

RISK TAKING AMONG CHILDREN WITH AND WITHOUT ADHD

by

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Abstract

Researchers have reported that children with behavior disorders are more likely to experience injury than children without behavior disorders. Distinguishing injury patterns and developing effective strategies to interrupt these patterns continues to be a challenge. The purpose of this mixed methods study was to further our understanding of why children with ADHD experience more injuries than children without ADHD. In the quantitative inquiry, child attributes (temperament, overestimation and ADHD) associated with injuries were examined and in the qualitative inquiry, attributes that children associated with injury (individual, family and community level) were examined. Quantitative findings suggest that children with ADHD overestimate their physical abilities but this was not associated with injuries. Children with ADHD described overestimation but within the context of multiple other factors they associated with risk. A theory of social reaction is proposed as a plausible theory underlying children's perceptions of risk and associated injuries. A number of issues are raised, particularly for those children with ADHD who overestimate their ability, inaccurately interpret social cues and are willing to take a risk. These children could attribute less personal responsibility for their behavior and fewer negative consequences, therefore be a group of children least likely to respond to traditional injury prevention strategies. Testing innovative prevention strategies based on this theory could lead to more effective interventions.

List of Abbreviations and Symbols Used

ADHD	Attention Deficit Hyperactive Disorder
α	Alpha
β	Beta
p	Probability or Alpha Level
t	t-test
m	Mean
χ	Chi Square Test
CD	Conduct Disorder
ODD	Oppositional Defiant Disorder
DBD	Disruptive Behavior Disorder Behavior Rating Scale
DSM-IV	Diagnostic and Statistical Manual of Mental Health Disorders
EATQ	Early Adolescent Temperament Questionnaire
<i>df</i>	Degrees of Freedom
OR	Odds Ratio
n	Number of Participants
SD	Standard Deviation
CIHI	Canadian Institute Health Information
CI	Confidence Interval

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CHAPTER 1. INTRODUCTION

Background

Understanding the causes of children's injuries is an important step in preventing injuries. Researchers and health promotion advocates continue to struggle to reduce the number of childhood injuries with limited success. The challenges have been to distinguish causal patterns for injuries and to develop effective strategies to interrupt these patterns. For example, there is evidence that children who are male, who are older or who have a behavior disorder, such as attention deficit/hyperactivity disorder (ADHD) (Brehaut, Miller, Raina & McGrail, 2002; Bruce, Kirkland & Waschbusch, 2007; Pastor & Reuben, 2006; Rowe, Maughan & Goodman, 2004) are more likely to suffer an injury. Although the associations between sex, age and injuries have been well researched, the high rates of injuries among children with ADHD is not well understood. There is strong evidence that these children experience more injuries than children without ADHD, however, we have no clear understanding of the mechanism by which this occurs.

The present study assumes the perception of risk is associated with engagement in risky events that may or may not be associated with an injury. Risk may be perceived as a positive or negative event, may be approached differently across individuals, and may depend on the anticipated outcome of the event. For example, if one perceives negative consequences for a risky event, then the event may be defined as dangerous. On the other hand, if one sees the outcomes positively, then the event may be perceived as a challenge and seen in terms of achievement. In either case, cognitive risk assessments are believed to occur.

Children's assessment of risk is one possible mechanism underlying the increased number of injuries experienced by children with ADHD. A number of recent studies support this assertion through the exploration of cognitive processes associated with injuries. Among normally developing children, researchers have reported that overestimation of physical abilities is related to injuries (Plumert, 1995; Plumert & Schwebel, 1997; Schwebel, 2004a). These researchers hypothesize that children who overestimate their ability are more exposed to risk and subsequently suffer more injuries. They also found that impulsivity, inhibition and high activity levels were associated with children's injuries in their study, but this association has not been explored among ADHD children. Only one study has examined risk assessment among ADHD children (Farmer & Peterson, 1995). These researchers reported that ADHD children anticipated fewer negative consequences and had lower expectations of personal risk than children in the control group.

We have little empirical evidence of how children with ADHD assess risk and if the assessment differs from children without ADHD. However, deficits on several social information processing skills, such as attending to cues, assigning attributes and generating potentially unsuitable or inappropriate responses, have been found among children with behavior disorders, including children with ADHD (Matthys, Cuperus & Van Engeland, 1999; Milich & Dodge, 1984). That is, research has shown that children with ADHD tend to ignore or distort cues from their peers during social interactions, which leads to misinterpretation of and inappropriate response to the situation. For example, a child may perceive that a challenge from his friends to attempt a task as a cue that he can and is expected to perform the task when in fact the friends are attempting to

communicate that he is not capable and is not socially accepted. The response may be entirely different if the child perceived he was not welcome in this group of friends. Although logically such processes may be transferable to risk assessment, it is not currently known what process children use to assess risk and whether that process is different among children with and without ADHD.

Purpose

The purpose of this study is to examine the role of children's overestimation of their physical abilities in relation to injuries among children with and without ADHD. The intention is to examine their estimation of physical abilities specifically and more broadly in the context of risk assessment. Such inquiry may further our understanding of why children with ADHD experience more injuries. It is proposed that this process is altered among children with ADHD resulting in unique risk taking that may be associated with an increased chance of injury. This is explored through concurrent mixed methods of qualitative and quantitative inquiry. Children were recruited to quantitatively examine the association between estimation of physical abilities, temperament and injuries. From this group, a sample of children with and without injuries was invited to explore the construction of risk perception using qualitative inquiry.

Researchers now suggest that the paradigm wars are subsiding (Bryman, 2006a) but emphasize that it is important to be respectful and clear about the epistemological differences permitting the use of both methods when studying a particular phenomenon (Morgan, 1998). The goal of combining two methods in this study is true triangulation, in which the phenomenon will be explored from both paradigms providing an opportunity to explore the different knowledge created by such approaches. The goal of this study is to

explore risk assessment among children with and without ADHD. Each study approach is given equal priority in the study design and each is recognized as making a significant and unique contribution to our knowledge.

Objectives

1. To describe the association between estimation of physical abilities, temperament and injuries among children with and without ADHD.
2. To describe the process of assessing risk among children with and without ADHD.
3. To describe how estimation of physical abilities fits with perceptions of risk.
4. To describe the contribution from each inquiry to the understanding of risk.

Research Questions

1. Does overestimation of physical abilities differ between children with ADHD and children without ADHD?
2. Does overestimation of physical abilities differ between injured and non injured children?
3. What is the relationship of overestimation scores, temperament, age, sex, ADHD with injuries?
4. What factors (ADHD, age, sex, temperament, physical overestimation) best predict childhood injuries?
5. How do children with and without ADHD assess risk?

Theoretical and Practical Significance of Study

Overestimation of physical ability has been linked to injuries among normally developed children and this study examines this association among children with and without ADHD. No other research has examined this among children with ADHD who are at greater risk for injury nor has any research qualitatively examined risk taking from the perspective of children themselves. Distinguishing how these children perceive risk

and examining if this perception is associated with their estimation of physical ability is an important next step. Traditionally, risk has been couched in negative terms but we now understand that positive risk taking can be associated with long term development of appropriate or inappropriate skill assessment. From a practical perspective, this study provides further distinction of how to predict those children most at risk for injuries. With a growing body of knowledge, we can better design interventions that promote safe risk taking from the children's perspective. This study is timely as we continue to refine our approaches in injury prevention to target those children most at risk of an injury. Conceptually, this study employed mixed methods as the research design. Using a dialectical approach, the intent is to examine the tensions created through such inquiry. This novel study provides a unique understanding to further develop efforts how to most effectively prevent injuries among children.

Literature Review

Childhood Injury

Injuries represent the leading cause of morbidity and mortality in children and young adults (Roberts, Smith & Bryce, 1995; UNICEF, 2001; Canadian Institute of Health Information, CIHI, 2003). In Canada, almost 1,200 children and youth (0 -19 years) died as a result of an unintentional injury in 2000 (Public Health Agency of Canada, 2000) and over 30,000 children and youth were hospitalized for an injury in 2003 (CIHI, 2003). It is estimated that for every childhood injury death in Canada, at least 300 visits to an emergency room occur (Pickett, Garner, Boyce, & King, 2002; CIHI, 2003). Furthermore, the economic costs associated with injuries have risen to over eight billion dollars in Canada annually (Angus et al., 1998). Given the magnitude of this

health issue, many researchers are determined to expose causal links to injuries in hopes of reducing them.

