Effects of Televised Safety Models on Children's Risk Taking and Hazard Identification

Richard Potts, PhD, and Lisa Swisher, MS
Oklahoma State University

Objective: To examine effects of televised safety models on children's willingness to take physical risks and their ability to identify injury hazards in common situations.

Methods: Sixty children, between the ages of five and eight years, were exposed to one of three TV stimulus programs: (1) a safety educational videotape, in which actors engaged in dangerous behavior, suffered injuries, and then enacted alternative safe behaviors; (2) an animated cartoon, which portrayed characters engaged in safety behaviors incidental to the main story line; or (3) the same cartoon program edited to omit the scenes depicting safety behavior. Children's willingness to take physical risks was measured before and after the TV stimulus by a series of pictorial child-relevant scenarios in which they could indicate the level of risk they would take. They also completed pretest and posttest measures of hazard identification, in which they were to identify injury hazards in several pictorial scenarios.

Results: Exposure to the safety educational videotape decreased children's willingness to take physical risks and increased their identification of injury hazards. Exposure to the animated cartoon with incidental safety components did not affect risk taking, but did increase ability to identify hazards.

Conclusions: Findings are interpreted as evidence of observational learning and priming of thematically related knowledge by the television stimuli. Implications for safety educational curricula are discussed.

Television viewing may have both direct and indirect effects on childhood injuries. Although relatively little research has been previously reported on this topic, a small body of evidence suggests that the behavior of young children and adolescents may be influenced by television content in both injury-facilitative and injury-preventative directions. The purpose of the present study was to examine effects of exposure to safety content in television programs on children's willingness to take physical risks, as well as effects of such content on their ability to identify injury hazards in common situations.

The effects of television content on children's interpersonal behavior is well-documented, and most behavioral scientists acknowledge its potential role in many areas of social interaction (Huston et al., 1992; Pearl, Bouthilet, & Lazar, 1982). Violent TV content has repeatedly been shown to increase aggressive behavior of children, adolescents, and adults in a range of social situations (e.g., Liebert & Sprafkin, 1988). Similarly, prosocial TV content has
been shown to increase positive, socially desirable behavior (Rushton, 1982). Few would argue that commercial television content portrays, and potentially influences in viewers, modes of social interaction that may prove either detrimental or beneficial to the individual and society. Another category of behavior with potential for producing significant consequences for the individual and society is that of physical risk taking. Risk taking has been often found to be associated with injury (e.g., Manheimer & Mellinger, 1967; Matheny, 1988). The societal significance of risky behaviors is that unintentional injury is the leading cause of death in children between the ages of 1 and 18 years. Approximately 22,000 children die each year from accidental injury, and 16 million more suffer nonlethal injuries that require medical treatment (Rodriguez, 1990). Unfortunately, effects of the social environment on risk taking, especially that which leads to injury, are relatively unexplored (Roberts, Elkins, & Royal, 1984; Scheidt, 1988).

Effects of social models on various forms of risk taking have been reported in a small number of studies. Montgomery and Landers (1974) reported that exposure to risk taking or risk-avoidant modeled behavior on a gambling game influenced children's behavior on the task in corresponding directions. However, that study did not include actual television content, and risk behavior in a gambling game is not necessarily the same construct as physically-dangerous risky behavior. Atkin (1989) reported evidence of a positive correlation between exposure to television advertisements for alcohol and teenagers' self-reports of drunk driving. Such data suggest an influence of TV content on risky behavior, but, clearly, the causal direction cannot be concluded from a correlational design. Finally, Potts, Doppler, and Hernandez (1994) experimentally manipulated children's exposure to commercially produced TV cartoons that contained high-risk or low-risk behaviors of characters. Afterward children who saw the high-risk TV content reported a greater willingness to take risks on a self-report measure than those who saw the low-risk TV content. Thus, while relatively sparse, the available research findings suggest that television content can influence viewers' risk-taking behavior, at least in the short term.

The effects of risky TV content on viewers' behavior are likely to be the outcome of observational learning processes (Bandura, 1986), in which viewers learn new behaviors or previously learned behaviors are disinhibited by exposure to modeled behavior. Long-term effects of repeated exposure to risk-taking TV characters is unknown, although both Atkin (1989), Potts et al. (1994), and Potts and Henderson (1991) have speculated that various mechanisms, already known to operate in the domain of TV effects on aggressive behavior, may produce long-term changes in injury-relevant behavior. These include disinhibition of risky behavior, desensitization to fear of injury from risky behavior, cultivation of beliefs about the prevalence of risky behaviors, and construction of cognitive scripts about risk and injury outcomes.

