behaviors. Concerted efforts between the television industry, federal and state science education projects, and local and community efforts could undoubtably provide both children and adults with greater scientific literacy, while promoting the message that 'science is for everyone.'

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APPENDIXES

APPENDIX A

PARENT LETTER

OSU

Oklahoma State University

DEPARTMENT OF PSYCHOLOGY
COLLEGE OF ARTS AND SCIENCES

STILLWATER, OKLAHOMA 74078-0250
NORTH MURRAY 215
405-744-6027

Dear Parent:

Your child's school is participating in a research project being conducted by Dr. Richard Potts, a developmental psychology professor at Oklahoma State University. The project concerns children's interests in science and science-related activities and how those interests may be related, in part, to the way in which television presents scientists in entertainment programs. The study is designed to investigate television viewing as one of many influences on children's knowledge about scientists and their interest in science as an academic topic and a career choice.

In this study, children will be interviewed individually by an adult researcher during the school day. Children will watch one of three 6-minute TV segments that shows either a good scientist (one whose work helps others), a bad scientist (the stereotypical "nerdy" or "mad" scientist), or a program with no scientists. These program segments will be edited material taken directly from network children's programs. There will be no objectionable content in any of the segments. After seeing one of the segments, children will be presented with pictures of several "occupational" characters, including scientists, and asked to evaluate them using questions such as "How smart is this person?", "How hard is this person's job?", "How many friends does this person have?", and so on. Finally, a list of television programs will be presented, and children will indicate how often they watch those programs at home. At the end of the interview, the interviewer will briefly discuss with children how many things they see in TV programs are not real, and that science is an important topic to learn about. The interview sessions will last only about 20 minutes and scheduled to avoid interfering with the daily lesson plan.

If you choose to let your child participate, please complete the forms attached to this page and send it back to school with your child. Our experience over the past several years has shown that children find participation in these projects enjoyable. However, children will be informed that they may withdraw from the interview at any time for any reason. You may also withdraw from participation at any time. Once the study is completed, we will be glad to provide a description of our findings and how they relate to our understanding of child development and education.

All aspects of your child's participation will be completely confidential and will be seen only by the researchers directly involved with the study. Results will be summarized as group averages, and not on an individual basis. We hope that you agree to participate. If you have any questions, feel free to call Dr. Potts at 744-6027, or you may contact the administrator of the OSU Institutional Research Review Board, University Research Services, 001 Life Sciences East, OSU, Stillwater, OK, 74078, telephone 744-5700.

Sincerely,

Richard Potts

Richard Potts, Ph.D.
Assistant Professor of Psychology

APPENDIX B

CONSENT FORM AND DEMOGRAPHIC INFORMATION

Return this form with your child to his/her teacher.

_____

(your child's first and last name)

has my permission to participate in the study being conducted by Dr. Richard Potts of OSU concerning television viewing and children's evaluations of scientists.

_____

(your name) (date)

Please provide some brief information about your household:

Is yours a single parent household? yes___ no___

What level of education did you complete: high school___ some college___ college degree___

If you are married, what level of education did your spouse complete? high school___ some college___ college degree___

How many younger brothers and/or sisters does your child have?___ Older ones?___

Thank you very much for your cooperation.

APPENDIX C

CHARACTER EVALUATION AND SCIENCE

BOOK CHOICE MEASURE

TV SCIENTIST STUDY FALL 1994

SUBJECT NAME_____ S NUMBER_____ AGE_____

SEX: M F ETHNICITY: W B H O SITE:_____

CONDITION: (-) (+) N

CHARACTER EVALUATION _____

SCIENTIST _____

1. NICE	1 2 3 4 5
2. HAPPY	1 2 3 4 5
3. IMPORTANT	1 2 3 4 5
4. #FRIENDS	1 2 3 4 5
5. HELP	1 2 3 4 5
6. HURT	1 2 3 4 5
7. NEIGHBOR	1 2 3 4 5
8. BE LIKE	1 2 3 4 5

PHARMACIST _____

1. NICE	1 2 3 4 5
2. HAPPY	1 2 3 4 5
3. IMPORTANT	1 2 3 4 5
4. #FRIENDS	1 2 3 4 5
5. HELP	1 2 3 4 5
6. HURT	1 2 3 4 5
7. NEIGHBOR	1 2 3 4 5
8. BE LIKE	1 2 3 4 5

