PHYSICAL RISK TAKING, SAFETY RULE FOLLOWING, AND CHILDHOOD INJURY

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CHAPTER I

REVIEW OF THE LITERATURE

Childhood injury

Accidental injury is the leading cause of death in children aged 1 to 19 in the United States (Rodriguez, 1990). Additionally, More than 600,000 children are hospitalized or permanently disabled every year (Rodriguez, 1990). The cost of childhood injury is substantial. Rice and Mackenzie (1989) estimated that $158 billion dollars are spent on medical treatment and disability each year. These personal and financial costs have impelled researchers to investigate the mechanisms that lead to childhood injury.

Historically, researchers believed that some children were "accident prone", in that they possessed a stable trait that predisposed them to accidents (e.g., Klonoff, 1971; Matheny, 1988). This belief implied that the accident-prone child was likely to be injured, regardless of his/her behavior. However, studies failed to demonstrate the existence of such a trait and in fact failed to control for environmental or behavioral factors (Matheny 1988). The idea of accident proneness therefore fell into disfavor (Langley, 1982), although recent research suggests at least some trait basis for injury. More recent research has examined sensation seeking, impulsivity, activity level, and temperament as dispositions or traits that are associated with injury (Matheny, 1988).

Researchers presently believe that psychological and behavioral mechanisms contribute to childhood injury and that most injuries can be avoided (Haddon & Baker, 1981; Robert & Brooks, 1987). Researchers have investigated both contextual and

environmental factors, such as family and demographic status, as well as behavioral aspects of children themselves (Matheny, 1988). Family characteristics have included general parental competence, parental competence specific to injury prevention, and parental history of injury. Child characteristics have included sex and age differences, intelligence, and attention patterns. For example, Matheny showed in a longitudinal study that child characteristics in particular are related to childhood injury. Children are injured with increased frequency when they are highly active and easily distracted. Such studies also indicated that boys are injured more and their injuries required medical attention more often than girls (Matheny, 1987).

Other studies have also examined various behavioral factors that are related to childhood injury. Manheimer and Mellinger (1967) identified two categories of behavior that are associated with injury, behaviors that exposed the child to hazards and behaviors that impaired the child's ability to cope with the hazards. Behaviors that may have exposed the child to hazards included curiosity, aggression, and risk taking. Behaviors that may have impaired the child's coping ability included lack of attention and distractibility. These types of behavior have consistently emerged in studies of childhood injury (Matheny & Fisher, 1984). Injury prevention research has shown that there is a learned basis for many of these behaviors and efforts to modify these behaviors to avoid injury have been reasonably successful (e.g., Yeaton & Bailey, 1978; Roberts, Elkins, & Royal, 1984).

In summary, both the human and economic costs of childhood injury facilitate the need to identify its causes. Research has shown that specific behaviors can lead to injuries and that most injuries are preventable through behavior modification. Psychologists also

know that certain dispositional characteristics such as sensation seeking, impulsivity, and attention styles are correlated with injury. A contemporary approach to childhood injury research must therefore address both learned behaviors and stable dispositions in order to fully understand the mechanisms of influence. In the present study, various behaviors, cognitions, and dispositions were investigated as correlates of childhood injury. Specifically, risk taking and injury were studied in relation to children's conceptions of rules and observations of their rule-following behavior. It was speculated that high-risk takers might place less importance on rules in general than low risk takers. Or, they might believe rules in general are important, but think that safety rules are less important than other types of rules. It was of both theoretical and practical interest to know if injury liability is related only to children's regard for safety rules or to their regard for rules in general.

Risk taking

A behavioral mechanism that contributes to injury is risk taking. Risk taking can be defined as engaging in goal directed behaviors that also involve the potential for negative outcomes (Zuckerman, 1994). There are many forms of risk taking including social, financial, and physical risk. The present study was primarily interested in physical risk taking, as many childhood injuries may result from risky behavior.

Empirical study has revealed distinctive patterns of risk taking in children. For example, research has shown gender differences. Boys take more physical risks than girls (Byrnes, Miller, & Schafer, 1999; Ginsburg & Miller, 1982; Rosen & Peterson, 1990) as well as make riskier decisions in other, non-physical, situations (Walsea, 1975). It has been further shown that there are age differences in risk taking as well. Older children

engage in riskier behavior than younger children (Ginsburg & Miller, 1982) and this continues to increase through adolescence before declining in adulthood (Arnett, 1994; Zuckerman, 1994).

Studies of physical risk taking in children have shown a relationship with accidental injuries. Manheimer and Mellinger (1967) showed that children who were labeled "daring" by their mothers were injured more often than other children. Potts, Martinez, and Dedmon (1995) used a self-report measure of risk taking to measure children's willingness to take a physical risk. Results showed that children who reported a willingness to take greater physical risks had higher rates of injuries, as reported by their parents.

Other aspects of childhood risk taking have been examined in addition to overt behavior patterns. Specifically, researchers have studied children's cognitive appraisals of risky situations. Both the appraisal of risk and the actual behavior of risk taking appear to be interrelated as it applies to childhood injury. Studies on risk appraisal have shown that the way children appraise risky situations relates to the amount of risk they are willing to take. Morrongiello and Rennie (1998) found that children who appraised situations as less risky reported more risk taking behavior. Similarly, DiLillo, Potts, and Himes (1998) showed that direct experience with risky situations was associated with lower appraisals for those situations.

In summary, studies have shown that physical risk taking is correlated with childhood injuries. Researchers have focused on both dispositional bases and social influences on risk taking and there is still much debate as to the causes of risk taking. It is possible that risk taking is related to other behaviors such as rule following. Children who

engage in risky behavior may believe that safety rules are less important than other rules and perhaps break these rules intentionally. Also, high-risk takers may be unaware that there are safety rules in place to keep them from injuring themselves where low risk takers are aware of such rules. However, little or no research has been done to examine the relationship between physical risk taking and measures of general or safety-specific rule following. The present study examined the possible relationship between children's risk taking and their rule following behaviors.

Children's regard for safety rules

Two aspects of safety rule following were addressed in the present study. First, using measurements from moral development research, this study examined whether children conceptualize prudential (safety) rules differently from other rule categories. Secondly, the study addressed children's ability to control their behavior in accordance with established rules, as indicated by reliable informants who actually observe children's overt rule following behaviors. It was possible that either or both of these aspects of rule following were related to risk taking and injury in children. By studying individual differences in these characteristics, the generality or specificity of risk taking as a form of self-regulation can be ascertained.

Conception of rules

One important aspect of rule following is children's conceptualization of rule domains. Piaget (1932/1965) theorized that during moral development young children view all rules in the same manner due to cognitive developmental limitations. He believed that moral development involved a combination of cognitive development and interpersonal interactions, and theorized that children pass through various stages of

development. Piaget stated that during the *premoral stage* of development (prior to age 4) children have no concepts of rules at all. Children then move into the *heteronomous stage* (age 4-10) of moral development, where they understand the concept of rules, yet believe that these rules are fixed and unalterable. They tend to regard all rules in a unitary manner, i.e., no discrimination among different types of rules. Children in this stage believe that rules must be adhered to and authority must be obeyed. In the highest stage, the *autonomous stage* (age 10-11+), children begin to critically consider the origins and functions of rules and apply them according to the situation. They understand that rules are flexible, not fixed. Children in this stage can differentiate between rule domains and understand that rules can be altered depending on the situation.

Recent research has contradicted some of Piaget's propositions by revealing that even very young children can differentiate between certain rule domains (Turiel, 1977; Nucci & Nucci, 1982). Nucci and Turiel (1978) found that preschool children could discriminate between moral rules and social-conventional rules. Social-conventional rules are useful because they help maintain social order. An example of a social-conventional rule that a school age child could relate to is that you must raise your hand before asking a question. On the other hand, moral rules address individual responsibility and justice. Examples of moral rules are those that deal with not harming another individual or being honest. Social-conventional rules are determined by social consensus. Moral rules are intrinsic and do not rely on consensus (Turiel, 1977). By asking children to explain why specific actions were wrong, Nucci and Turiel were able to show that children saw acts that hurt other people or violated a person's rights as moral transgressions. Conversely, actions that were seen to go against social order were viewed as social conventional

transgressions and viewed as less important than moral transgressions (Nucci & Turiel, 1978).

Smetana (1981) also examined preschooler's conceptions of moral and social rules. She asked preschoolers to make judgments about several acts that reflected many dimensions. These dimensions included rule contingency ("would the transgression be okay in the absence of a rule"); rule relativism ("would the transgression be okay in another situation"); seriousness of transgression ("how bad is the transgression"), and amount of punishment deserved ("none, a little, or a lot"). Smetana found that children as young as 2 1/2 years could distinguish between moral rules and social-conventional rules using those criteria. She found that children evaluated moral transgressions as more serious, deserved more punishment, and were more generalizable across various situations than social rules (Smetana, 1981). These studies show that children conceptualize different rule domains much earlier than Piaget believed.