In addition to modeling effects, viewers' behavior may be indirectly influenced by TV content via priming or cueing processes. Informational contexts can influence the availability of behavior-relevant thoughts, which may alter overt responses to social stimuli. Research in social cognition has demonstrated that exposure to certain types of information during initial tasks can influence how persons judge others in later tasks (e.g., Wyer & Srull, 1981). These processes also have been implicated in the areas of TV violence and aggressive thoughts and behavior (Jo & Berkowitz, 1994). Berkowitz and his colleagues have shown how exposure to violent television content can cue further thoughts of aggression in subsequent social situations and that these processes partially account for effects of television models on viewer behavior. These findings suggest the possibility that risky or safe TV models can cue viewers' thoughts about risk and safety in a similar manner, possibly with additional injurious consequences.

The present study was designed to examine both modeling and priming effects of TV safety content on children's willingness to take physical risks and their ability to identify injury hazards. Children were presented with one of three television segments in which safety behaviors were either the central focus of the situations, or were minor background components of the situations, or were not portrayed at all. Children's willingness to take risks was measured both before and after the program, as was their ability to identify physical hazards in pictorial scenes. We predicted that children who saw televised safety behaviors would decrease their risk taking and increase their hazard identification from pretest to posttest.
Television Safety Models and Risk Taking

Methods

Participants
The sample was comprised of 60 children between the ages of 5 and 8 years. There were 32 boys and 28 girls. Children were recruited from afterschool programs at private daycare establishments. Parents of the children signed informed consent statements, and children were treated in accordance with research ethics guidelines of the American Psychological Association.

Television Stimuli
Three television segments, each approximately 7.5 minutes in length, were used as experimental treatment stimuli. One was an edited portion of a safety education videotape produced for children. It depicted a sequence of several recreational settings with human actors and, in each situation, portrayed a child or children engaged in a dangerous behavior, then showed certain aspects of the injurious consequences, followed by alternative safe behavior along with positive consequences. A voice-over narrated the events as they happened. For purposes of ecological validity, several commercial advertisements were included before, during, and after the main educational segment; these commercials did not depict any safety content. Thirty-nine percent of the total stimulus duration (safety video plus advertisements) portrayed safety behaviors or verbal safety messages. The second television stimulus was an edited version of a commercially broadcast animated cartoon. The plot involved a family on vacation who endured several comical mishaps. It contained several scenes in which safety behaviors were visible, but were incidental to the main topic of the scenes. These included use of safety belts in motor vehicles and flotation vests on watercraft. There were no scenes in which the characters’ safety was jeopardized; that is, all safety behaviors were precautionary. Commercial advertisements also appeared at appropriate points during the program; some of these also depicted safety behaviors, such as a breakfast cereal advertisement showing children wearing skateboard pads and helmets. Twenty-four percent of the duration of this stimulus portrayed some type of safety behavior. The third television stimulus, representing the control condition, was an edited version of the same cartoon as described above, but no scenes with safety behaviors appeared; other scenes from the primary plot were used instead. Commercial advertisements with no safety behaviors were added to this program. Only .5% of the duration of this stimulus portrayed any safety behavior.

Measures
A self-report risk-taking measure, developed by Potts, Martinez, and Dedmon (1995), was used for both pretest and posttest measures of children’s willingness to take physical risks. Five of the 10 items in the scale were randomly chosen for the pretest, and the remaining 5 served as the posttest, in order to observe effects of the television stimuli. The items in the scale depicted common childhood situations: climbing on branches of a tree to retrieve a kite, riding a bicycle down slopes of varying steepness, swimming in a pool of different depths, jumping a bicycle across a sidewalk ramp, jumping off porch steps, jumping out of a swing, approaching a flaming barbecue grill, approaching exploding firecrackers, approaching a vicious dog, and crossing a street to retrieve a ball. For each situation, subjects indicated which of five levels of risk they would take (e.g., higher branches, steeper hills, deeper water) by moving a child character to different locations in the pictorial scene. Scores on individual items are summed for total pretest and total posttest scores, which could range from 5 (lowest risk levels) to 25 (highest risk levels).

Validity of the risk-taking measure was demonstrated by Potts et al. (1995) in an independent sample of 83 children. In that study, correlations were examined between children’s self-reported scores on this measure and peer-, parent-, and teacher-informant reports of subjects’ risk taking, as well as frequency of injuries. Classroom peer informants reported subjects’ risk taking via a peer nomination technique. Subjects’ teachers rated their risk taking on a unidimensional scale where 1 = definitely not a risk taker, 3 = an average risk taker, and 5 = definitely a risk taker. Subjects’ parents completed the Injury Behavior Checklist (Speltz, Gonzales, Sulzbacher, & Quan, 1990), which measures risk taking and other injury behaviors, and parents also completed a checklist of their child’s lifetime frequency and types of injuries. The self-reported risk scores were found to be significantly and positively correlated with all informant risk scores and the injury score (rs = .23, .20, .26, and .17, respectively; all ps < .05). Thus, those results provide evidence of concurrent validity, in that a child’s self-report on
this measure of willingness to take physical risks corresponds, albeit modestly, to several independent reports of his or her risk taking from other individuals familiar with that child. Convergent validity is offered as well as by a significant positive correlation between risk-taking reports and actual injury occurrences.