Historically, research has focused on the epidemiology of injuries in an attempt to describe those children at greatest risk and in most need of intervention. Despite the significant contributions of these studies to our understanding of childhood injuries, prevention efforts continue to be moderately ineffective. This may be because epidemiological studies did not fully elucidate the underlying causes of childhood injuries. Further research ensued, often using a psychosocial perspective to examine factors associated with injuries. Researchers focused their efforts on predictive factors that might be responsive to interventions to reduce rates of injuries – again with limited success. Such social and psychological factors as those associated with family, parents and the child have been among the most commonly researched. Family factors including socioeconomic status (Pickett et al., 2002; Roberts et al., 1995; Rivara, 1995), single parenting (Russell, 1998; Wadsworth, Burnell, Taylor, & Butler, 1983), family conflict (Harris & Kotch, 1994), stress (Glik, Kronenfeld & Jackson, 1991), social norms (Sellstrom & Bremberg (1996), safety practices (Hapgood, Kendrick & Marsh, 2001), father's employment (Schwebel, Brezausek, Ramey & Ramey, 2004) have been found to be related to the incidence of childhood injuries. Parental supervision (Morrongiello, 2005; Morrongiello, Midgett & Shields, 2001; Morrongiello, Ondejko & Littlejohn, 2004; Peterson & Saldana, 1996; Schwebel & Bounds, 2003), depression (Russell, 1998), health beliefs (Russell, 1996), risk perceptions and behaviors (Glik, Kronenfeld & Jackson 1993; Rivara, 1995) have also been reported to influence the risk of childhood injury. In addition, associations between injury and child factors of extraversion

(Kennedy & Lipsitt, 1998; Schwebel & Plumert, 1999), age (Rivara, 1995), sex (Kennedy & Lipsitt, 1998; Morrengiello & Rennie, 1998), injury behaviors (Schwebel, Speltz, Jones & Bardina, 2002; Speltz, Gonzales, Sulzbacher & Quan, 1990; Bryne, Bawden, Beattie & DeWolfe, 2003), verbal ability (Schwebel et al., 2002), stressful life events (Thompson & Morris, 1994) and risk behaviors (Pickett et al., 2002; Kennedy & Rodriguez, 1999) have been investigated. Despite the growing body of knowledge in this field, much remains unanswered.

One plausible link to injuries is the assessment of risk. Although an intriguing concept, risk assessment has yet to be examined in depth in relation to children's unintentional injuries among children with and without ADHD.

Risk

Risk, and risk in relation to health, is poorly defined in research literature (McWhirter & Wetton, 1994; Tulloch & Lupton, 2003; Turner, McClure & Pirozzo, 2004). Disagreement exists not only on how to define risk but also how risk is conceptualized (Ballinger & Payne, 2002; Tulloch & Lupton, 2003; Turner et al., 2004). Generally risk embodies a notion of uncertainty in the future (Joffe, 2003). Risk may be defined broadly to encompass both a negative and positive perspective (Tulloch & Lupton, 2003). Negative risk is described as stepping into the unknown with a sense of uncertainty, fear that embraces a sense of choice in taking the risk. However once the choice is made, a sense of fatalism and loss of control emerges. On the other hand, positive risk is associated with voluntary risk taking for the purpose of personal gain. It is seen as an adventure that could result in self-improvement, emotional engagement and control. Tulloch and Lupton (2003) argue that risk is not about danger but rather about

the location of the attributes for risk. Perception of risk is thought to be an interactive process embedded in social and cultural contexts (Rapp, 1993; Robertson, 2002; Slovic, 1987; Slovic, 2001; Taylor-Gooby, 2002; Tulloch & Lupton, 2003) that is constructed through knowledge and values (Rapp, 1993), affect (Slovic & Peters, 2006) and is temporal and responsive to culture and gender (Mitchell, Crawshaw, Bunton & Green, 2001; Tulloch & Lupton, 2003).

Risk is believed to vary dependent on social group association. Although some research does not differentiate according to social group, there can be different perspectives of risk associated with different social perspectives: scientific, clinical and lay. The orientation of risk is formed by how the individual group creates meaning about risk within the context of their world. Further, the content and meaning of risk may be different for each social group (Kaufert, O'Neil, Lindenbaum, & Lock, 1993; Robertson, 2002; Slovic, 1987). The basic differences in perceptions of risk are that an objective form of expertise is associated with a scientific or clinical perspective whereas a lay perception of risk is based on subjective knowledge. Scientists and clinicians typically rely on objective scientific evidence and/or clinical expertise to form their perspective of risk (Ballinger & Payne, 2002; Robertson, 2002). Risk from this perspective is seen as the odds of developing a disease or an illness event given a particular set of risk factors. Lay perceptions of risk are associated with future implications (Slovic, 1987) embracing a moral construction of risk that is subjective (Joffe, 2003; Kaufert et al., 1993; Robertson, 2002). Some would argue that this subjectivity is random and non-expert as it is not based on any formalized expertise. However, lay perceptions of risk can be informed from knowledge gained through everyday life experiences.

Not only is the meaning of risk constructed by group socialization but it is also believed to be constructed at different individual levels, including an intrapersonal and an interpersonal level. At the intrapersonal level, individual knowledge, attitudes, beliefs, emotions and behaviors influence construction (Ballinger & Payne, 2002; Gielen & Sleet, 2003; Joffe, 2003; Kaufert et al., 1993). For example, individuals may judge risk based on previous experience, belief in their ability to succeed, sense of vulnerability and whether or not they are seeking adventure. Interpersonal risk construction is influenced by family, peers, norms (Gielen & Sleet, 2003; Kaufert et al., 1993) and society (Joffe, 2003). At this level, perception of risk is believed to be socially constructed (Joffe, 2003) and may vary at the individual level but is generally shaped by media, policies and organizational settings (Ballinger & Payne, 2003; Gielen & Sleet, 2003; Joffe, 2003; Kaufert, et al., 1993). For example, media may represent the risk of child abduction differently than actual risk known to be associated with the occurrence of this event (Joffe, 2003).

If one approaches risk from an intrapersonal perspective, one assumes that individuals are the primary participants in their own construction of risk. Behavior is seen as a product of the ability of the inner self to control and determine one's own behavior. Behavior is built on a foundation of individual cognitive processes and perception (Gielen & Sleet, 2003; Joffe, 2003). Cognitive information processing has been the dominant paradigm for exploring intrapersonal risk perception. This theory proposes that there are errors in information processing that can lead to a sense of overconfidence and optimism bias (Joffe, 2003). It has been suggested that individuals who lack experience may compare themselves to others, resulting in a sense of invulnerability. Slovic (2001)

argues that risk perception is a more complex process than traditionally proposed and that it is dependent on experiential thinking, emotional and affective processes that are socially constructed. Importantly, although several theories have been proposed, there is limited research that explores the actual experience of risk construction at an intrapersonal level.

Risk Perception Among Children and Youth

How do children perceive and assess risk? What constitutes taking a risk? Children's perception of risk has been largely unexplored although it has been deemed valuable in developing our understanding of childhood injuries (Roberts et al., 1995). Several different approaches to this field of study have been taken in an attempt to expand our understanding of risk. Alexander and colleagues (1990) used focus groups to examine risk-taking behaviors among young adolescents. Risk-taking behaviors reported by youth included bike racing, walking a bridge rail, rule breaking, stealing, and driving with a dangerous driver. Although no attempt was made to understand the process of determining these behaviors as risky, nor were attributes ascribed to these behaviors, the authors did report that participants had no difficulty articulating behaviors they viewed as risky.

Kelley, Mayall and Hood (1997) explored children's and parents' descriptions of risk within a decision making context in daily family living in an effort to describe what contributes to the understanding of safety and prevention. They found that children externalized risk: they expected control and protection from physical risk as their parents' role, endorsing a fear of traffic and strangers as imposed by their parents. Parents tended

to deny children had the competence or knowledge to adequately judge risky situations and described their role to protect and control to ensure their children's safety.

Roberts and colleagues (1995) approached the study of childhood injuries from the interpersonal perspective that injuries are a result of social interactions rather than a result of poor education and unsafe behaviors. They studied not only injury events but also those that were near misses in an attempt to understand risk and vulnerability. They were interested in how people use the information they have about risk and what were the barriers to using it more effectively. Using case study methods, they examined how accidents are conceptualized, experienced and dealt with in everyday lives from a lay perspective. They argue that traditional injury prevention strategies have been largely ineffective as they have failed to address the social class gradient associated with injury patterns. They concluded that although safety is a highly respected social value for families, the public domain lacks a similar level of acknowledgment.

At an intrapersonal level, McWhirter and Wetton (1994) conducted a study with 4-13 year olds exploring their perceptions of risky situations. Children were asked to draw and write about something risky. Children believed a risky event to be short term and rare. The majority of children viewed risk negatively. However, older children tended to assign a positive attribution to risk. The investigators concluded that children in this age group understand the concept of risk but do not link risk and health. The authors recommended future examination of risky behavior from the children's perspective. Green and Hart (1998) conducted a qualitative study of the meaning of accident risks and prevention among 7-11 year olds. The researchers conducted 16 focus groups with 3 -13 volunteer child participants. They found that taking risks relieved boredom and

represented opportunities to develop individual competence. Interestingly, researchers reported that the children were knowledgeable about injury risks and saw injury prevention as their responsibility.

A unique approach to study risk taking behaviors was conducted with children aged 8-11 years (Morrongiello, 2004). Children were asked to judge how high they would place a balance beam from the floor to walk across and then they completed an actual balance beam task. The researcher reported that children are aware of their risk taking behaviors and those intentions were similar to actual risk taking behaviors. These findings are the first to suggest that intentions of risk taking provide a reasonable proxy measure for risk taking behavior. However, the authors caution that this was measured in a simulated lab environment not a real world situation.