Most of the research done on children's conceptions of rules has involved the distinction between social and moral rules. However, another rule domain has been identified that is of particular interest to the present study. Tisak and Turiel (1984) investigated conceptions of prudential (safety) and moral rules in children aged 6 to 11 years old. They reported that most of the children believed that both types of rules were useful and violating them was wrong. However, children perceived moral rules as more important than prudential rules. The children focused on the consequences of violating the rules, and made the distinction between moral and prudential rules based on these consequences. Moral transgressions have the consequence of hurting another person.

Prudential transgressions are perceived as less important because the transgressor is only hurting him/herself (Tisak & Turiel, 1984).

It can be speculated that that children's regard for prudential rules would be related to their experiences with injury and their preferred levels of risk taking behavior. Children who engage in risky behavior may view prudential rules as less important than other rules or they may be oblivious to such rules and perhaps are injured as a result of this lack of knowledge. High-risk takers may regard prudential transgressions as less serious than children who are low risk takers. There is a lack of research into individual differences of rule conceptualization. The present study investigated the relationship between individual differences in children's conception of different rule domains and their risk taking behavior and injury history.

Self-control

Another aspect of children's rule following is their overt self-control behavior. Self-control can be defined as the ability to control impulses, postpone gratification, or resist temptation (Harter, 1983). Researchers have examined self-control from dispositional, developmental, and learned bases. Self-control in children may be determined by social factors such as parental and peer influence or by personality factors such as impulsivity and sensation seeking. Social learning theorists including Bandura (1973) and Mischel (1973; 1974) proposed that self control, as it is related to rule following, is discriminative and situation specific. A child who exhibits control in one situation may fail to demonstrate it in a new situation. They may be unfamiliar with the new situation and have limited experience of how to behave. Research has shown that self-control behaviors are affected by several factors. For example, studies have shown

that punishment is effective in shaping rule following behaviors in children (Toner, 1986). Studies have shown that punishment is especially effective when it is administered immediately following the rule violation. Studies have also shown that it is effective when it is accompanied by rationales for the punishment (Blackwood, 1970) and that the effectiveness of these rationales is contingent upon the age of the child (Parke, 1970, 1974, 1977).

Researchers have also focused on the effects of modeling on self-control. Studies have shown that children will model self-control behavior of others. Bandura (1973) showed that children could control aggressive behavior when they observed other children punished for aggressive behavior. Toner (1986) showed that exposure to rule following models was actually more effective than punishment in children's ability to follow rules. Other studies have shown that children can exhibit greater self-control when they practice after observing modeled behavior (White, 1972).

Little research has been conducted on the relationship among self-control, safety rule following and injury. Intuitively, injuries can be thought of as punishment for breaking a safety rule and past research has shown that punishment is effective in deterring rule violations. However, injuries fail to deter some children from breaking safety rules. A possible reason for this is that injuries occur so infrequently that they are ineffectual punishment. The rewards for violating a safety rule may be too much of a temptation for some children to resist. These rewards could include material, social, or intrinsic rewards. Children who are lacking in self-control may break safety rules to obtain certain rewards, regardless of the risk of injury.

In summary, rule following is a significant part of self-control and is one major goal of children's socialization. Researchers have stressed that in order for children to control their behavior they must first understand the concept of rules and have the ability to perceive consequences of rule violations (Karoly, 1982). Self-control is developed at least in part, and perhaps largely through social influence, including punishment and observations of models. Self-control can also be situation specific, and thus, variable across children and across situations. It may be that high-risk takers are good rule followers in general but poor followers of safety rules. Or high-risk takers may have less control than low risk takers over their rule following behavior in general. Also of interest is the correlation between rule following and injury. Children who have been injured often in the past may be better rule followers than children who have not been injured. The present study examined the relationship between children's risk taking and their self-control behaviors.

Sensation seeking

Past research has shown that self-control behavior is determined by social influences (Bandura, 1973, Toner, 1986), and may be determined by dispositional traits. Risk taking and injury may also be influenced by dispositional traits. One approach to the study of risk taking and rule following is to examine dispositional characteristics that are associated with risk taking, rule following, and, ultimately, injury. Some children may be predisposed to engage in behaviors that carry the risk of physical injury. Some characteristics may be incompatible with high regard for prudential rules, or high degrees of self control and rule following. Perhaps the most well researched dispositional characteristic that has been linked to risk taking and injury is sensation seeking. Sensation

seeking has been defined as "the need for varied, novel, and complex sensations and experiences, and the willingness to take physical and social risks for the sake of such experiences" (Zuckerman, 1979, p.10). Several studies have demonstrated a positive correlation between sensation seeking and risk (Horvath & Zuckerman, 1993; Arnett, 1996; DiLillo et al., 1998). It is possible that sensation seeking is also related to children's rule following behavior. Sensation seeking may be related to the way children differentiate different rule domains, with high sensation seekers regarding prudential rules as less important than other types of rules, compared to low sensation seekers. Sensation seeking may also be related to their ability to control their overt rule following behavior. High sensation seeking children may be unable or unwilling to follow certain rules as well as low sensation seekers.

Sensation seeking has been considered to be a relatively stable personality trait. Zuckerman (1994) and colleagues have done extensive research on sensation seeking in adults. They have shown that sensation seeking is correlated with preferences for a wide variety of stimulation and activity. Zuckerman (1994) also showed that sensation seeking correlates positively with risk taking behavior. High sensation seekers tend to take greater risks, including physical, financial, and social risks. For example, they tend to engage in more dangerous driving and drive under the influence of alcohol more often than low sensation seekers. High sensation seekers take greater gambling risks and make riskier financial investments than low sensation seekers. Adolescent research has also shown that sensation seeking is correlated with reckless driving, unsafe sexual practices, illegal drug use, and minor criminal activity (Arnett, 1996).

Zuckerman developed the first sensation seeking measurement in the late 1960's. His scale originally had a forced choice format. For example, one item stated "A) I like "wild" uninhibited parties; B) I prefer quiet parties with good conversation." Participants were given two choices and were asked to select the one that best described themselves. Zuckerman's scale had four subscales that addressed different factors of general sensation seeking. These subscales included thrill and adventure seeking (TAS), experience seeking (ES), Disinhibition (Dis), and boredom susceptibility (BS). All the subscales except the BS have shown good replicability across genders and cultures (Zuckerman, 1994).

Research suggests that sensation seeking may be genetically determined. A behavior genetic study by Fulker, Eysenck, and Zuckerman (1980) examined sensation seeking in identical and fraternal twins. They found that, in identical twins, the correlation of sensation seeking was .63 for males and .56 for females; while in fraternal twins, the correlation was .21 for males and .21 for females. A later study revealed similar findings in identical and fraternal twins raised apart (Tellegen, Bouchard, Wilcox, Segal, & Rich, 1988). This research seems to indicate that sensation seeking is a heritable trait. Other studies have revealed relationships between sensation seeking and endorphins, hormones, and enzymes in the body. For example, neuro-chemical studies have shown that high sensation seekers have lower levels of monoamine oxidase enzymes than low sensation seekers (Murphy et al., 1977; Schooler, Zahn, Murphy, & Buchsbaum, 1978). Thus, there seems to be a relationship between biological makeup and individual differences in sensation seeking, and these possibly emerge in childhood behavior patterns.

Very little research has focused on sensation seeking in young children. One reason for this is that Zuckerman (1979) and Arnett (1994) designed the sensation seeking scales for adults, reflecting their focus on individual differences in the trait. The language and format of these scales make them difficult to administer to children. However, a few researchers have attempted to study sensation seeking in children. Kafry (1982) adapted the wording in Zuckerman's SSS for use with young children and found that, in children aged 5-10 years, sensation seeking was significantly correlated with preferences for risky physical activities and complex stimuli in pictures and puzzles. Russo et al. (1991) also developed a sensation seeking scale for use with school age children by adapting Form V of Zuckerman's SSS. Russo et al. slightly modified the language and content material of each item so that children could understand them. They determined that sensation seeking could be measured in children. Some participants were given the measurement again three weeks later to assess test-retest reliability. These results showed good test-retest reliability. Russo, Stokes, Lahey, & Christ (1993) revised their sensation seeking measure for children and showed good validity and moderate test-retest reliability when administered to participants aged 9-25. Results from this revised scale showed differences in age and gender that were similar to the results found in previous studies. Potts et al. (1995) developed a picture version of the sensation seeking scale, which focused on Zuckerman's Thrill and Adventure Seeking subscale. The picture version was developed to enable young children (5-10 years) to comprehend the sensation seeking scenarios. They found that sensation seeking was positively correlated with other measures of risk taking as well as injury history.