A measure of hazard identification was developed for this study that was intended to assess whether the TV stimuli would influence children’s ability to identify dangerous elements in common childhood situations. A conceptually-similar hazard identification measure was described by Coppens (1986). In the measure used here, 12 drawings depicted common activities, and in each situation some pictorial element was missing. Six of the drawings depicted situations in which an element was missing that created an injury hazard: children fishing on a dock while not wearing shoes, riding in a car without using seatbelts, riding a bicycle with no helmet, removing a pan from an oven without wearing an oven mitt, riding in a sailboat without life preservers, and using a chain saw with no eye protection. The remaining six items depicted situations in which missing elements did not create any hazard: drawing with crayons but no paper, serving meals without dinner plates, running bases in the wrong direction, using a sliding board with no ladder, playing on a swingset with no swings, and playing with a doll with a missing arm. The nonhazard items were included in order to prevent children from quickly realizing that only one type of element (i.e., hazard-related) could be missing from each picture. Three hazard and three nonhazard items were randomly presented for the pretest measure, and the remaining six items served as the posttest. Scores used in the analyses were simply the number of missing hazard-related elements correctly identified in pretest and posttest.

Procedure
Each child participated individually in the experimental session at their daycare center. Children first completed a familiarization task in which they indicated on a 5-point scale how much they liked each of 20 different activities unrelated to risk or safety, such as visiting the library or eating spinach. Children then completed the pretest measures of risk taking and hazard identification. The individual items on each measure were randomly chosen for pretest or posttest. The order of presentation of measures was also counterbalanced across children.

After the pretest, children saw one of the three television stimuli and, immediately afterward, completed the posttest measures of risk taking and hazard identification. After the posttest, all children were given a debriefing that entailed a discussion of safety rule compliance.

Results
The effects of the TV treatment conditions on children’s risk taking and hazard identification were analyzed in a 2 (gender: male vs. female) × 3 (TV condition: educational safety program vs. incidental safety cartoon vs. control cartoon) × 3 (age: 5 vs. 6 vs. 7 and 8 years old) × 2 (time of testing: pretest vs. posttest) repeated measures analysis of variance (ANOVA); the analyses were done separately for each dependent measure. Because of unequal representation of ages, seven- and eight-year-old children were combined into one level. The resulting age groups contained 25 five-year-olds, 17 six-year-olds, and 18 seven- and eight-year-olds. For the risk-taking measure, a significant TV Condition × Pretest-posttest interaction was found, *F*(2,42) = 5.37, *p* < .01, indicating that the pretest to posttest change differed according to the TV condition. Post hoc followup comparisons, using Dunn’s multiple comparison test, indicated that pretest to posttest change in risk-taking scores was significant only for the children who saw the safety education TV program, *r*(1,42) = 2.97, *p* < .05. As shown in Table 1, children who saw the safety education TV stimulus significantly decreased their self-reported willingness to take risks from pretest to posttest levels. Children in the other two conditions did not show a significant change in risk-taking scores. A significant main effect of gender was also observed, *F*(1,42) = 8.36, *p* < .01, indicating that boys reported higher levels of risk taking averaged across

<table>
<thead>
<tr>
<th>TV condition</th>
<th>Pretest</th>
<th>Posttest</th>
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<tbody>
<tr>
<td>Control</td>
<td>13.75 (5.14)</td>
<td>15.15 (5.03)</td>
</tr>
<tr>
<td>Cartoon</td>
<td>14.45 (5.92)</td>
<td>13.50 (5.29)</td>
</tr>
<tr>
<td>Safety</td>
<td>14.40 (5.18)</td>
<td>11.25 (3.89)*</td>
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Risk-taking scores could range from 5–25 on both pretest and posttest. “Control” refers to the cartoon with no safety content, “Cartoon” to the animated cartoon with incidental safety content, and “Safety” to the safety educational videotape. *Significant change (p < .05) from pretest to posttest using Dunn’s multiple comparison procedure.*
Television Safety Models and Risk Taking

Table II. Effects of Television Safety Content on Hazard Identification Scores

<table>
<thead>
<tr>
<th>TV condition</th>
<th>Pretest</th>
<th>Posttest</th>
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<tbody>
<tr>
<td>Control</td>
<td>0.70 (0.80)</td>
<td>1.10 (0.85)</td>
</tr>
<tr>
<td>Cartoon</td>
<td>0.95 (0.82)</td>
<td>1.85 (0.74)*</td>
</tr>
<tr>
<td>Safety</td>
<td>0.40 (0.68)</td>
<td>2.15 (0.87)*</td>
</tr>
</tbody>
</table>

*Significant change (p < .05) from pretest to posttest using Dunn's multiple comparison procedure.