COOK _____

1. NICE	1 2 3 4 5
2. HAPPY	1 2 3 4 5
3. IMPORTANT	1 2 3 4 5
4. #FRIENDS	1 2 3 4 5
5. HELP	1 2 3 4 5
6. HURT	1 2 3 4 5
7. NEIGHBOR	1 2 3 4 5
8. BE LIKE	1 2 3 4 5

BANKER _____

1. NICE	1 2 3 4 5
2. HAPPY	1 2 3 4 5
3. IMPORTANT	1 2 3 4 5
4. #FRIENDS	1 2 3 4 5
5. HELP	1 2 3 4 5
6. HURT	1 2 3 4 5
7. NEIGHBOR	1 2 3 4 5
8. BE LIKE	1 2 3 4 5

BOOK CHOICE RANK _____

SOCIAL STUDIES ____

SCIENCE ____

MATH ____

SPELLING ____

READING ____

COMMENTS:

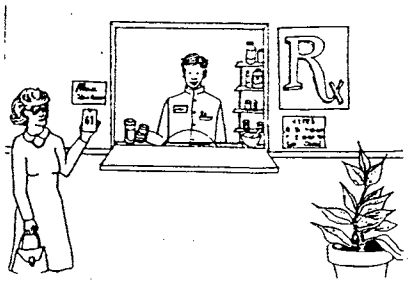
_____

_____

_____

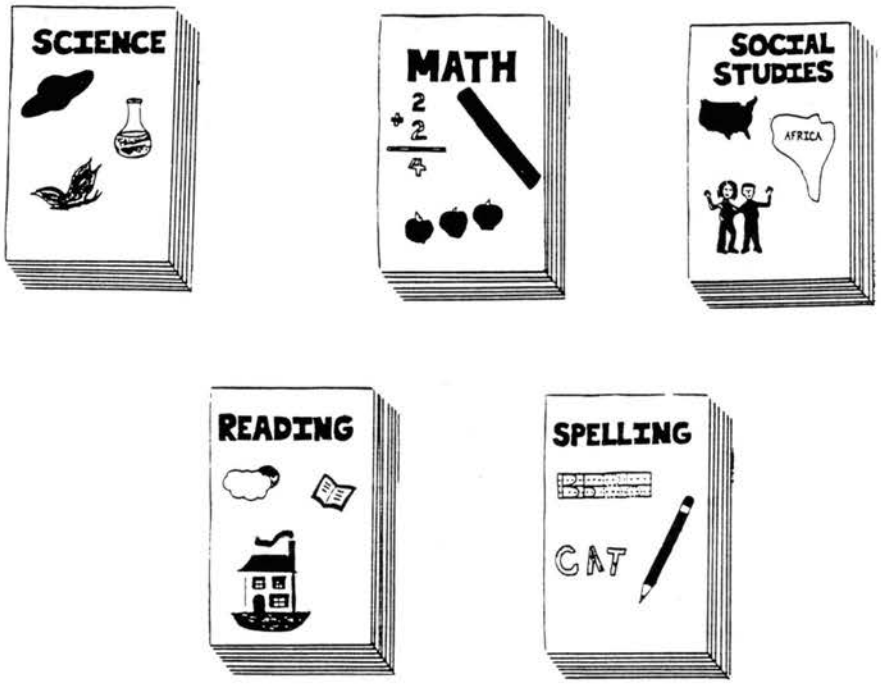
APPENDIX D

OCCUPATIONAL CHARACTERS



APPENDIX E

BOOK CHOICE STIMULI


SCIENCE
MATH
2
+2
4
SOCIAL STUDIES
AFRICA
READING
SPELLING
CAT

APPENDIX F

SCIENCE INTEREST QUESTIONNAIRE

TEACHER FORM

Science Interest Questionnaire - Teacher Form

The following rating scale is designed to assess the interest that children in your class display in the area of science-related activities. You are asked to rate each of the children listed below on their apparent interest in science. Please keep in mind that the ratings should indicate not how a child performs academically in science courses but, rather, how much intrinsic interest or enjoyment they show in science-related activities. The categories and topics below may be useful in your determination of your students' interest in science.

Biology	Geology	Astronomy	Mechanics
Plants	Caves	Space	Machines and how they work
Animals	Rocks	Stars and Planets	
Fish	Shells	Astronauts	How machines are built
Dinosaurs	Rivers & Lakes	Rockets/Shuttlecraft	
Birds	Rock Formations	Space travel	
Insects		Telescopes	

Circle the number which indicates each child's <u>overall</u> interest in science in comparison with other students in your class.