Recently, Arnett (1994) discussed several limitations in Zuckerman's scale. One problem was that several of the items asked about drug and alcohol use and sexual practices. Many studies have used Zuckerman's scale to examine these specific behaviors in relation to an overall trait. Therefore the items on the scale and the behaviors being examined were confounded. Another limitation to the Zuckerman's SSS cited by Arnett is the format of the SSS. Subsequent to version VI, Zuckerman's SSS had a forced choice format. Arnett suggested that this limited the findings by making participants pick one choice over another even if they felt that neither or both applied to them. Arnett (1994) addressed these limitations to Zuckerman's scale by developing an alternative sensation seeking scale. Arnett's scale, called the Arnett Inventory of Sensation Seeking (AISS) focused on novelty and intensity as the primary dimensions of sensation seeking. He eliminated items he identified on Zuckerman's scale as confounded. This new scale did not include items that involved physical strength, which may create gender bias, or items that focused on norm violations or illegal behaviors. He addressed the limitation of forced choice format by developing the new scale using a Likert format (Arnett, 1994). The four point Likert scale ranged from "not like me" to "a lot like me". Arnett showed that this new scale was a valid alternative to Zuckerman's SSS and was a stronger predictor of many risky behaviors than scores using Zuckerman's scale.

Past research has used Zuckerman's scale as a foundation for developing a child version of the sensation seeking measurement. Based on Arnett's concerns regarding Zuckerman's SSS, the present study developed a new child version of the sensation seeking scale using Arnett's AISS. Items were presented in pictorial form, to ensure that the children understood them.

In summary, sensation seeking is a dispositional trait that is related to risk taking. This relationship has been studied at length, although primarily in adolescents and adults (e.g., Arnett, 1996; Horvath & Zuckerman, 1992). Fewer studies have examined the relationship between sensation seeking and risk taking in children. The present study examined the relationship between sensation seeking and risk taking and injury as well as children's regard for safety rules and their self-control behavior. It was possible that high sensation seekers regard safety rules as less important than low sensation seekers. Furthermore, it was possible that high sensation seekers exhibit less self-control with regard to physically risky behavior than low sensation seekers.

CHAPTER II

STATEMENT OF PROBLEM

Factors relating to childhood injury have been investigated, separately, in a great many studies. Several studies have shown that physical risk taking is positively correlated with injury, indicating that the more physical risk taking a child engages in the more injuries they have sustained. It is also possible that other factors besides risk taking are related to childhood injury. The present study examined rule conception and rule following behaviors as correlates with risk taking and injury. Few or no studies have investigated this relationship and the question remains as to whether children who are physical risk takers conceive safety rules differently from children who are not risk takers.

Another purpose of this study was to investigate the underlying constructs of risk taking, rule following, and childhood injury. Past research has indicated that sensation seeking is related to physical risk taking and childhood injury. However, it is unclear if sensation seeking is related to rule conception and rule following. It is possible that sensation seeking is a mediator variable between physical risk taking and the way children understand and follow rules. The present study may show that sensation seeking is related to the way children understand and follow rules, specifically prudential rules. Little research has examined children's regard for prudential rules. The purpose of this study was to examine how children regard prudential rules, compared to other rule domains and how this relates to risk taking. The relationship between sensation seeking

and children's conceptions of prudential rules in this study was also examined. Several hypotheses were tested in this study.

Research Question #1: Is the amount of risk taking a child is willing to take related to his/her conception of safety rules and ability to follow such rules?

- Hypothesis: Children who are high risk takers will regard safety rules as less important as other types of rules, as measured by their regard for moral, social conventional, and prudential rule transgressions.
- Hypothesis: Children who are high-risk takers will break safety rules more often than children who are low risk takers, as measured by teacher reports of self control behavior patterns.

Research Question #2: Is the way a child regards safety rules and follows such rules related to the number of injuries they sustain?

- Hypothesis: Children, who regard safety rules as not important, compared to other rules, are injured more often than children who regard safety rules as important.
- Hypothesis: Children who are identified as poor safety rule followers sustain more injuries than children who are good safety rule followers.

Research Question #3: Can the dispositional trait of sensation seeking be a mediator between risk taking, injury, and safety rule following in children?

- Hypothesis: Children who are high sensation seekers engage in greater physically riskier behavior than low sensation seekers and regard safety rules as less important than other rules.

- Hypothesis: Sensation seeking is a dispositional mediator of risk taking, rule conception, and self-control, and relationship among those measures will diminish when their relationship with sensation seeking is statistically removed.

CHAPTER III

METHOD

Participants

Children were recruited from local schools, through their parents, via a letter of informed consent. Participants in the study were 68 children from four age groups: 16 first graders, 15 second graders, 21 third graders, and 16 fourth graders. At the time the study began the mean ages in months (with standard deviations in parentheses) for the children were 86.06 (5.09), 99.13 (6.41), 109.71 (5.65), and 120 (4.87), respectively in the four groups. All participants had been given consent by parents and verbal assent was obtained from each child prior to the interview. None of the children refused to participate or discontinued participation after interviews began.

Measures

Risk taking measure. The measure of risk taking used was developed by Potts et al. (1995) and consisted of 10 pictorial scenarios depicting everyday childhood situations that may involve injury. These scenarios included (a) retrieving a kite caught in a tree, (b) chasing a ball that rolls into a street, (c) retrieving a toy from a yard with a mean dog, (d) riding a bike down steep inclines, (e) jumping a bicycle across a ramp, (f) swimming in a pool of several depths, (g) approaching a flaming barbecue, (h) jumping off porch steps, (i) jumping from a moving swing, and (j) approaching exploding firecrackers. The scenarios were presented in random order and the children were asked to imagine themselves in these scenarios. They were given a same-gender figure and asked to place

the figure at one of five predetermined locations on the picture. These locations represented the amount of risk the child was willing to take. For example, one scenario represented a porch with five steps, of increasing height (see Figure 1 in Appendix A). The child was given a same-gender figure and asked to place the figure on the step they would be willing to jump off. Scores for each scenario were determined by the position of the figure, with 1 = the least risky location to 5 = the most risky location. All scores were totaled for a total measure of risk and ranged from 10 to 50, with the higher score representing greater risk. Potts, et. al. compared this self report measure of risk taking with peer nomination of risk taking and teacher ratings of risk taking. They found that the self report measure had a +.23 correlation with peer nomination of risk and +.26 correlation with teacher ratings, demonstrating concurrent validity with other indices of risk taking in children.

Rule conceptions. To measure rule conceptions, this study used procedures previously used in past studies of moral development (Smetana, 1981; Tisak & Turiel, 1984). The rule conception measure consisted of scenarios depicting moral, social conventional, and prudential transgressions. Two stories depicting moral transgressions had actors (1) throw a rock while on the playground and (2) take an apple from a fellow student during lunch. Two stories depicting social conventional transgressions had actors (1) talk out of turn in the classroom and (2) cut in front of other children standing in a line. Two stories depicting prudential transgressions had actors (1) approach a swing set where another child is swinging and (2) climb a ladder left by a workman. The actor in each story was the same gender of the subject and given a gender relevant name. The stories were presented in random order and each child saw all stories. An example of a

safety transgression is shown in Appendix A (see Figure 2), and the story presented with the pictures were as follows:

"At this school there is a rule that says 'don't stand behind someone when they are swinging on the playground.' But Johnny broke the rule. He stood behind Billy while he was swinging."

For each story seriousness of transgression (how bad is the transgression) and evaluation of deserved punishment (how much punishment should transgressor get) were measured. To help children evaluate seriousness and amount of punishment deserved, pictorial scales were used (see Figure 2). The meaning of each pictorial scale was shown to participants prior to the presentation of the rule stories and children were asked to respond to the different criterion judgments, using the pictorial scales as well as verbalizing their responses.

Sensation seeking. The sensation seeking measure involved pictorial depictions of 10 items from Arnett's (1994) Inventory of Sensation Seeking (AISS). The AISS was modified for use with children and the 10 pictures represented 5 items each from the novelty and intensity subscales (Arnett, 1994). The pictures were designed to make the items easier for younger children to comprehend. The items selected included (1) If I have to wait in a long line, I'm usually patient about it, (2) I think it is fun and exciting to perform or speak before a group, (3) I would have enjoyed being one of the first explorers of an unknown land, (4) If it were possible to visit another planet or the moon for free, I would be one of the first in line to signup, (5) When the water is very cold, I prefer not to swim even if it is a hot day, (6) When I listen to music, I like it to be loud, (7) It would be interesting to see a car accident happen, (8) I like the feeling of standing next to the edge

of a high place and looking down, (9) I can see how it would be interesting to have a friend from a foreign country, and (10) If I were to go to an amusement park, I would prefer to ride the rollercoaster or other fast rides. See Appendix A, Figure 3, for an example of sensation seeking pictures that were shown to participants.