Research to date suggests that parental supervision, societal values, individual risk attributions, awareness and intentions may be associated with risk taking. Inherent in past research is the association between risk and injury events. Researchers have suggested that understanding children's construction and experiences of risk taking is an obvious gap that could enhance our understanding of a possible link between risk and injuries.

Childhood Behavior Disorders

The Disruptive Behavior Disorders (DBD) in children includes Attention Deficit Hyperactive Disorder (ADHD), Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD). ADHD is characterized by inattentiveness, impulsivity and hyperactivity whereas ODD and CD are characterized by defiance, argumentativeness, hostility and noncompliance, aggression and violation of rules. These disorders are typically defined using criteria outlined in the Diagnostic and Statistical Manual of Mental Health

Disorders (DSM-IV, American Psychiatric Association, 2000). To receive a diagnosis of ADHD, children must display inattentive, impulsive and/or hyperactive behavior to a greater extent than others their same age, and these behaviors must cause them serious impairment. A child may present with a combination or all of the symptoms or exclusively inattentiveness or exclusively hyperactivity/impulsivity. Behaviors must have been present prior to 7 years of age and be considered inappropriate for the child's developmental stage and gender. Furthermore, behaviors must be pervasive across school and home settings. Prevalence rates are believed to range from 1-7% and many children experience comorbid antisocial and aggression behaviors (30-50%) and learning disabilities (10-30%). Increased risk of injury and peer rejection are cited as two predominant health issues for these children (Hinshaw, 1994).

CD and ODD, collectively referred to as conduct problems (CP), are often referred to as antisocial behaviors that may include oppositional, argumentative, noncompliant and defiant behaviors. Diagnosis is difficult and is often dependent on the pattern of behaviors, including number of behaviors, lasting over a prolonged period of time. Prevalence rates of ODD and CD vary widely depending on the degree of disorder (number and severity of behaviors), sex and age group. Frick (1998) cites prevalence rates for oppositional disorder ranging from 4-9% in preschoolers, 6-12% in school age, and 15% in adolescence; whereas severe conduct disorders range from 2-4% in children and 6-12% in adolescence. The pattern of behavior often persists throughout adolescence and adulthood.

Cognitive Processing in Children with Behavior Disorders

Deficits in information processing have been a predominant paradigm for examining behavior patterns in ADHD children and may also have implications for investigating risk perceptions of these children. Barkley's (1997) model is among the most prominent model used to examine behavior patterns in children with ADHD. The model describes a disruption in the internal processing of information, with a disorder of inhibition control as the central problem among children with ADHD. Barkley's (1997) model proposes that a primary problem with disinhibition functions to secondarily effect performance of verbal working memory, self-regulation of affect, motivation, arousal and reconstitution. In support of Barkley's model, other study findings have included deficits in inhibitory control, working memory but not responsiveness to external reinforcement (Stevens, Quittner, Zuckerman & Moore, 2002). In a recent qualitative study, researchers interviewed 39 children with ADHD with respect to how they perceived the meaning and experiences of ADHD in the context of their everyday lives (Kendall, Hatton, Beckett & Leo, 2003). The investigators reported similar findings of disinhibition, not understanding circumstances, nor following rules and diminished ability to control behavior in the children's accounts. Clearly, disrupted information processing presents a plausible link between risk taking and children with ADHD given that it has also been a traditional paradigm for examining risk perception. Risk perception may be impaired among children with behavior disorders but there has been no attempt to examine the process empirically.

In addition to Barkley's (1997) model of disinhibition, other researchers have also found impaired cognitive abilities in children with ADHD, including an impaired ability

to accurately evaluate social situation and a tendency to overestimate their own abilities. Initial studies reported inconsistent findings; with some studies reporting no differences between children with ADHD and controls on measures of self perception (Gresham, MacMillan, Bocian, Ward, & Forness, 1998; Hoza, Pelham, Milich, Pillow & McBride, 1993), while others reporting that children with ADHD expressed overly positive self perceptions (Deiner & Milich, 1997; Ohan & Johnson, 2002). On the other hand, Dumas and Pelletier (1999) reported lower self perceptions on all dimensions except athletic competence among ADHD children, similar to findings reported by other researchers (Horn, Wagner & Ialongo, 1989). More recently there is consistent evidence of overestimation behaviors among children with ADHD (Hoza, Waschbusch, Pelham, Molina, & Milich, 2000; Hoza, Pelham, Dobbs, Owens, & Pillow, 2002; Owens & Hoza, 2003). Hoza et al. (2000) found that ADHD boys overestimated their social performance as compared to non-ADHD boys. Further research demonstrated that boys with ADHD tend to overestimate scholastic competence, social acceptance and behavior conduct more than their controls (Hoza, et al., 2002). These researchers theorized that overestimation is a self protective coping mechanism to create a positive illusion of their competence to others. Other researchers, who have found that children with ADHD overestimate their abilities, suggest that they do so because they are unable to process feedback needed to be self evaluative (Kendall et al., 2003).

It has been suggested that children who have low inhibition may be insensitive to cues of danger and perhaps lacking fearful inhibitions (Frick & Morris, 2004). Meaux (2000) contends that this interruption in information processing puts these children at risk for injuries as they are unable to think before they act and they are less able to synthesize

behavioral sequences for responding to novel experiences. If children with ADHD experience low inhibition and overestimate their ability, it is possible that these behaviors influence their assessment of risk.

Childhood Behavior Disorders and Injuries

Children with a behavior disorder are generally thought to be more at risk of an injury as compared to typically developing children. Some have considered that this is due to the nature of their behavior, specifically impulsivity and inattentiveness (Bryne et al., 2003; Hoare & Beattie, 2003; Wazana, 1997) and aggressiveness (Bijur, Golding, Haslum & Kurzon, 1988; Davidson, 1987) that may alter the development of appropriate assessment of risks. However, research examining this possibility has provided mixed results (Brehaut et al., 2003; Hoare & Beattie, 2003; Davidson, 1987; Discala, Leschiorier, Barthel, & Li, 1998; Schwebel et al., 2002). Researchers have examined psychological factors related to injury proneness. Behaviors including antisocial behavior, aggression, inability to adequately respond safely, inattention, poor concentration, overactive, impulsive, inability to estimate personal risk, lower expectations of negative consequences, daring, exploring, careless, unreliable, disobedient, competitive, overestimation of physical abilities, oppositional, poor decision making, and poor motor control are among those cited as associated with increased injuries among this population (for example see Davidson, 1987; Farmer & Peterson, 1995). Wazana (1997) conducted a comprehensive review of the literature examining behavioral and emotional risk factors for children's injuries. Wazana (1997) concluded that consistent evidence to support an association with aggressive behavior exists but not so with respect to hyperactive behavior. He theorized that extroversion, daring and

exploring attributes led to increased exposure to injury events and impulsive, careless, unreliable, disobedient and competitive behaviors decreased the child's ability to cope with hazards.

Davidson (1987) reviewed studies examining the association between hyperactive and antisocial behavior, and rates of injuries in children. She reported that existing literature is difficult to interpret due to methodological limitations and mixed findings. However, Davidson (1987) concluded that children with conduct problems were at increased risk of injury whereas this association among children with hyperactive and impulsive behaviors was less clear. Subsequently, DiScala and colleagues (1998) examined both intentional and unintentional injuries among children with ADHD using a national Trauma Registry, concluding that children with ADHD were at increased risk for serious injuries. More recently, Brehaut and colleagues (2003) conducted a population based study examining the association between children with pediatric behavior disorders (prescription for methylphenidate) and hospital injury outcomes. After controlling for age, sex, socioeconomic status, and regional location, children with behavior disorders had a 50% greater risk of injury.

In an attempt to deal with the lack of control for comorbidity in previous studies, Rowe et al. (2004) using a nationally representative sample of children, examined comorbid psychopathology of ODD, ADHD, CD and injuries. These researchers found that children with a clinically assigned diagnosis of ODD or ADHD were at greater risk than those children with CD for some hospitalized injuries. In the final predictive model, children with ODD were at the greatest risk for poisoning and burns whereas children with ADHD were independently predictive of other disorders for fractures and CD did

not fall into any model. It should be noted that injury events were based on parent recall and limited to five types of serious injuries resulting in hospitalization. In another study of comorbid behavioral disorders and injuries, Schwebel et al. (2002) studied preschool boys, those with clinically diagnosed ODD, with and without comorbid ADHD. They found a greater risk of injuries requiring medical attention, based on parent report, for children with ODD regardless of comorbidity. However this finding was limited to preschool boys and researchers did not examine children with only ADHD. Although we have evidence that children with behavior disorders are at increased risk for serious injuries, there is limited and controversial evidence of the salient features of children with behavior disorders that may significantly contribute to this association.