1=little or no interest 2=below average interest 3=average interest

4=above average interest 5=extremely interested

Child's Name	Rating (circle)
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5
_____	1 2 3 4 5

APPENDIX G

TELEVISION VIEWING QUESTIONNAIRE

TV Viewing Questionnaire 10/94 **Name**_____

Tuesday Afternoon & Evening

Darkwing Duck	2	1	0
Animaniacs	2	1	0
Carmen San Diego	2	1	0
Wheel of Fortune	2	1	0
News	2	1	0
**********			
Hard Copy	2	1	0
Full House	2	1	0
Grace under Fire	2	1	0
Lonesome Dove	2	1	0
NYPD Blue	2	1	0
Donahue	2	1	0

Thursday Afternoon & Evening

Goof Troop	2	1	0
Rescue Rangers	2	1	0
Shop Till U Drop	2	1	0
Space Commando	2	1	0
Jeopardy	2	1	0
Reading Rainbow	2	1	0
Entertain. Toni.	2	1	0
**********			
Martin	2	1	0
Mad about You	2	1	0
Seinfeld	2	1	0
Cops	2	1	0
Forever Knight	2	1	0
Emer. Room	2	1	0
Jay Leno	2	1	0
Roseanne	2	1	0

Saturday Morning

Save by Bell	2	1	0
Eek the Cat	2	1	0
Garfield	2	1	0
Shazam	2	1	0
Teenage MNT	2	1	0
Cro	2	1	0
Gladiator 2000	2	1	0
Wrestling	2	1	0

Sunday Night

60 Minutes	2	1	0
Married w Chil	2	1	0
National Geo.	2	1	0
Time Trax	2	1	0
Sports	2	1	0

SOMETIMES ALWAYS

APPENDIX H

INSTITUTIONAL REVIEW BOARD

APPROVAL FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 03-24-94 **IRB#:** AS-93-026

Proposal Title: THE EFFECTS OF TV PORTRAYALS ON CHILDREN'S EVALUATIONS OF SCIENTISTS (SPENCER GRANT PROPOSAL - STUDY 2)

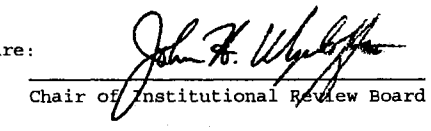
Principal Investigator(s): Richard Potts, Isaac G. Martinez

Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s): APPROVED

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL. ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature:  Date: March 22, 1994

Chair of Institutional Review Board

APPENDIX I

TABLES

Table 1

Demographic Characteristics of Participants

Descriptive Category	Frequency	Percent
Gender		
Female	35	45.5
Male	42	54.5
Age		
6 Years	9	11.7
7 Years	24	31.2
8 Years	35	45.5
9 Years	9	11.7
Ethnicity		
Anglo-American	75	97.4
African-American	1	1.3
Hispanic	1	1.3
Number of Older Siblings		
None	22	28.6
One	26	33.8
Two	23	29.9
Three	5	6.5
Four	1	1.3
Number of Younger Siblings		
None	47	61.0
One	28	36.4
Two	2	2.6

Note. Categories are displayed according to frequency and percentage.

Table 2

Demographic Characteristics of Parents

Descriptive Category	Frequency	Percent
Parental Education		
Some High School	12	15.6
High School Diploma	26	33.8
Some College	16	20.8
College Degree	22	28.6
Spouse Education		
Some High School	9	11.7
High School Diploma	23	29.9
Some College	21	27.3
College Degree	9	11.7
Marital Status		
Single Parents	15	19.5
Married	62	80.5

Note. Categories are displayed according to frequency and percentage.

Table 3

Means of Character Evaluations Across All Conditions

Evaluation Item	Character			
	Banker	Cook	Pharmacist	Scientist
1	4.55(.64)	4.23(.90)	4.52(.72)	4.32(.85)
2	4.52(.60)	4.05(.82)	4.25(.81)	4.13(.95)
3	4.71(.53)	4.44(.75)	4.69(.70)	4.80(.52)
4	4.13(.80)	3.88(.96)	4.10(.88)	4.00(.99)
5	4.54(.68)	4.38(.89)	4.70(.59)	4.48(.85)
6	1.16(.56)	1.34(.80)	1.19(.51)	1.23(.65)
7	3.80(1.06)	3.53(1.24)	3.94(1.16)	4.20(.93)
8	3.29(1.16)	2.69(1.28)	2.96(1.45)	3.21(1.47)

Note. Scale used was 1=*not at all* (or none) to 5=a *whole lot*. Standard deviations are presented in parentheses. 1=How nice is this person?; 2=How happy is this person?; 3=How important is this person's job?; 4=How many friends does this person have?; 5=How often does this person help others?; 6=How often does this person hurt others?; 7=How much would you like this person to be your neighbor?; 8=How much would you like to be like this person?