Children responded to each item using the picture scale shown in Figure 3. Responses ranged from 1 = does not describe me at all (with a frowning face and thumbs down) to 4 = describes me very well (with smiling face and thumbs up). Captions below each picture described in words what the pictures represented. Children were first tested as to their understanding of the picture scale. Experimenters then showed participants 10 pictures that depicted same gender children engaging in sensation seeking activities. Experimenters also verbally presented each item. For example, participants were shown a picture depicting someone listening to a loud speaker. The experimenter presented the picture and said, "When I listen to music, I like it to be loud." Children were asked to indicate their response, using the picture scale. Total scores ranged from 10 to 40, with the higher score representing higher sensation seeking.

Injury Behavior Checklist. Parents of participants completed the Injury Behavior Checklist (IBC). This measure was developed by Speltz, Gonzales, Sulzbacher, and Quan (1990) and consisted of 24 items representing behaviors that have the potential to cause injury. One example of the items on the scale was "runs into street." Parents rated how often their child engages in each behavior. Responses on the IBC were measured on a 5 point scale, with 0 = not at all to 4 = very often (more than once/week). Total scores for the IBC ranged from 0 to 96. Although Speltz et al. designed the IBC for use with

preschool children, Potts, Martinez, Dedmon, Schwartz, DiLillo, and Swisher (1997) showed that it is a valid and reliable tool to use with children up to nine years old.

A subset of 12 items from the IBC were selected and presented pictorially to the child as a self-report measure of injury behavior (see Appendix A, Figure 4). Children were presented with the items and asked to indicate how often they engage in each behavior. The scale for this measure was the same 5-point scale used above. The total scores ranged from 0 to 48. The purpose of this measurement was to evaluate how accurately parents and children reported on similar behavior patterns. Morrongiello and Rennie (1998) have used the IBC successfully with young subject's self-reporting of their own risky behaviors.

Injury frequency history. Parents completed an injury history survey where they assessed the frequency of injuries their child has sustained. Injuries assessed included broken bones, muscle strains, serious cuts, concussion, burns, poisonings, animal bite, insect sting/bite, water inhalation, shock, and miscellaneous injuries. Score for this measure was the total of all injuries sustained by the child in his/her lifetime. Parents were also asked to provide information regarding family size and level of education by each parent.

Teacher rating of child's self control. Teachers were asked to evaluate each child's rule following abilities for the three rule domains. Teachers were given a form with the names of the children from his/her class and they rated each child, comparing them to the other children listed. The scale used on this measurement was a 100-point analog format scale, ranging from "Poor" to "Excellent." An example of the evaluation sheet is shown in Appendix B.

Procedure

Parents completed the adult version of the Injury Behavior Checklist (AIBC) and injury history and returned both items with the child's consent form. Teachers completed the self-control measure at their convenience. Teachers were also given an informed consent form that assured that their responses on the self-control measure were confidential.

The experimenter individually interviewed each child for approximately 20 minutes at school. They asked participants if they wanted to play a picture game with the experimenter to gain verbal consent. They were then taken to a separate room for the duration of the interview session. The items from the risk taking, sensation seeking, and rule conception measures, and child version of the Injury Behavior Checklist (CIBC) were randomly presented to each child. Experimenters paused between measures to explain to participants that they were moving on to a different picture game. After all measures were presented, Experimenters debriefed participants by explaining why it is important to follow safety rules. Specifically, they focused on the behaviors depicted in the measures. Children were told that the actions they saw in the pictures could cause injury to them if they attempted them without the assistance of a grownup. The experimenter emphasized the importance of safety rules and stressed that the child should get help from a parent or teacher before doing anything they saw depicted in the pictures. All procedures for this study were conducted in accordance with the ethical research guidelines of the American Psychological Association.

CHAPTER IV

RESULTS

Descriptive analyses

The means and standard deviations for the sensation seeking measure, risk taking, child IBC (CIBC), Adult IBC (AIBC), and injuries sustained are reported in Table 1.

	Mean	SD	Reliability*
Sensation seeking (SS)	25.85	4.02	.20
Novelty subscale	13.50	2.79	.19
Intensity subscale	12.35	2.73	.14
Risk taking (RT)	22.87	7.12	.81
Child IBC (CIBC)	7.37	6.34	.80
Adult IBC (AIBC)	14.41	10.47	.87
Total injuries	1.18	1.56	-
Treated injuries	.66	.97	-

* Cronbach's alpha
Note: Possible scores – SS 10-50; RT 10-40; CIBC 0-48; AIBC 0-96

Table 1. Means, standard deviations, and reliability of measures.

Analyses were also conducted to test the reliability of the various measures used in the present study. Cronbach's index of internal consistency yielded an alpha of .81 for the risk taking measure, which is similar to the alpha of .86 found by Potts et al., (1995). The alpha for the adult IBC was .87 and, again, was similar to results reported in past studies (.87 – Speltz et al., 1990; .91 – Potts et al., 1995; .92 - Potts, et al., 1997). The sensation seeking measure and the CIBC were new measures designed for the present study and therefore additional analyses were conducted to test their reliability.

Sensation-seeking measure. The sensation seeking measure was a child version derived from the Arnett Inventory of Sensation Seeking (Arnett, 1994), developed specifically for this study. It was therefore necessary to determine its internal reliability, prior to using it in subsequent analyses. As seen in Table 1, Cronbach's index of internal consistency yielded an alpha for the total measure of only .20. The instrument was then divided into the intensity and novelty subsections and the reliability of the subsections were analyzed. For the five items on the intensity subscale, the alpha was .14. The five items on the novelty subscale generated an alpha of .19. The reliability of this measure is therefore questionable because of low internal consistency. It was determined that, due to the low reliability, this measure would not be used in subsequent analyses, and several hypotheses that involved using sensation seeking would not be tested as originally specified. Instead, a substitute measure, risk taking, was used to address certain hypotheses in modified form.

Child IBC. Internal reliability of the CIBC was tested using Cronbach's alpha, which generated an alpha of .80. Children thus responded consistently to the questions about risk taking behaviors that they engage in on a regular basis. This result is similar to those from past studies that have used the IBC with parents (Speltz et al., 1990; Potts et al., 1995).

It was also of interest to examine whether the children and their parents reported similar risky behaviors on their respective versions of the IBC. To test this question, analyses were conducted to examine the relationship between the children's responses on the CIBC and their parent's responses to the same questions from the AIBC. First, the responses from the 12-item CIBC were correlated with the 24-item AIBC and they were

found to be significantly correlated, $r(68) = .28$, $p < .05$. Children who scored high on the CIBC were also given high scores by their parents on the AIBC. The next set of analyses tested whether the children and their parents responded similarly to the 12 items that were on both the CIBC and the AIBC. Results showed that the correlation coefficient was significant, $r(68) = .25$, $p < .05$, indicating that children who reported highly risky behavior were also given high scores by their parents on those same items. Finally, the correlation between child and adult responses to individual items were examined. As reported in Table 2, children's and parents' responses to five of the twelve statements were significantly correlated at the $p < .05$ level and one was significant at the $p = .10$ level (all tests are one-tailed). These results suggest a relatively low but significant degree of correspondence between child and adult reports of risky behavior, but high internal consistency in the way children reported their own behavior.

Table 2. Correlations between parent and children responses on individual IBC items.

Item	Correlation
Jumps off furniture	.38*
Teases unfamiliar animals	.23*
Gets into dangerous substances	-.06
Plays with sharp objects	.14
Bumps into things	-.13
Rides bike in unsafe areas	.33*
Explores places that are off limits	.14
Stands on chairs	.01
Plays with fire	.45*
Takes chances on playground equipment	.19**
Puts nonfood items in mouth	-.07
Runs into street	.26*

All tests are one-tailed
* $p < .05$
** $p < .10$

Hypotheses tests

Six hypotheses were proposed for the present study. These hypotheses explored three research questions that were of interest to the researchers.

Hypothesis 1. The first research question examined whether the amount of risk taking children were willing to take was related to their conception of safety rules and ability to follow such rules. Two hypotheses were proposed to test this research question. The first hypothesis stated that children who are high-risk takers would regard safety rules as less important as other types of rules. To test this hypothesis, several analyses were conducted.

The first set of analyses examined the hypothesis using children's total score on the risk taking measure to establish high and low risk-taking groups. A median split designated risk-taking groups into high and low risk takers. Two repeated-measures analyses of variance (ANOVA) were then performed using rule domains as the within factor and risk taking as the between factor. Two dependent variables were used in the ANOVAs, seriousness of transgression and deserved punishment.

The first ANOVA used seriousness of transgression as the dependent variable. The means and standard deviations for low and high risk takers are reported in Table 3. Results from the ANOVA showed that the interaction between risk taking and rule domains was non-significant, F (2, 132) = 1.38, $p > .10$. High-risk takers did not regard transgressions across rule domains differently than low risk takers. There was a significant main effect of rule domain, which will be discussed below under additional analyses. The main effect of risk taking was non-significant.