Most research has focused on the association between behavior disorders and serious injury events with limited research on the association to injuries of less serious nature, those treated in the emergency room or those managed in physician offices. Bryne and colleagues (2003) compared emergency injury visits for preschool children with a clinical diagnosis of ADHD to children with no behavior disorder. Although the ADHD cohort exhibited more injury risk behaviors that could place them at an increased risk of an injury, there was no evidence of any difference in actual numbers of emergency injury visits between the groups. On the other hand, Hoare and Beattie (2003) found that children with ADHD experienced an increased relative risk (1.42) of an emergency injury visit compared to the control group. Bruce et al. (2007) drew similar conclusions in that injury risk was greater among children with a behavior disorder diagnosis. Children with ADHD were the only behavior disorder group at increased risk for both minor and major

injuries. These recent comprehensive epidemiological studies have provided substantial evidence that children with ADHD are at greater risk for injury.

Risk is seldom directly associated with injury. Only one study has examined risk assessment in association with injury events in children diagnosed with and without ADHD (Farmer & Peterson, 1995). These researchers found that children with ADHD could identify risky events but anticipated fewer negative consequences if they were injured and cited fewer prevention strategies as compared to control children. They examined the ability of children to recognize hazards, evaluate risk and define prevention strategies by comparing fourteen school age boys with moderate to severe ADHD with a control group (n=16). Findings included no differences between groups in their ability to identify and respond to hazardous situations although children with ADHD reported more likelihood of engaging in risky behavior, less distress if hurt and less severe consequences of an injury. Furthermore, children with ADHD stated fewer ways to prevent injuries and fewer rules. Although the sample size was small, they proposed that children with ADHD are less able to accurately estimate their own personal risk and less likely to implement an effective prevention strategy. The researchers hypothesized that the lower expectations of negative consequences may result in increased risk taking that may, in turn increase risk of injury. Despite the limited number of studies examining risk perception in children at the intrapersonal level, cognitive processes appear to be a promising link to risk taking in the research to date.

Summary

Researchers have provided evidence of independent linkages between temperament, overestimation and injuries but no combined linkages have been explored.

In studies of normally developed children, researchers have found associations between overestimation and injuries (Plumert, 1995; Plumert & Schwebel, 1997; Schwebel, 2004a) and temperament and injuries (Plumert & Schwebel, 1997; Schwebel & Plumert, 1999). In addition, temperament has been associated with overestimation (Schwebel & Plumert, 1999). Researchers hypothesized that those children who were extraverted, overestimate abilities and expose themselves to increased risk may be those at greater risk of an injury. Given the evidence suggesting that children who have extraverted behavior tend to be injured more often and overestimation of abilities is independently associated with extraverted behavior, these researchers suggest it is plausible that overestimation may influence the relationship between temperament and injuries.

In addition, if such an association does exist, understanding why that relationship exists is crucial to the development of future injury prevention initiatives. One plausible explanation is perception of risk. In the past, researchers have reported that children with behavior disorders have disrupted information processing in multiple domains and given that theorists have suggested risk perception is associated with cognitive information processing ability, it is fitting to explore risk perception. It is conceivable that the information processing deficits in children with ADHD also impair their assessment of risk which in turn may be an underlying factor associated with risk of injury.

Although this hypothesis is plausible, there is currently no evidence to support it. That is, little or no research has yet been conducted to evaluate overestimation within the realm of perception of risk among children with ADHD. This study will seek to better understand risk perception in children with and without ADHD by exploring the association between overestimation and risk perception in children with and without

ADHD. The study findings will provide new insight into the process of risk assessment and discover if there is evidence to support the contended association between risk assessment and deficit information processing.

Theoretical Framework – Mixed Methods

Background

Historically, research methods have been dominated by the paradigm wars between inductive and deductive ways of knowing. Specifically, methodological approaches were juxtaposed either from a quantitative or a qualitative method. Such modes of inquiry have a long tradition and have been defended by researchers from diverse disciplines. More recently, researchers have broadened their methodological perspective to include mixed methods. Maxcy (2003) argues that such approaches “...have moved researchers away from sole considerations of knowledge and knowns to a discourse centered on consequent knowings and meanings” (p. 52). It is on this premise that one may question if there is only one way of knowing from either an inductive or deductive paradigm. It is asserted that a complementary role exists for both to contribute to knowledge that can lead to a better understanding of the phenomena.

In order to examine the complexity of risk assessment from a broad perspective, a mixed method design was employed. Using a strategy of concurrent mixed methods design, data was reported for each level of inquiry both independently and in combination. Both study approaches were given equal attention and priority in the study design and recognized as making significant and unique contributions to knowledge. The inductive inquiry discovers the meaning attributed to estimation of physical abilities within a framework of risk assessment whereas the deductive inquiry examines the

associations between behavior disorders, injuries and estimation of physical abilities. Data findings from each inquiry were compared and contrasted to examine tensions created through this complementary methods inquiry. This approach permitted an examination of a complex phenomenon through the diverse views to expose convergent and divergent inferences. The study provides a novel understanding of the process of risk assessment among children with and without ADHD and factors associated with that process. Moreover, it examines the contributions of different methods of inquiry in an effort to provide a broader perspective to the development of a theory of risk taking among children.

Third Methodological Movement – Mixed Methods

Morse (2003) argues that all research must have a single theoretical drive in that the research cannot be informed equally by inductive or deductive inquiry while others argue that paradigm wars have waned (Bryman, 2006a). Although many researchers have claimed one or the other approach, many have integrated both theories of inquiry, either knowingly or unconsciously (Tashakkori & Teddlie, 2003). Only recently have researchers begun to suggest there is a *third methodological movement – mixed methods*, which has been described using a number of terms including multimethods, mixed models or mixed methods, often interchangeably (Bryman, 2006b; Teddlie & Tashakkori, 2003). Mixed methods have been described as involving:

... the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in the process of research (Creswell, Plano Clark, Guttman & Hanson, 2003, p. 212).

Researchers further argue that this third movement "...rejects the "either-or" of quantitative or qualitative approaches" (Tashakkori & Teddlie, 2003, p. 672). Many researchers now advocate that "a single philosophical framework does not work with all designs" (Creswell et al., 2003, p. 231) and moreover, that mixed methods design "...may use several paradigms as a framework for the study" (Creswell et al., 2003, p. 232).

Mixed methods research serves three main purposes; 1) answers questions that other methods cannot, 2) provides stronger inferences, and 3) presents greater diversity of views (Creswell et al., 2003; Dixon-Woods, Agarwal, Young, Jones & Sutton, 2004; Sandelowski, 2003). Johnson and Turner (2003) further propose that mixed methods designs serve to: "1) obtain convergence or corroboration of findings, 2) minimize key plausible alternate explanations for conclusions, and 3) reveal the divergent aspects of the phenomena" (p. 229). Mixed methods design is intended to complement or expand theory (Creswell et al., 2003). Complementarity refers to the emergence of common and diverse characteristics whereas expansion can add breadth of understanding.

Paradigmatic Foundations

Paradigm is the word often used to frame the researcher's perspective on what constitutes knowledge and where the researcher positions him/herself in relation to that knowledge. Paradigmatic foundations situate the researcher with respect to the method of inquiry, qualitative, quantitative or mixed methods. Sandelowski (2003) provides a comprehensive perspective that guides the inquiry of this study:

Qualitative and *quantitative* are words that are used in a variety of ways to refer to an even wider variety of research entities, including (a) paradigms, or overarching

worldviews or perspectives for inquiry, such as neo-positivism, social constructionism and feminism; (b) kinds of data such as stories, self-reports, numbers, accounts, field notes, and photographs; (c) kinds of research methods such as grounded theory and experiments; and (d) kinds of research techniques for sampling, data collection and analysis such as random or theoretical sampling, questionnaires and in-depth interviewing, and multiple regression and qualitative content analysis. The words *qualitative* and *quantitative* are typically used to present research paradigms, methods, and/or techniques as one or the other. Mixed methods studies imply difference, as they entail the combination of entities – qualitative and quantitative – that are viewed as different from, albeit compatible with, each other (p. 322).

Nonetheless, there remains much controversy over the use of qualitative and quantitative paradigms in the development of mixed methods (Morgan, 2007). Several positions are offered by researchers that defend or reject the possibility of mixing methods (Tashakkori & Teddlie, 2003). Those who favor incompatibility of paradigms claim mixed methods are impossible (positivist paradigm) or mixed methods are only possible if studies are independent of each other (metaphysical paradigm) (Morgan, 2007). On the other hand, those who support mixed methods argue from multiple perspectives that the link between epistemology and methods is not an issue, or a single paradigm (pragmatism or transformative-emancipatory) can serve both methods, or multiple sets of paradigms (dialectical) can simultaneously exist as both paradigms make a contribution, or that both paradigms exist but one is superior (Morgan, 2007; Tashakkori & Teddlie, 2003).