Table 4

Pearson Product-Moment Intercorrelations Between Age, Cartoon, Viewing, Science Interest and Independent and Dependent Variables

Variables	1	2	3	4	5	6	7
Age	--	-.21	.20	--	-.24	--	--
Cartoon Viewing		--	--	--	--	.21	.21
Science Interest			--	.32	.24	--	.20
Gender				--	-.32	.20	.25
Science Book					--	--	-.32

Note. Correlations reported for those which were significant at $p < .05$.
-- = nonsignificant.
$N = 77$.

Table 5

Univariate ANCOVA of Scientist Evaluation Item "How Often Does This Person Hurt Others?

Source of Variation	df	F
Gender	(1.66)	<1
Condition	(3.66)	4.33
Gender x Condition	(3.66)	2.94

Covariate	Significance of t-Value
Age	.133
Teach	.242
Cartoon Viewing	.474

Note. N = 77.

Table 6

Univariate ANCOVA of Scientist Evaluation Item "How Much Would You Like to be Like This Person?

Source of Variation	df	F
Gender	(1.66)	<1
Condition	(3.66)	3.52
Gender x Condition	(3.66)	2.31

Covariate	Significance of t-Value
Age	.391
Teach	.054
Cartoon Viewing	.014

Note. N = 77.
$p < .05$.

Table 7

Means and Standard Deviations for Scientist Ratings by Gender and Condition on "How Much Does This Person Hurt Others?"

Condition	Males	Females	Total
Negative/Hostile	1.20(.42)	2.00(1.3)	1.60(1.05)
Positive	1.17(.58)	1.00(.00)	1.11(.46)
Control	1.20(.42)	1.00(.00)	1.11(.32)
Negative/Drama	1.00(.00)	1.20(.42)	1.10(.31)

Note. Standard Deviations are in parentheses.
n=77.

Table 8

Mean Scientist Ratings By Gender and Condition On "How Much Would You Like to be Like This Person?"

Condition	Males	Females	Total
Negative/Hostile	2.50(1.43)	2.60(1.26)	2.55(1.32)
Positive	3.92(1.44)	3.14(1.35)	3.63(1.42)
Control	3.70(1.70)	3.25(1.28)	3.50(1.50)
Negative/Drama	4.00(1.41)	2.40(1.17)	3.20(1.51)

Note. Standard deviations are in parentheses.
n = 77.

VITA

Isaac Gerard Martinez

Candidate for the Degree of

Doctor of Philosophy

Thesis: TELEVISION VIEWING, CHILDREN'S BELIEFS ABOUT SCIENTISTS, AND PREFERENCE FOR SCIENCE AS AN ACADEMIC TOPIC

Major Field: Psychology

Biographical:

Personal Data: Born in San Antonio, Texas, June 14, 1966, son of Isaac and Theresa Martinez.

Education: Graduated from Tom C. Clark High School, San Antonio, Texas in May 1984; received a Bachelor of Arts degree in Psychology from the University of Texas at Austin, Austin, Texas in August, 1989; received a Master of Science in Psychology from Oklahoma State University in December, 1994, completed requirements for the Ph.D. in Psychology with a specialization in Child-Clinical Psychology at Oklahoma State University in December, 1996.

Experience: Raised in San Antonio, Texas; employed as a musician during summers; served as Research Assistant at the University of Texas at Austin for several research projects1988-1990; employed as a Casemanager I for Laurel Ridge Psychiatric Hospital in 1990-1991; employed as a Case-manager II for San Antonio State Hospital in 1991; Graduate Assistant for Psychology Diversified Students Program 1991-1993; employed as a Psychotherapist at Edwin Fair Community Mental Health Center in Ponca City, Oklahoma 1993-1994;employed as a lab instructor in the Department of Psychology at Oklahoma State University Fall, 1994; Clinical Psychology Internship at the University of Texas Medical Branch at Galveston, Galveston, Texas, 1995-1996.

Professional Memberships: Student Member, American Psychological Association