		Rule domain					
		Moral		Safety		Social	
Measure							
Seriousness							
Risk	n	M	SD	M	SD	M	SD
Low	34	3.41	.47	3.40	.50	2.70	.64
High	34	3.49	.45	3.24	.68	2.79	.68
Punishment							
Low	34	1.57	.41	1.40	.49	1.03	.43
High	34	1.74	.39	1.44	.55	1.16	.47

Table 3. Rule conception measures by risk taking level.

The second ANOVA used amount of punishment deserved as the dependent variable. Means and standard deviations are reported in Table 3. Results showed that the interaction between risk taking and rule domains was non-significant, $F(2, 132) = .42$, $p > .10$. High-risk takers did not regard transgressions of rule domains differently than low risk takers. Again, there was a significant main effect of rule domain but the main effect of risk taking was non-significant.

An additional analysis was used to test hypothesis 1, which examined the correlation between children's self-reported risky behavior on the CIBC and their regard for safety rules. A Pearson product-moment correlation indicated a significant negative relationship between the children's reported risky behavior and their seriousness scores for safety rule violations. Children who reported engaging in more risky behavior regarded safety rule violations as less serious than those children who reported minimal risky behavior, $r(68) = -.31$, $p = .01$. High risk takers did not view moral rules and less

serious than low risk takers, $r(68) = .06$, $p > .10$. The relationship between social conventional serious and the CIBC was also not significant, $r(68) = -.16$, $p > .10$. There was a significant negative correlation between risky behavior and deserved punishment scores for safety rule violations. Children who reported higher risk taking believed that safety rule violations deserved less punishment than children who reported low risk taking did, $r(68) = -.33$, $p < .01$. The relationships between the CIBC and punishment for moral and social-conventional rules was not significant, $r(68) = -.03$ and $r(68) = -.09$, respectively.

Hypothesis 2. The second hypothesis stated that children who are high-risk takers would break safety rules more often than children who are low risk takers. As with hypothesis 1, several analyses were conducted to test this hypothesis. The first set of analyses looked at the relationship between teachers' ratings of safety rule following and the risk taking measure. Preliminary analysis showed that teachers rated girls as better safety rule followers than boys; therefore, girls and boys were analyzed separately. A Pearson product-moment correlation revealed that the relationship between teacher ratings of safety and risk taking for girls was non-significant, $r(37) = .23$, $p > .10$. Teachers did not rate high risk taking girls as poorer safety rule followers than low risk takers. A second correlation using only boys was also non-significant, $r(31) = -.12$, $p > .10$. High-risk taking boys were not poorer safety rule followers than low risk takers, according to teachers' reports.

A second set of analyses were conducted using teacher ratings of safety rule following and actual risk taking behaviors as measured by the AIBC and the CIBC. There was a significant correlation between teacher ratings of safety rule following and parents'

reports of risk taking, as measured by the AIBC, $r(68) = -.34$, $p < .01$. Teachers rated children identified as risk takers by parents as poor safety rule followers. The relationship between teacher ratings and the CIBC was not significant.

Hypothesis 3. The second research question for the present study regarded the relationship between the way children regard and follow safety rules and their injury history. Several hypotheses were proposed to answer this question. Hypothesis three stated that children who regard safety rules as unimportant will be injured more often than children who regard safety rules as important. To test this hypothesis, a multiple regression was conducted using total number of injuries as the criterion variable and scores for serious of safety violation and amount of punishment deserved as predictor variables. Results indicated that children who regarded safety rules as unimportant had not been injured more often than children who regarded them as important, $F(2, 65) = .86$, $p > .10$, $R^2 = .16$. Neither seriousness scores nor deserved punishment scores were significantly related to children's injuries.

Hypothesis 4. Hypothesis four stated that children who are poor safety rule followers will have been injured more often than children who are good rule followers. A Pearson product-moment correlation was conducted to examine the relationship between total number of injuries and teacher rating of safety. The correlation coefficient was non-significant, $r(68) = -.18$, $p > .10$, indicating that children who were poor safety rule followers did not differ in the amount of injuries suffered from children who were good safety rule followers.

Hypotheses 5 and 6. The final research question concerned the relationships between sensation seeking, risk taking, injury, and safety rule following in children.

Hypothesis 5 stated that children who are high sensation seekers will engage in greater physically riskier behavior and regard safety rules as less important than children who are low sensation seekers. As discussed previously, the sensation seeking measure was found to be an unreliable measure. Therefore, this hypothesis could not be tested as stated. Instead, risk taking was substituted for sensation seeking because risk taking can be regarded as an individual personality trait similar to sensation seeking (Potts et al., 1995). Hypothesis 5 was then tested, using risk taking in place of sensation seeking. A Pearson product-moment correlation was conducted to examine the relationship between hypothetical risk taking and self-reported risky behavior, as measured by the CIBC. The correlation coefficient was significant, $r(68) = .40$, $p = .001$, indicating that children who stated that they would engage in riskier behavior reported greater actual physically risky behavior. The second part of Hypothesis 5 has already been tested for Hypothesis 1, and results showed that high-risk takers did not regard safety rules as unimportant, compared to low risk takers.

Hypothesis 6 stated that sensation seeking is a dispositional mediator of risk taking, rule conception and self-control, and relationship among those measures will diminish when their relationship with sensation seeking is statistically removed. This hypothesis assumes inter-correlations of risk taking, rule conception, and self-control. As seen in Table 4, the correlation matrix revealed that this is not the case. Given that there is a lack of inter-correlation among the variables, Hypothesis 6 is no longer of interest. It is, therefore, not tested.

	Risk taking	Safety serious	Safety punish	Rule following
Risk taking	--	-.08	.07	-.04
Safety serious		--	.57*	.12
Safety punish			--	.11
Rule following				--

* significant at the .001 level

Table 4. Correlation matrix for hypothesis 6

Additional Analyses

Over and above the hypotheses presented, many other research questions can be tested with the data collected. Two primary exploratory questions were proposed which examined the rule conception measure and potential predictors of childhood injury.

Rule conception measure. Past research on children's rule conceptions has shown that children regard moral rule violations as more serious than other types of rule violations (e.g., Smetana, 1982). It was therefore of interest to examine whether the measures used in the present study generated similar findings. Two repeated-measures ANOVAs were conducted using moral, safety, and social-conventional rule domains as the within factor and grade level as the between factor.

The first ANOVA used seriousness of rule violation as the dependent variable. Means and standard deviations are reported in Table 5. As shown in Figure 5, results revealed a significant rule x grade interaction, $F(6, 128) = 2.57$, $p < .05$. Children, depending on their grade level, differed in their evaluations of the seriousness of rule violations across the three domains. Post hoc tests were then conducted to determine the mean differences between the rule domains among the different grades.

		Rule Domain					
		Moral		Safety		Social	
Measure							
Seriousness							
Grade	n	M	SD	M	SD	M	SD
1	16	3.44	.44	3.38	.56	3.19	.70
2	15	3.53	.50	3.47	.58	2.60	.71
3	21	3.36	.45	3.02	.66	2.57	.55
4	16	3.50	.46	3.50	.45	2.69	.51
Punishment							
1	16	1.59	.38	1.47	.50	1.19	.36
2	15	1.73	.37	1.60	.51	1.20	.68
3	21	1.69	.43	1.19	.49	1.07	.33
4	16	1.59	.46	1.50	.52	.94	.40

Table 5. Rule conception measures by grade level.

Paired samples t-tests were conducted to examine the mean differences between moral and safety violations and moral and social-conventional violations for each grade level. Due to the elevated number of comparisons being performed, the Bonferroni alpha correction method was used and results were evaluated using $p < .001$. As shown in Figure 5, children, regardless of grade level, viewed safety violations as equally serious as moral violations. The non-significant t-test results (with degrees of freedom) for first graders through fourth graders were .38 (15), .35 (14), 2.20 (20), and .00 (15), respectively ($ps > .001$). However, comparing moral violations with social-conventional violations, only the first graders viewed them as equally serious, $t(15) = .38$, $p > .10$. The second, third, and fourth graders all viewed moral violations as more serious than social-

conventional. The t-tests results (with degrees of freedom) for second graders through fourth graders were 4.19 (14), 5.77 (20), and 5.40 (15), respectively (ps ≤ .001).