Exposure to TV safety models can increase children's risk-taking willingness, and this exposure is not limited to the type of TV program. The effects of exposing children to TV safety models in the form of cartoons or animated programs may be significant. The main effect of gender was observed on the posttest scores, with girls showing higher risk-taking willingness than boys. The correlation between risk-taking willingness and pretest scores indicates that gender differences may have been present even before the exposure to TV safety models. Further, strong correlations were found between exposure to TV safety models and risk-taking willingness for children who were more aware of injury hazards in common situations. Gender differences in pretest scores may have contributed to this relationship. The observed increases in children's risk-taking willingness may be an immediate consequence of exposure to TV safety models or may be the result of interactions with other variables. Future research should consider these interactions and explore the underlying cognitive processes that mediate the effects of TV safety models on children's risk-taking willingness.
differences in risk-taking behaviors, as well as actual injury rates (e.g., Ginsberg & Miller, 1982; Manheimer & Mellinger, 1967; Matheny, 1988). Because of the consistent gender pattern in these behaviors observed in so many studies, it is noteworthy that gender did not enter into any interaction with the television conditions; that is, boys and girls were equally affected by the content of the television stimuli. This pattern clearly illustrates the independent effects of both external influences and dispositional factors on injury-relevant behavior.

Limitations of the present study include the fact that only one level of centrally focused safety content and only one level of incidental safety content were presented. It is thus unknown what minimum levels are needed to produce changes in the outcome variables. As mentioned previously, it is also unknown which safety modeling components, or combinations of components, were responsible for the effects of the safety education TV program (e.g., risky behaviors, injurious consequences, safe behaviors). It is not known how long the TV treatment effects would last, because no delayed assessment of effects was done beyond the experimental situation. Studies of the effectiveness of direct tuition of safety behaviors find that at least some knowledge is retained up to several months after training (e.g., Peterson & Mori, 1985); however, long-term retention of safety information acquired via observation learning from TV programs is not known at present.

It is difficult to gauge precisely the practical or clinical significance of the observed effects of TV content on risk taking and hazard identification as measured in this laboratory setting. The previous validation study (Potts et al., 1995) offers some indication that responses on the risk-taking measure correspond to overt, “real world” risk behaviors; from this, it can be assumed that a change in willingness to take risks is associated with some change in actual risk behavior, although by how much is not easily specifiable. Current conceptualizations of injuries (e.g., Peterson, Farmer, & Mori, 1987) suggest that they are caused by a multivariate concatenation of antecedent factors, including characteristics of the situation, dispositions of the child, learning history, and so on. It is not inconceivable that even a slight reduction in willingness to take risks, such as that observed in this study, may “tip the balance” in favor of cautious behavior and thus prevent possible injury. Given the ubiquitous presence of television in this and most other societies, in conjunction with the large number of annual childhood injuries, even a slight push toward caution may result in a measurable reduction in childhood injury events. More likely to be of practical significance, however, is a process of longer duration, based on repeated exposure to television content that portrays consistent consequences of risk and/or caution; repeated, pervasive messages are likely to influence viewers’ behavior via a cumulative process of observational learning, which may lead to more durable behavior change (Bandura, 1986).

Current safety educational curricula often focus on one or both outcome variables examined in this study (e.g., Comer, 1987; Della-Giustina & Yost, 1991). Similarly, the U.S. Department of Education (1993) has published guidelines for children's health education, including physical safety, and endorses curricula that seek to facilitate cognitive changes in safety knowledge, as well as behavioral changes in avoiding hazardous activities and situations. However, those recommendations are based largely on the face validity of the outcome variables. Because of the relative dearth of research on psychological mechanisms of injury, direct links between both risk taking and hazard identification, as causes, and physical injury, as the outcome, are not fully demonstrated at present. If an assumption is made that these factors are, in fact, determinants of injury, then the present findings suggest that carefully designed TV programs can accomplish the stated safety curriculum goals of decreasing children's risk-taking motivations and increasing their awareness of injury hazards in their everyday environments, along with actual reduction in unintentional injury.

Acknowledgments

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