Greene and Caracelli (2003) offer two approaches to the paradigm dilemma present in mixed methods, pragmatist and dialectical. A pragmatist posits that each paradigm can be considered separately and the researcher uses the methods that best fits the research question. Paradigms are not considered to be important. Whereas the dialectical stance supports the premise that each method is linked to a paradigm and that each paradigm makes a unique and meaningful contribution to knowledge. Dialectic mixed methods are “envisioned as way of intentionally engaging with multiple sets of assumptions, models or ways of knowing toward better understanding” (Greene & Caracelli, 2003, p. 97). These differences are valued for the tensions they invoke. If data converge, inferences will be strengthened and may move to theory development. On the other hand, if findings are divergent then one must construct an approach to explore the gap in knowledge generated by this triangulated approach. From a dialectical approach, the researcher intentionally uses both paradigms of inquiry to explore the tensions created between each. The present study collected both qualitative and quantitative data concurrently and both were given equal priority. Data were analyzed independently and then examined together for convergence or divergence of findings.

Although the debate continues for researchers, many mixed methods studies have neglected to address the issue of paradigms. Greene and Caracelli (2003) argue that:

Inquiry decisions are rarely, if ever, consciously rooted in philosophical assumptions or beliefs. It further appears that mixed methods social inquirers choose from a full repertoire of methodological options at multiple points in the inquiry process— inquiry purpose, overall design, methods and sampling, data recording and analysis, and interpretation...signaling both creativity and a view that paradigm characteristics are not

intrinsically bound to particular methods or techniques. Rather, methods and techniques can be crafted and used with multiple, diverse paradigmatic positions (p.107).

Despite the apparent lack of attention to paradigmatic obligations, many researchers who support mixed methods stress the importance of the researcher's epistemological and ontological beliefs that inform that inquiry perspective (Greene & Caracelli, 2003). The assumption of mixed methods research is that it is possible to have two paradigms mixed in a single study (Greene & Caracelli, 2003; Sandelowski, 2003). Mixed methods study provides an opportunity to examine a phenomenon from a diverse perspective, much like typical examination of everyday experiences when arriving at a decision. As humans, we are exposed to different and multiple perspectives that inform our understanding which Greene and Caracelli (2003) suggest are reflective of our 'complex' and 'pluralistic' society. Such a position is grounded in the philosophy that knowledge is gained by using various sources and different contexts of information.

From a dialectical perspective, I believe there are multiple ways of knowing that can create tensions that can also offer another level of understanding. While many events can be objectified through quantitative inquiry, those events can also be constructed by the individual; each inquiry requires a different method of inquiry. It is the intent of this inquiry to examine whether overestimation is associated with risk assessment and if so, in what way does it exist? More specifically, we have evidence that suggests that children with ADHD are more likely to suffer an injury and we also have evidence that injured children are more likely to overestimate their physical ability but we have no understanding if this association exists among ADHD children and in what way is that conceived by the children themselves. The existence of such a phenomenon among

children with ADHD is important to examine but equally important is the context in which that exists for those children. How do children come to understand risk? What influences their perception of what is a risk and what is not? Using mixed methods offers the opportunity to examine this phenomenon from both perspectives for convergence or divergence of findings. Moreover, mixed methods provide an opportunity to expand knowledge beyond the contribution of either one or the other method of inquiry. Johnson and Turner (2003) adhere to the fundamental principle that: “data collection methods should be combined so that they have different weaknesses and so that the combination used by the researcher may provide convergent and divergent evidence about the phenomena being studied” (p. 299).

Assumptions of the Researcher

The approach to this research was guided by a set of assumptions about the social world, knowledge and purpose of research. The paradigm chosen for this inquiry was not found solely in one paradigm or another. As a researcher and clinician, it has been my practice to gather evidence from multiple sources and in multiple ways to make sense of the world. There is not one way of knowing, it can be both propositional and constructed and reality is both causal and contextual. Assuming such an approach to knowing, mixed methods provided the most logical approach to examine the research question, exploring from both paradigm perspectives to more fully appreciate the phenomena. Using a dialectic stance on mixing paradigms while mixing methods supports the approach that as Greene and Caracelli (2003) explain: “...all paradigms are valuable and have something to contribute to understanding; use of multiple paradigms leads to better understanding” (p.96).

My journey into this area of inquiry began with personal experiences of children taking risks. As an adult, it seemed to me that the risks of such activities were obvious and the likelihood of personal injury significant, so why were these children taking risks? In addition, my past clinical work and research provided evidence that childhood injuries continue to exist in unacceptable proportions despite rigorous efforts to reduce these rates. Given that there has been a significant amount of research conducted in the field of children's injuries and a multitude of interventions tested with limited success, it seems that we have yet to capture the essence and complexity of children's risk of injury. It is concerning that despite all the evidence that suggests we have a logical understanding of the factors associated with injury; we have yet to establish a comprehensive approach to reduce the risk. All this leads to an uncertainty about how we come to understand injury risk among children.

Although we are aware of the significant health issues associated with childhood injuries, many strategies intended to reduce or eliminate this risk remain largely ineffective. If we believed that these strategies should be effective, then why were they not? Perhaps it has more to do with how we perceive children's injuries and how that perspective might be different for children. I once had a discussion with a mother of an extreme risk taker. She described not worrying anymore as she had discovered that his entire risk taking was comprehensively calculated. She was confident that the risks he would take would have limited personal risk as he was aware of his ability to successfully accomplish the task. What this mother perceived as risky was seen differently by her son and his success appeared linked to estimation. As a parent, I am well aware of the limited value in telling your children the 'dos' and 'don'ts' as rarely did my children and I agree

on the potential risk. All this leads me to question whether we actually have an understanding of children's perceptions of risk and moreover, what children need to allow them to discover ways in which to take risks successfully. Perhaps our traditional approach of assuming we understand has laid the foundation for ineffective interventions.

This study examines overestimation of physical abilities among children with and without ADHD as overestimation has been associated with injuries among children without behavior disorders. This study further expands that inquiry through discovering if and how children perceive estimation of physical abilities within their perceptions of risk. Given that I have my own experiences and ideas about how children might perceive risk, it is impossible not to have some influence on the process of co-creating that understanding. Regardless of the method of inquiry, the researcher can introduce bias during data collection whether it is an interview, observation or survey. However, as Yin (1994) posits the strength in mixed methods is the "neutralization of bias inherent in data source, researcher and methods". I do not assume to have a similar understanding as children but assume that children indeed have their own views. However, I do believe that my words, assumptions, mannerisms and reactions to their participation, both qualitatively and quantitatively, can alter their responses. Throughout data collection, my interaction with the children created a new awareness and new knowledge that changed my understanding of their perceptions of risk. I have attempted to describe and reflect that understanding, in my findings, from the perspective of the children participating in this study. Although that understanding may be representative of other children, transferability can be determined by others who consider the relevance and fit to their inquiry and situation.

Contribution of Mixed Methods

Advocates of mixed methods propose multiple benefits of such inquiry including “more generative understanding, means to explore differences, understand different ways of seeing, knowing and valuing” (Greene & Caracelli, 2003, p.107). The intent of mixed sources of data in this study is to explore convergence and divergence of theory between two sources of data with the expectation that knowledge and understanding of risk perception among children will be improved. In this study, each method provides an answer that another method could not, one confirmatory and the other exploratory. The first question about the association of estimation of physical abilities among children with and without ADHD is a confirmatory question attempting to establish whether a relationship exists between overestimation and injury. The second question explores if and how overestimation exists in children’s perception of risk, attempting to provide the context for if and how overestimation exists. Creswell and colleagues (2003) argue that by adding other methods, one can enhance explanatory power. Stronger inferences are produced as the children describe more broadly how overestimation fits with their perception of risk. Lastly, using mixed methods provides an opportunity to examine and compare diverse views in an attempt to develop a more comprehensive understanding.

Conceptual Model

The study employs a concurrent, mixed methods design (see Figure 1). In other words, there are multiple questions, the data collected corresponds to each question, data is analyzed independently and inferences are drawn together to reach a meta-inference.

Creswell and colleagues (2003) explain:

In concurrently gathering both forms of data at the same time, the researcher seeks to compare both forms of data to search for congruent

findings (e.g., how themes identified in the qualitative data collection compare with the statistical results of the quantitative analysis) (p. 217).

Creswell and colleagues (2003) outline four factors in a mixed methods study design that include: 1) implementation of data collection, 2) priority given to type of data, 3) stage at which integration occurs and 4) theoretical perspective. In this study, data were collected concurrently. It was done intentionally for two reasons, one that both data sets were considered independent of each other and secondly in the terms of timeliness. Data were not intentionally compared during this phase and there was no iterative process engaged between the two sets of data. Both data sets were given equal priority as both were considered to make unique and significant contributions to the body of knowledge about children's risk. Data were analyzed independently initially and then compared for inferences about convergence and divergence of findings. Data findings were integrated during the interpretation phase of the study as a means to: "...strengthen knowledge claims or explain lack of convergence" (Creswell et al., 2003, p. 229).