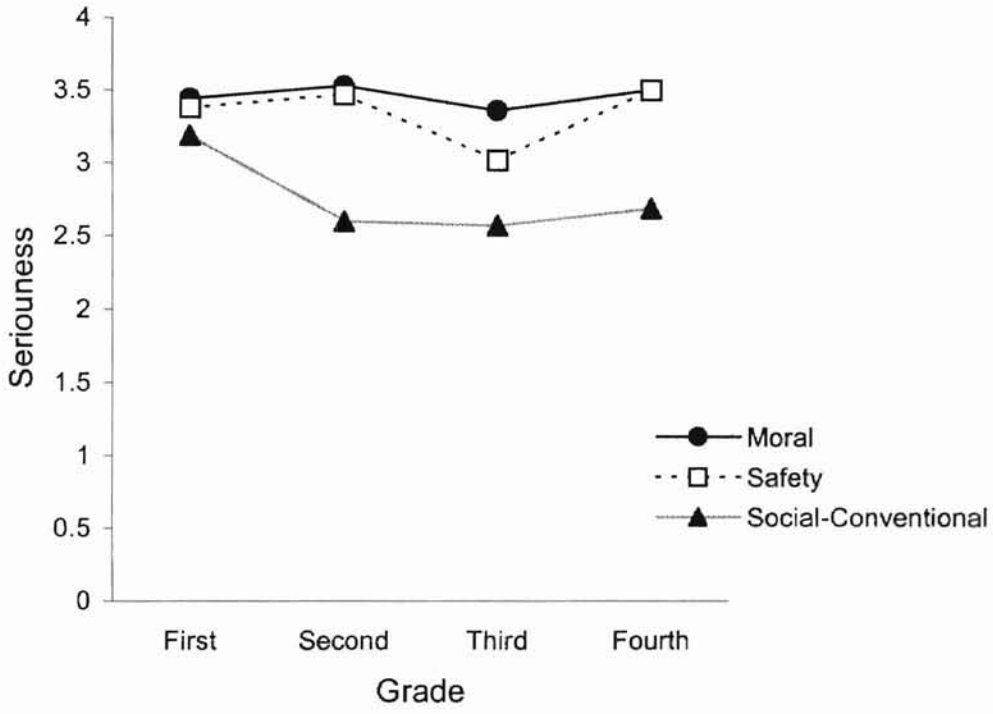

Figure 5. Rule by grade interaction for seriousness of transgression.

The second repeated-measures ANOVA was conducted using amount of punishment deserved for rule violation as the dependent variable. Table 5 shows the means and standard deviations for each grade level. Results showed that the interaction between rule domain and grade level was non-significant, $F(6, 128) = 1.80$, $p > .10$. The main effect of rule domain was highly significant. Children viewed some rule violations as deserving greater punishment than other rule violations, $F(2, 128) = 36.27$, $p < .001$. Post hoc tests were then conducted to investigate the significant main effect of rule domain.

Paired samples t-tests were conducted to compare the mean differences between moral and safety violations, between safety and social, and between moral and social-conventional violations. Because more than one comparison was being performed, the Bonferroni alpha correction method was used, and the results were evaluated using $p < .02$. Results showed that children viewed moral rule violations as deserving more punishment than safety rule violations, $t(67) = 3.37$, $p = .001$, and more punishment than social-conventional violations, $t(67) = 9.08$, $p < .001$. Children also viewed safety rule violations as deserving more punishment than social rule violations, $t(67) = 4.84$, $p < .001$.

Injury prediction. The second exploratory question regarded injury prediction. As stated previously, children's regard for safety rules and teachers' reports of children's rule-following behaviors were not significant predictors of injury. However, past research has shown that the adult version of the IBC and risk taking are related to the numbers of injuries children have experienced. It is, therefore, of interest to examine whether the present research generated similar results. A Pearson product-moment correlation was conducted to examine the relationships between the AIBC, risk taking, total injuries, and medically treated injuries. Children who engaged in more physically risky behavior, as reported by parents on the AIBC, were injured more, $r(68) = .26$, $p < .05$, including those injuries that require medical attention, $r(68) = .23$, $p < .05$ (one-tailed) than children who engaged in less risky behavior. Also, self-reported risk taking was significantly correlated with medically treated injuries, with high risk takers receiving more medically treated injuries than low risk takers, $r(68) = .20$, $p = .05$ (one-tailed).

Although children's report of risky behavior on the CIBC was not correlated with injury, it was of interest to see if scores from the CIBC and the AIBC could significantly improve prediction of injury when used together. A multiple regression was conducted using scores from the AIBC and the CIBC to predict injury. Results indicated that children who reported risky behavior and were identified as risk takers by parents were injured more often than children who were low risk takers, $F(2, 65) = 4.01$, $p < .05$, $R^2 = .33$. However, only the contribution of the AIBC was significant, $t(68) = 2.64$, $p = .01$.

A final analysis of the predictors of injury examined the correlations between children's injuries and the 12 items on the AIBC that were not part of the CIBC. This correlation was significant for total injuries, $r(68) = .27$, $p < .05$, as well as for medically treated injuries, $r(68) = .26$, $p < .05$. Thus, while children may be responding to the CIBC in an internally consistent way that corresponds somewhat to the same items on the adult version, the adult IBC is a far better predictor of injury. No other variables measured in this study were significantly correlated with injury scores.

CHAPTER V

DISCUSSION

The purpose of the present study was to examine individual differences in childhood risk taking, various indices of injury behaviors, and the relationship of those measures to children's regard for safety rules. Several research questions and hypotheses were proposed to examine these differences. Hypotheses 1 and 2 were designed to look at the way high vs. low risk-takers regard and follow safety rules. Hypotheses 3 and 4 were used to look at the relationships between regard for safety rules, safety rule following, and injury history. Finally, hypotheses 5 and 6 proposed that sensation seeking, as a personality trait measurable in children, was related to risk taking, regard for safety rules, rule following behavior, and injury. Results showed that, in general, the hypotheses were not well supported. Reasons for the lack of support for the hypotheses are discussed below.

Summary of results

Hypothesis 1. It was predicted that children who engage in risky behavior would view prudential rules as less important than other rules. Results for hypothesis 1 showed high-risk takers, as measured by the risk taking measure, did not regard safety rules differently from low risk takers. However in another test of this prediction, children who reported high actual risk taking behavior on the CIBC did regard safety rules as less important than children who were low risk takers. It is of interest to note that one measure of risk is related to regard for safety rules and the other is not. This may be due to the

different tests of analysis that was used. However, it is also possible that this is due to the fact that the risk taking measure uses hypothetical scenarios in which the children are asked what they may do. The CIBC, however, is a measure of actual risk taking, with children reporting behaviors they currently engage in. It can be speculated that for safety rule conceptualization, overt action leads to judgment. Children who engage in more risky behavior may have developed a lax regard for safety rules in order for behavior and cognition to be consistent.

Hypothesis 2. It was also hypothesized that children who were high-risk takers would disobey safety rules more often than children who were low risk takers would. Similar to hypothesis 1, results were mixed for this hypothesis. Teachers' ratings of safety rule-following were correlated with parents' responses on the AIBC, in that children who were identified as high-risk takers by parents were judged to be poor safety rule followers by teachers. However, teachers did not evaluate high-risk takers as poor safety rule followers more often than low risk takers. Children's reports of actual risk (CIBC) also were not related to their teacher's ratings of their rule following. So the hypothesis is partially supported, in that children who engage in risky behavior are identified as poor safety rule followers as long as data came from independent informants. However, there is a lack of support for a relationship between children's self-report of risk and their rule following behavior.

Hypothesis 3. It was further hypothesized that children who regard safety rules as unimportant would be injured more often than children who regard those rules as important. Results did not support this hypothesis. Children who regarded safety rules as unimportant were not injured more often than children who thought safety rules were

important. As seen in the test of hypothesis 1, high-risk takers, as measured by the CIBC, regarded safety rules as less important than low risk takers. And, further analyses have shown that high-risk takers, as measured by the risk taking measure, were injured more often than low risk takers. However, the direct relationship between regard for safety rules and injury is not significant. There are several possibilities as to why this relationship is unclear. Risk taking does not always result in injury and there are other variables that could be involved in the relationship between risk taking and injury. For example, children's skill at certain tasks or environmental factors may play a part in whether they are injured or not. Also, the injury history measure addresses only major injuries, not minor injuries. It is possible that children's safety rule conception may be related to minor injuries, but those injuries were not recorded.

Hypothesis 4. Hypothesis 4 stated that children who are poor safety rule followers will have been injured more often than children who were good rule followers. However, the results showed that poor rule followers and good rule followers did not differ in the number of injuries sustained or treated medically. It is possible that the restrictive nature of school settings limits the number and type of observations teachers have to make judgments about children's safety rule following behaviors. Therefore, they may be unable to accurately rate children's safety rule following behavior that leads to injury. It is possible that the behaviors that teachers are able to observe in the school setting are not the types of behaviors that ultimately lead to injuries in children.

Hypotheses 5 and 6. The last two hypotheses involved sensation seeking as a personality trait that possibly mediates the relationships between risk taking, rule conception, and injury. Analyses revealed that the sensation seeking measure used here

had very low reliability and could not be used as an index of that personality trait. Past studies have successfully measured sensation seeking in young children (Kafry, 1982; Russo et al., 1993; and Potts et al., 1995). However, those studies used scenarios that were familiar and preferable to young children. The sensation seeking measure designed for the present study used some scenarios that were possibly unfamiliar to young children. A lack of experience with these situations may influence how the children responded. Also, children may have had difficulty responding to the scenarios using the "a lot like me", "somewhat like me", or "not like me at all" response scale. Although this response scale has been used successfully with adolescents (Arnett, 1994), most studies examining sensation seeking in children have utilized a forced choice response format. It is possible that young children are unable to use the present scale, especially when the scenarios are unfamiliar to them. Although risk taking was used as a substitute measure for hypothesis 5, analyses using the substitution were similar to those conducted for hypothesis 1 and therefore are not discussed in detail. Hypothesis 6 was not tested at all because of a lack of intercorrelation among the measures of interest, which was necessary in order to meet criterion for testing mediation of the variables.

Limitations

There are several concerns about the present methodology that may limit detection of individual differences in rule conception. One concern is that the measure of rule conception was designed to examine age differences (Turiel. 1977; Smetana, 1981), while the present study was the first attempt to use it to measure individual differences. It is possible that this measure is insensitive to individual differences. The criterion judgments, i.e., seriousness of transgression and deserved punishment, have very limited

response ranges (1-4 for seriousness and 0-2 for punishment). This limited range may not be sufficient to detect individual differences in rule regard. The number of stories used may also be a problem. The present study only used two stories for each of the three rule domains. It may be necessary to use more stories for each domain to detect reliable individual differences in rule conception.

Another concern is the minimal reliability of some of the other measures. The risk taking measure and the adult version of the IBC have been shown to have good reliability and the results from the present study are similar to findings from past studies. However, the reliability of the two measures designed specifically for the study is questionable. The sensation seeking measure was shown to be unreliable and not useable in further analyses, as discussed previously.

The other measure designed for the present study was the child version of the IBC. Results showed good internal consistency. Children were very consistent in their reports of physically risky behavior. However, there was limited correspondence between children responses and adult responses on the 12 items presented to both groups. Although the correlation was significant, it was small. The items on the CIBC were selected under the assumption that children engage in such behaviors away from parent's observation. It is possible that this lack of correspondence is because children are reporting many behaviors of which parents are unaware. The items selected for the CIBC may not reflect behaviors that are related to rule following or injuries. So, while there was a relationship between the CIBC and children's regard for safety rules, the relationship between safety rule following and injury totals was not significant. Another problem may be that children are reporting "never" to behaviors that they have done in the past but

were injured when doing so. They may be saying that they don't engage in those behaviors *anymore*, while parents are reporting such occurrences.

Summary of additional findings

Rule conception. Results showed that all children regarded safety rules as equally important as moral rules, regardless of their age. However, with the exception of the first graders, children regarded moral rules as more important than social-conventional rules. With the exception of the first graders, these findings support Smetana (1981). The fact that first graders regarded social-conventional rules as equally important as moral rules may be due to the structured atmosphere of early elementary schooling. Children first entering school may be instructed on the importance of social-conventional rules and therefore regard violations of those rules as serious and deserving of punishment as moral violations. While Smetana found that preschoolers viewed moral rule violations as more serious than social conventional, the atmosphere of kindergarten may actually reverse such views temporarily. Once children enter school they, at first, believe that all rules are important but learn with experience to discern the different domains. Smetana also used different rule scenarios for social-conventional items than were used in the present study (for example, not sitting in designated place during story time). Those stories were specifically designed to reflect the daycare atmosphere that the preschoolers were familiar with. The present study, however, used elementary school-specific stories (raising hand before speaking).

The results from the present study differ from Tisak and Turiel's (1984) findings that 6-10 year old children regard moral rule transgressions as more important than safety rule transgressions. Although the present study used the same age participants, results

showed that children regarded safety rule violations as equally serious as moral violations. It is difficult to compare results from the two studies, primarily due to differences in methodologies. Tisak and Turiel used two stories to assess the moral domain (one involving personal harm and one involving property loss) and one story for the prudential domain (involving personal harm to self), and all stories included specific consequences for the rule transgressions (e.g., cut on head). The present study used two stories for each domain, but consequences were not made explicit. It is known that children use consequences to evaluate the actions of others (i.e., DeGroot, 1982; Moran & O'Brien, 1983; Surber, 1982), such that when injury is inflicted on another person, it is judged as more serious than when an injury occurs to actors who are injured as the result of safety rule violations. It is possible that in the absence of explicit negative consequences, children evaluate safety rule violations as equally serious as moral rule violations. Tisak and Turiel also measured the relative importance of the rules, rather than an absolute rating of the seriousness of rule violations. This could also account for the difference in results.

Despite the equivalence of moral and prudential rule domains on seriousness, the present study found that children judged moral transgressions as deserving more punishment than safety transgressions. It is possible that children may see moral transgressions as deserving more punishment because the actor may cause harm to another. On the other hand, safety violations deserve less punishment because the actors are only at risk of harming themselves, and if they are injured, that is punishment itself.

Another problem that limits the comparisons that can be made between Tisak and Turiel's findings and that of the present study is that Tisak and Turiel evaluated the

justifications participants used for responses to the criterion. These justification measures were then used collectively with the criterion judgments to determine the importance children placed on rules in the two domains. In contrast, the present study used only seriousness of violations and amount of punishment deserved separately, with the belief that these two criterion judgments focus on different aspects of rules.

Injury prediction. Another goal for the present study was to examine possible predictors of childhood injury. Results showed that one of the best predictors of childhood injury is risk-taking behavior. Children who are identified as risk takers by their parents are injured more often than children who are not risk takers. Children's hypothetical risk taking measure was also marginally related to the number of treated injuries they have sustained, but actual behaviors on the CIBC were not related to injury. Children and parents showed minimal correspondence with each other on their reports of risky behaviors. It is possible that children are under-reporting their behavior and that may explain the lack of relationship with injuries that is seen with AIBC. Thus, for predicting injuries, the most successful measure is the AIBC, as has been found in this and several previous studies (Potts et al., 1995; Speltz et al., 1990).

Conclusions

The results from the present study have revealed some important information about safety rule conception, despite a lack of findings for several of the initial hypotheses proposed. This study adds to a body of research on rule conception by focusing on individual differences rather than group differences, as has been the focus of past research. Results have shown that self reported risk taking is related to children's

regard for safety rules, and parent's report of risk taking was related to children's rule following behavior as well as injury history.

In addition to the individual differences found, the present study has also shown that most children regard prudential transgressions as equally important as moral transgressions, and both are more important than social-conventional transgressions. This finding supports past research on the importance of moral vs. social-conventional domains (Smetana, 1981) but contradicts one study that has examined moral vs. prudential domains (Tisak & Turiel, 1984). Methodological differences exist among these few studies and future research should more closely examine such differences and results.

Finally, the present study failed to find a relationship between children's regard for safety rules and their injury history. Injury prediction seems to be most successful by focusing on children's risk taking behavior, especially that obtained from informants. Regard for the rules governing safety behavior, at least that measured here, may reflect a distal set of cognitions not directly related to overt behavior and injury.

Future directions

Future research into individual differences of safety rule conception and the relationship between safety rule regard and injury history should focus on developing a measure more suited for studying individual differences than that used in the past. By using more scenarios for each rule domain and allowing children a wider response range, it may be easier to identify individual differences in rule conceptualization. Future studies should also include stories that vary as to degree of consequences, e.g., from none, to property loss, to personal harm as consequences. It may be necessary to include consequences to detect differences in regard for moral and safety rule transgressions, as

seen from Tisak and Turiel's (1984) findings. Finally, continued efforts should be made to develop a reliable sensation seeking measure for children that reveals consistent dispositions along the basic dimensions of intensity and novelty, as proposed by Arnett (1994).

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Appendix A

Examples of pictures shown to children

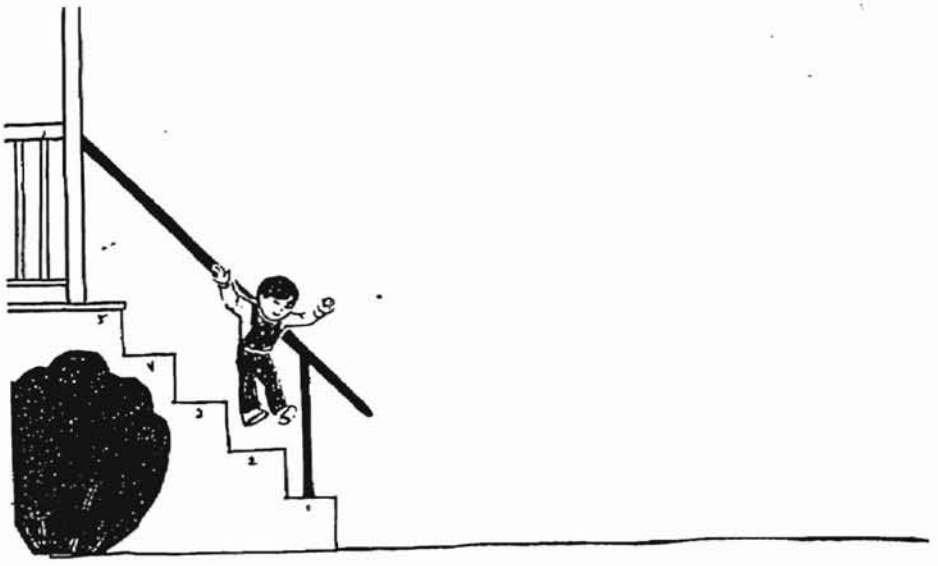


Figure 1. Example of risk taking measure pictorial scenario.