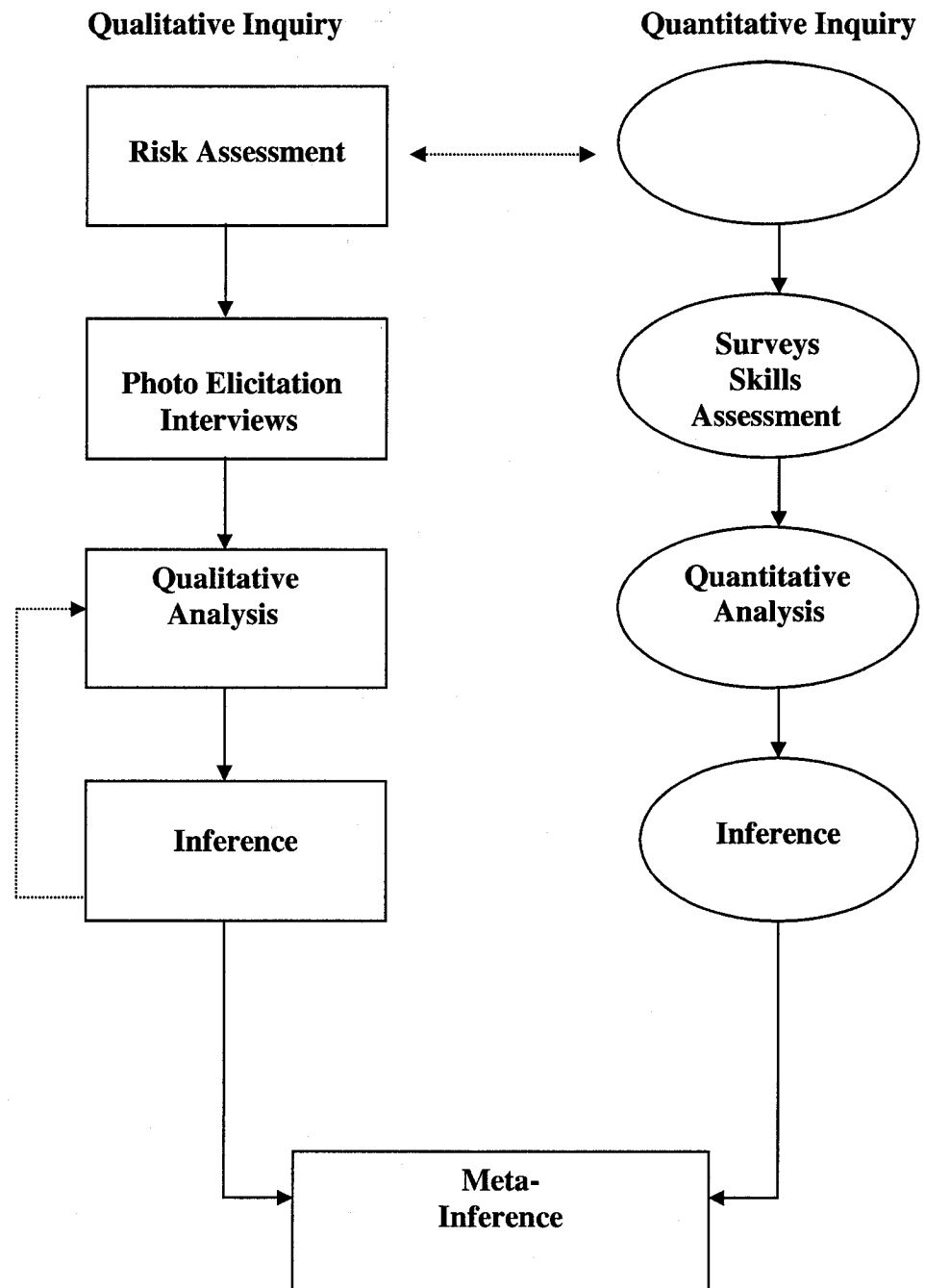


Figure 1. Concurrent Mixed Methods Design (Adapted from Tashakkori & Teddlie, 2003, p. 688).

The goal of the analysis was to examine the tensions created through the two methods and further develop a theory of risk taking. Both sets of data findings were analyzed independently and then compared together to develop a meta-inference where inference is defined as:

...a researcher's construction of the relationships among people, events, and variables as well as his or her construction of respondents' perceptions, behaviors, and feelings and how these relate to each other in a coherent and systematic manner. Inferences are integrated and internally consistent sets of statements about the phenomena, events, people, and/or constructs under study (Tashakkori & Teddlie, 2003, p. 692).

The theoretical perspective of this study is based on the premise that there has been limited success with present injury prevention initiatives that have been largely informed from an adult perspective. This research attempts to develop further our understanding of children's risk taking as a platform for advocating for change in current injury prevention strategies.

Summary

Given the limited success of previous attempts to influence the risk of children's injuries, this study has adopted a mixed methods approach to examine the tensions created by each unique inquiry. Using quantitative inquiry to explore the relationship between overestimation of physical abilities and risk of injuries and qualitative inquiry to explore children's perceptions of overestimation in relation to assessment of risk of injuries, findings from both methods of inquiry are compared and contrasted for convergence and divergence towards advancing present knowledge.

CHAPTER 2. QUANTITATIVE INQUIRY

Background

Children with ADHD are more at risk for an injury (Brehaut et al., 2002; Bruce et al., 2007; Pastor & Reuben, 2006). In addition, children who overestimate their physical ability also are more likely to experience an injury (Plumert, 1995; Plumert & Schwebel, 1997). Furthermore, children who are extraverted and have low inhibitory control are more likely to overestimate abilities (Schwebel & Plumert, 1999) and experience more injuries (Plumert & Schwebel, 1997; Schwebel & Plumert, 1999). However, although researchers have provided evidence of independent associations among temperament, overestimation and injuries among normally developing children, there has been no attempt to examine this association among children with ADHD.

Given we have evidence suggesting that: (1) children with ADHD tend to be injured more often (Brehaut et al., 2003; Bruce et al., 2007; Pastor & Reuben, 2006) ; (2) children with ADHD overestimate their abilities in scholastic and behavioral domains (Hoza et al., 2002; Hoza et al., 2004; Owens & Hoza, 2003); and (3) overestimation of physical abilities is associated with injuries among normally typically developed children (Plumert, 1995; Plumert & Schwebel, 1997; Schwebel, 2004a), and (4) overestimation and injuries are associated with children who are extraverted and have low inhibitory control, it is plausible that overestimation may be associated with injuries among children with ADHD (Figure 2). However, such theory has yet to be examined.

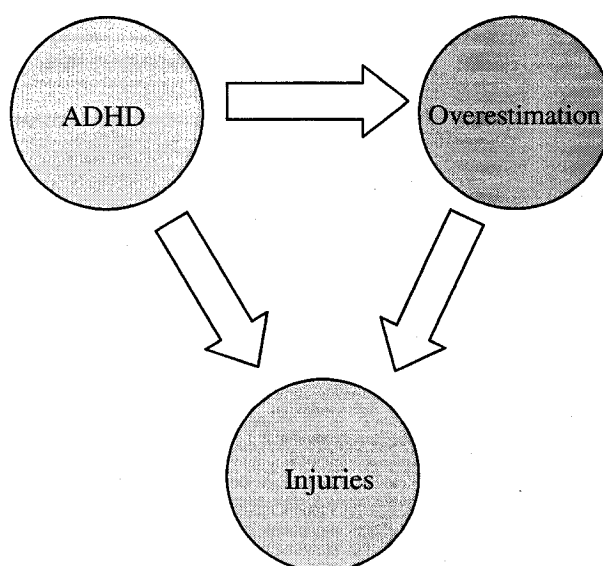


Figure 2. Association between ADHD, Overestimation and Injuries

This inquiry examines whether an association exists between overestimation of physical abilities and injury in children with and without ADHD. It is expected that children with ADHD who overestimate their physical ability will experience greater proportion of injuries than children without ADHD. In addition, sex will be examined as sex has been linked to both injured children (Lahey, Miller, Gordon & Riley, 1999; Morrongiello & Rennie, 1998; Schwebel, Brezaussek, Ramey & Craig, 2004; Wilkins & Park, 2004) and children with ADHD (Brehaut et al., 2002; Bruce et al., 2007). As some temperament characteristics have been associated with injuries, temperament scores will be examined in association with injuries.

Objectives

To describe the association between overestimation of physical abilities, temperament, and ADHD among children with and without injuries.

Research Questions

1. Do children with injuries overestimate their physical abilities more than children without injuries?
2. Do children with ADHD overestimate their physical abilities more than children without ADHD?
3. What is the crude association between independent variables of overestimation, temperament, age, sex, and ADHD and the dependent variable of injuries?
4. What factors of ADHD, age, sex, temperament, and overestimation of physical abilities best predict childhood injuries?

Method

Two cohorts of children, one group with diagnosed ADHD and one group with no behavior disorder were invited to participate in this study. Children with ADHD were recruited through health services at IWK (Appendix A, B), specialized education programs, a local ADHD Association, and television advertisement. Non disorder children were recruited through health services at IWK, community contacts and television advertisement. Interested families were given an opportunity to contact the researcher directly for information or to volunteer participation. Arrangements were made to conduct study assessments at the health centre at a time convenient for families.