Figure 2. Examples of rule transgression and pictorial scales for seriousness of transgression and amount of punishment deserved.

When I listen to music, I like it to be loud.

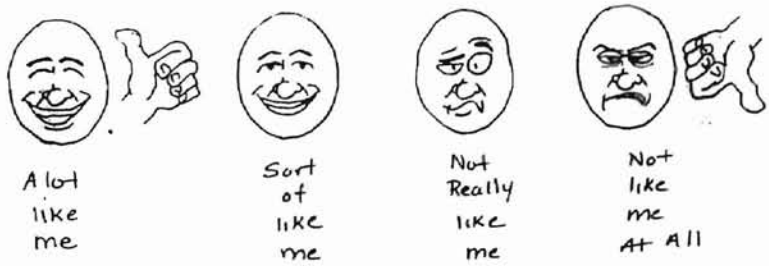
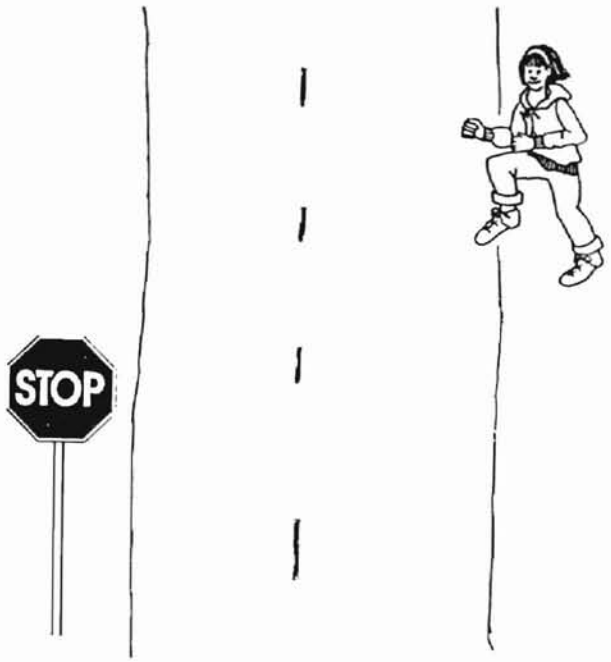


Figure 3. Examples of sensation seeking item and pictorial response scale.



Runs out into the street.

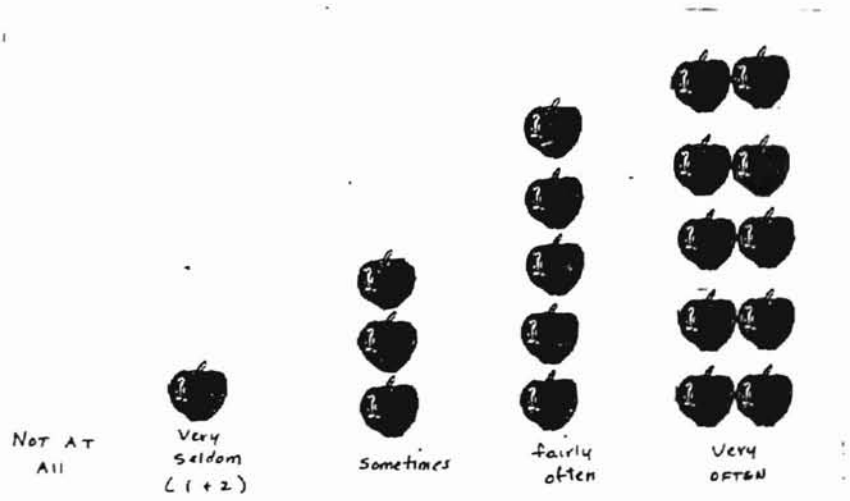


Figure 4. Example of child IBC item and pictorial response scale.

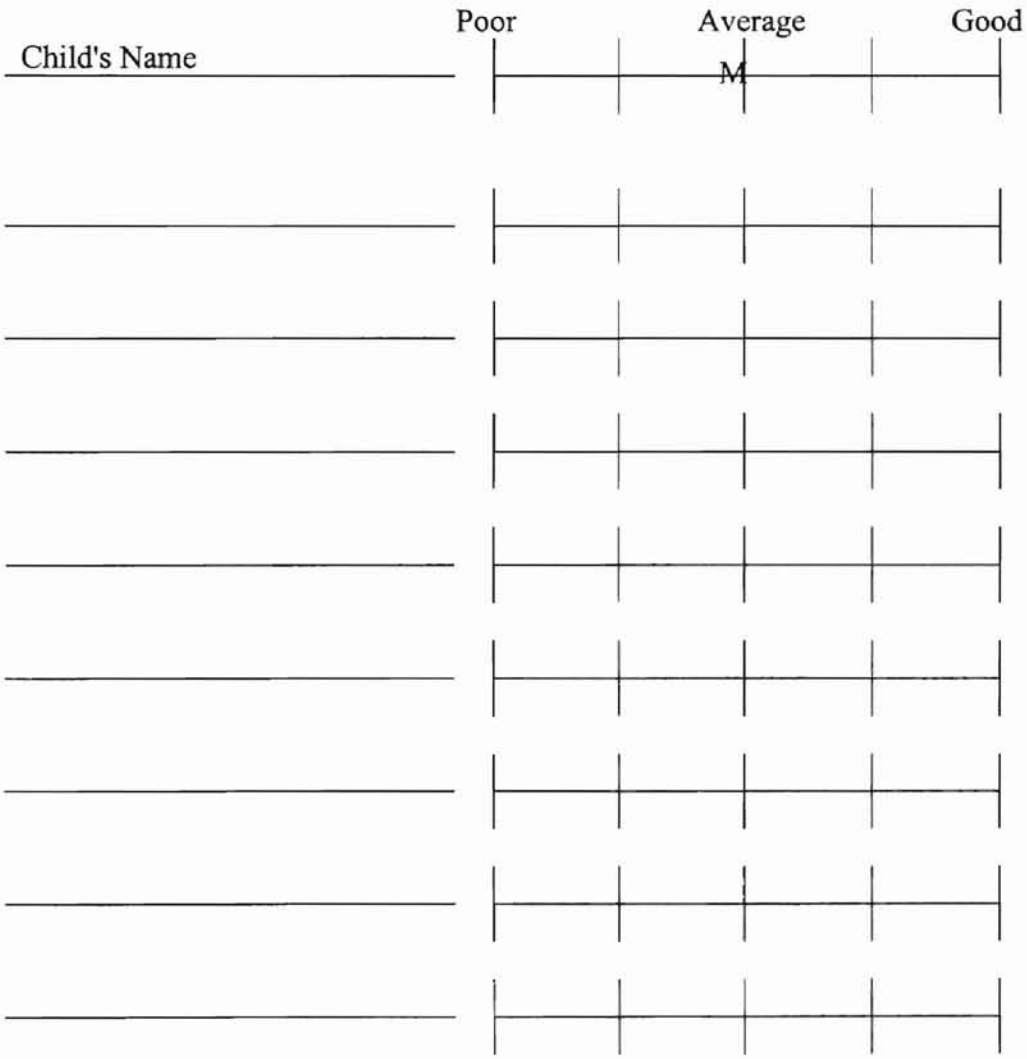
Appendix B

Teacher's Evaluation Form

Moral Rule Following Behaviors

For each child listed below, rate their moral rule following abilities, compared to the average child. Moral rules include but are not limited to rules on hitting, stealing, lying, and cheating.

Place an **M** on the line to indicate how well that child follows moral rules. Continue down the list for each child. Please see example below.



Appendix C

IRB Approval Page

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD

Date:	November 18, 1999	IRB #:	AS-00-093
Proposal Title:	"PHYSICAL RISK TAKING, SAFETY RULE FOLLOWING, AND CHILDHOOD INJURY"		
Principal Investigator(s):	Richard Potts Nikki Yonts		
Reviewed and Processed as:	Expedited (Special Population)		

Approval Status Recommended by Reviewer(s): Approved

Signature:

Carol Olson, Director of University Research Compliance

November 18, 1999
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modification to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

VITA

Nikki E. Yonts

Candidate for the Degree of

Master of Science

Thesis: PHYSICAL RISK TAKING, SAFETY RULE FOLLOWING, AND CHILDHOOD INJURY

Major Field: Psychology

Biographical:

Education: Received Associates Degree in Arts and Science from Columbia Basin Community College in December 1989; received Bachelor of General Science from Washington State University in May 1996. Completed the requirements for the Master of Science degree with a major in Psychology at Oklahoma State University in December 2000.

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