Sample

Fifty seven children aged 10-12 years were recruited. One child, in the control group, who met the criteria for ODD was removed from the analysis and three children, in the ADHD group who did not meet the criteria for ADHD, were placed in the control group. The final sample for analysis was ADHD (n=22) and non ADHD (n=35). ADHD children included ADHD diagnosis only and comorbid behavior disorders with ADHD. Children in the ADHD group also presented with Conduct Disorder (CD) (9%) and Oppositional Defiant Disorder (ODD) (22%) or both disorders (18%). Overall, 66% of the children experienced at least one injury and the majority of participants were male (70%) and older (45%). No children presented with a neurodevelopmental disease or obvious cognitive impairment. All children were competent in English.

Procedure

Once written informed consent was obtained from parents (Appendix D) and verbal assent (Appendix C) was obtained from children, parents completed a demographic profile (Appendix E). The history of number and type of injuries requiring medical treatment (physician office, emergency or hospital stay) since the child had enrolled in elementary school was recorded by parents on the demographic sheet. A measure of behavior disorder, the Disruptive Behavior Disorder Rating Scale (Pelham, Gnagy, Greenslade & Milich, 1992) (Appendix F, G) was completed by the parent. The child completed a measure of temperament, the Early Adolescent Temperament questionnaire, Revised Short Form (Ellis & Rothbart, 1999) (Appendix H, I, J, K) and a series of lab skills to measure estimation of physical ability (Appendix L).

Baseline skill levels were established for each child. Children were asked to reach as high as possible on a wall while standing on a marked line on the floor. The distance to the tip of their index finger was measured as baseline vertical reach. Horizontal reach was measured by asking the children to stand on a fixed platform and reach across the floor as far as possible. Children were asked to take as great a step out from the fixed platform as possible. Baseline stepping measures were taken from the back of the trailing heel. Baseline clearance measures were established by asking the children to horizontally align themselves along the wall and 'curl' themselves in a huddle. Measures were taken as 1 inch above the highest point of their back.

After establishing maximum baseline levels for each child, each child was given three trials for each of the four tasks. Different levels scaled to the abilities of the individual child were prepared, 'just within', 'just beyond' (8%) and 'well beyond' (13%) level of ability. Children were asked to decide if they thought they could perform the task (yes or no) and then asked to attempt each task. Tasks were presented in random order. Each set of three trials was randomly mixed as to level of ability across four tasks for each individual child. Interrater reliability between the investigator and the research assistant was calculated over five randomly chosen sets of scoring assessments of whether children accurately judged and completed tasks. The overall kappa was 0.90 (Woodward, 1999).

Measures

Disruptive Behavior Disorder Rating Scale (DBD)

The DBD consists of 45 questions designed to measure DSM-IV symptoms of ADHD, ODD and CD (Pelham et al., 1992). Items on the DBD were rated using Likert

scales that ranged from 0 (“not at all”) to 3 (“very much”). Symptoms rated 2 (“pretty much”) or 3 (“very much”) were classified as present and summed for each diagnostic scale of ADHD, ODD and CD. Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) symptom count criteria were then used to assign children into ADHD, ODD, and CD (present vs. absent) groups. The reliability and validity of the DBD has been well supported, as reported elsewhere (Masseti, Pelham, & Gnagy, 2005; Owens & Hoza, 2003; Pelham et al., 1992; Wright, Waschbusch & Franklin, in press).

Early Adolescent Temperament Questionnaire, Revised Short Form (EATQ)

The EATQ (Ellis & Rothbart, 1999) is a child rated measure based on a 5 point Likert scale. Subscales include: *Activation Control*: The capacity to perform an action when there is a strong tendency to avoid it; *Affiliation*: The desire for warmth and closeness with others, independent of shyness or extraversion; *Attention*: The capacity to focus attention as well as to shift attention when desired; *Fear*: Unpleasant affect related to anticipation of distress; *Frustration*: Negative affect related to interruption of ongoing tasks or goal blocking; *High Intensity Pleasure/Surgency*: The pleasure derived from activities involving high intensity or novelty; *Inhibitory Control*: The capacity to plan, and to suppress inappropriate responses; *Pleasure Sensitivity*: Amount of pleasure related to activities or stimuli involving low intensity, rate, complexity, novelty, and incongruity; *Perceptual Sensitivity*: Detection or perceptual awareness of slight, low-intensity stimulation in the environment; *Shyness*: Behavioral inhibition to novelty and challenge, especially social; *Aggression*: Hostile and aggressive actions, including person- and object-directed physical violence, direct and indirect verbal aggression, and hostile

reactivity; *Depressive Mood*: Unpleasant affect and lowered mood, loss of enjoyment and interest in activities. Scores were reported as means.

Overestimation Scores

Overestimation scores were calculated using the laboratory skill task based on level of task. The children completed four laboratory skill tasks designed to measure the accuracy that children estimate their own physical abilities (Plumert, 1995; Plumert & Schwebel, 1997). The four laboratory tasks have been well tested among normally developing children. The tasks included: (1) vertical reach, (2) horizontal reach, (3) stepping and (4) clearance. The vertical reach task involved removing an object from a shelf while standing on tiptoes. The horizontal task required children to reach from a squatting position for an object without touching the floor. The stepping task involved stepping across two parallel sticks on the floor and in the clearance task, children attempted to slide under a wooden bar without knocking it off the post.

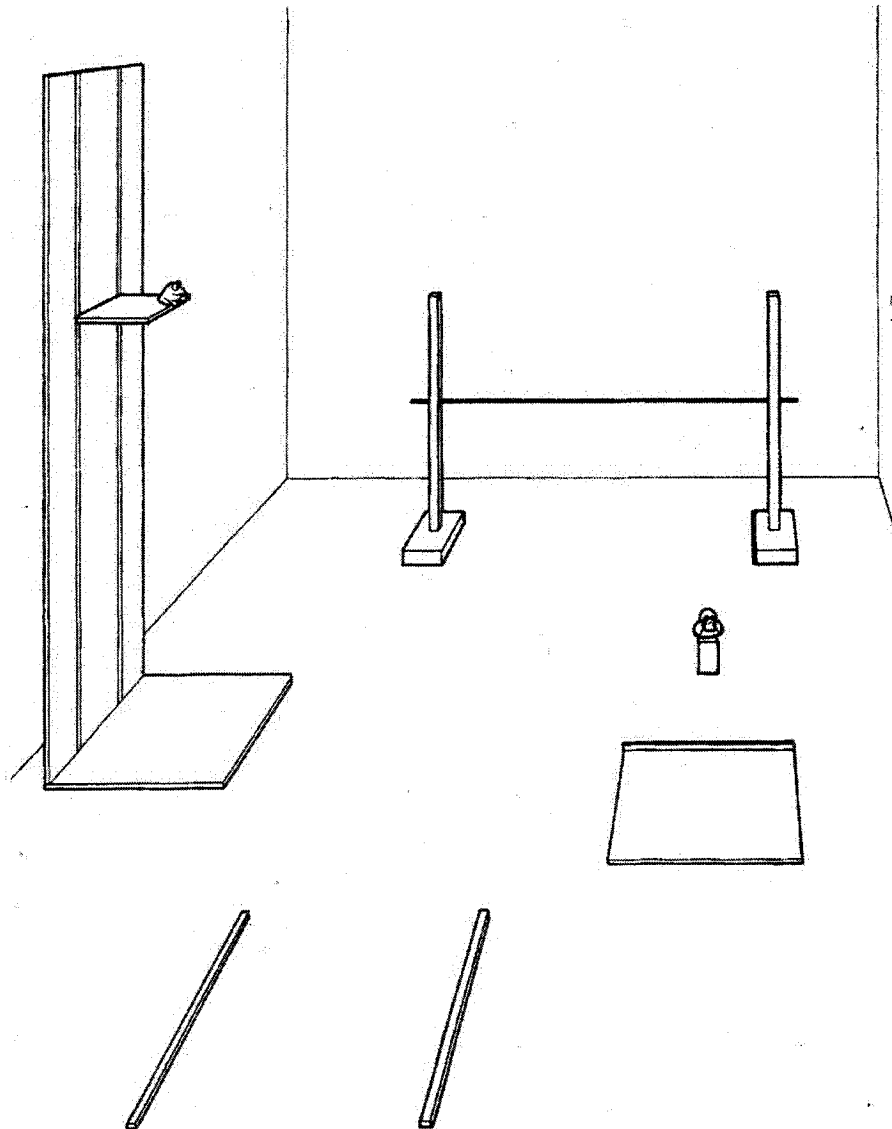


Figure 3. Diagram of Physical Estimation Tasks (Plumert, 1995)

Children received an accurate assessment score if they judged they were able to do the task and they successfully completed the task or if they reported that they were unable to do the task and they were not able to do so. Children were grouped as overestimating their ability if they reported that they could accomplish the task and were

unable to successfully do so. Baseline measures were considered within the child's ability. All children reported that they were able to complete the baseline task and all did so.¹ Scores were summed for all tasks over each level of ability such that a composite score was calculated for each of three levels of ability (baseline, 8% beyond ability and 13% beyond ability). Underestimation scores were not analyzed as the outcome of interest was overestimation only. Higher scores indicated the child overestimated their abilities. Scores were dichotomized as accurate or overestimation.

Analytic Plan

Descriptive statistics were run for all variables using Chi Square for dichotomous and categorical variables, and t-tests for mean scores. Crude associations were measured between dependent outcome variable of injury and independent variables of overestimation, age group, ADHD and sex using odds ratios with 95% confidence intervals. Bivariate analysis was conducted to assess ADHD as an effect modifier. A multivariate regression was run using logistic regression with independent variables of overestimation (8% beyond and 13% beyond), ADHD, attention and sex.

Findings

Overestimation and Injuries

The crude association between overestimation of physical ability (the independent variable) and injuries (the dependent variable) was first examined. As is seen in Table 1, children who overestimate at either '8% beyond ability' or '13% beyond ability' are no more likely to be injured than children who do not overestimate.

¹ Scores for children who said they could do the baseline level but did not do it or estimated they could not do the baseline level and did complete the task were removed from the dataset as it represented an inaccurate baseline assessment. This represented 5% of the children (n=3).

Table 1. Unadjusted association between overestimation at 8% and 13% beyond ability and injuries in children aged 10-12.

Overestimation of physical ability	No Injury N (%)	Injury N (%)	χ^2 (p value)	Odds Ratio	95% confidence interval
8 % Beyond					
No	9 (47%)	19 (56%)		Referent	
Yes	10 (53%)	15 (44%)	0.35 (0.55)	0.71	0.23, 2.19
13 % Beyond					
No	15 (79%)	26 (77%)		Referent	
Yes	4 (21%)	8 (23%)	0.04 (0.84)	1.15	0.29, 4.48

Overestimation and ADHD

Since it was hypothesized that children with ADHD would overestimate, and that that might be the mechanism that led to injuries, the association between overestimation of physical abilities and ADHD was also examined. As seen on Table 2, the unadjusted odds ratio for overestimation at 8% beyond ability was significantly associated with ADHD. At 13% beyond ability, this association approached statistical significance (p=0.09).

Table 2. Unadjusted association between overestimation at 8% and 13% beyond ability and ADHD in children aged 10-12 years.

Overestimation of physical ability	No ADHD N (%)	ADHD N (%)	χ^2 (p value)	Odds Ratio	95% confidence interval
8 % Beyond					
No	24 (73%)	4 (20%)		Referent	
Yes	9 (27%)	16 (80%)	13.89 (0.001)	10.66	2.80, 40.61
13 % Beyond					
No	28 (85%)	13 (65%)		Referent	
Yes	5 (15%)	7 (35%)	2.80 (0.09)	3.01	0.80, 11.31

ADHD and Injuries

The crude association between ADHD and injuries was then examined. As seen in Table 3, a statistically significant difference in the likelihood of injuries was not found between children with ADHD and no ADHD; unadjusted OR 1.65 (0.51 – 3.29).

Table 3. Unadjusted association between ADHD and injuries in children aged 10-12 years.

Injuries	No ADHD N (%)	ADHD N (%)	χ^2 (p value)	Odds Ratio	95% confidence interval
No	13 (38%)	6 (27%)			
Yes	21 (62%)	16 (73%)	0.71 (0.39)	1.65	0.51, 5.29

ADHD, Injuries and Overestimation

The data were then stratified by ADHD diagnosis to examine the association between injuries and overestimation. As seen in Table 4 there was no association between overestimation and injury for children with and without ADHD. Since the odds ratios were similar among both groups, ADHD was not an effect modifier.

Table 4. Unadjusted association between injuries and overestimation at 8% beyond ability among children with and without ADHD aged 10-12 years.

No ADHD	No Overestimation N (%)	Overestimation N (%)	χ^2 (p value)	Odds Ratio	95% confidence interval
Injured					
No	9 (36%)	5 (56%)		Referent	
Yes	16 (64%)	4 (44%)	1.04 (0.31)	0.45	0.09, 2.11
ADHD					
Injured					
No	1 (25%)	5 (31%)		Referent	
Yes	3 (75%)	11 (69%)	0.60 (0.81)	0.73	0.06, 8.91

Confounders and Injuries

The potential confounders of sex, age, and temperament measures were examined one at a time in relation to injuries. A significant association between sex and injuries was found (Table 5) while there was no association between age and injuries (Table 6). Among the temperament variables, only attention was found to be significantly associated with injuries (Table 7).

Table 5. Unadjusted association of independent factor, sex and dependent outcome of injury in children aged 10-12 years.

	Female	Male	χ^2 (p value)	Odds Ratio	95% confidence interval
Injured					
No	10 (59%)	9 (23%)		Referent	
Yes	7 (41%)	30 (77%)	6.74 (0.009)	4.76	1.40, 16.12

Table 6. Unadjusted association of independent factor of age and outcome of injury in children aged 10-12 years.

Injuries	No	Yes	χ^2 (p value)	Odds Ratio	95% confidence interval
Age					
10 years	6	8		Referent	
11 years	5	12		1.80	0.32, 10.27
12 years	8	17	0.69 (0.71)	1.42	0.29, 6.47

Mean temperament scores were compared between groups of injured and non injured children using t tests. No differences were found for affiliation, fear, depression, pleasure, perception, or surgency. Only attention scores differed between injured and non injured children ($t = 2.34$, $p = 0.02$, $df = 54$) with injured children scoring lower on the attention scale (Table 7).

Table 7. Comparison of mean scores on independent measures of temperament and outcome of injury.

Temperament	Injured m (SD)	Non Injured m (SD)	t	p *
Activation	3.12 (0.85)	3.42 (0.92)	1.36	0.17
Affiliation	3.46 (0.71)	3.31 (0.86)	-0.63	0.53
Aggression	2.23 (0.99)	2.14 (0.81)	-0.30	0.76
Attention	3.17 (0.74)	3.63 (0.70)	2.34	0.02*
Depression	2.23 (0.75)	2.42 (0.79)	0.80	0.42
Fear	2.73 (0.75)	3.07 (0.90)	1.25	0.21
Frustration	3.26 (0.78)	3.32 (0.73)	0.32	0.75
Inhibition	3.62 (0.77)	3.70 (0.71)	0.08	0.93
Pleasure	3.44 (1.08)	3.40 (0.99)	-0.33	0.74
Perception	3.62 (0.98)	3.58 (0.74)	-0.07	0.94
Shy	2.36 (0.96)	2.24 (1.08)	-0.66	0.50
Surgency	3.32 (0.70)	3.50 (0.94)	0.93	0.35

Note. * $p < .05$, ** $df = 54$

Predictive Model of Injuries

A multivariate model including overestimation (8% and 13% beyond baseline ability), ADHD, sex and attention was then run using logistic regression. Activation was added to the model initially but was removed from the final model as it did not contribute to the model. When controlling for ADHD, attention, and sex, there was no statistically significant association found between overestimation and injuries (Table 8). Sex was an

independent predictor of injuries. Being male increased the likelihood of injury almost five fold.

Table 8. Multivariate model of independent factors, overestimation (8% and 13% beyond), sex, ADHD and attention in predicting outcome of injury in children aged 10-12 years.

Injuries	β	p	OR	95 % Confidence Interval
Overestimation 8% beyond	-0.81	0.29	0.44	0.10, 2.01
Overestimation 13% beyond	-0.34	0.69	0.71	0.13, 3.89
ADHD	- 0.39	0.67	0.68	0.11, 4.09
Attention	-0.90	0.09	0.41	0.14, 1.18
Sex	1.58	0.04	4.87	1.05, 22.5

Note. Sex: 1=male, 0=female; Attention: Continuous positive score; Estimation: 1

= overestimation, 0 = accurate estimation

A separate multivariate model was run using logistic regression to examine the potential influence of comorbid Conduct Problems. Children with a diagnostic grouping of ADHD or Conduct Problem (ODD and CD) were included in the model with the same independent variables of overestimation (8% beyond and 13% beyond), sex, and attention (Table 9). The model did not change significantly.

Table 9. Multivariate model of independent factors, overestimation (8% and 13% beyond), sex, ADHD, Conduct Problem and attention in predicting outcome of injury in children aged 10-12 years.

Injuries	β	P	OR	95 % Confidence Interval
Overestimation 8% beyond	-0.79	0.28	0.45	0.11, 1.91
Overestimation 13% beyond	-0.38	0.66	0.68	0.12, 3.85
ADHD	-0.63	0.39	0.53	0.12, 2.25
CP	0.91	0.42	2.48	0.27, 22.42
Attention	-0.99	0.09	0.37	0.12, 1.16
Sex	1.81	0.03	6.09	1.24, 29.8

Note. Sex: 1=male, 0=female; Attention: Continuous positive score; Estimation: 1

= overestimation, 0 = accurate estimation; ADHD and CP = continuous scores, 0=not present, 1= just a little, 2 = pretty much, 3 = very much

In summary, children with ADHD are more likely to overestimate their physical abilities but this association does not appear to influence the likelihood of injuries. Injured children are more likely to be male and be less attentive. There was no association between injuries and overestimation.

Discussion

The intent of this study was to examine the association between overestimation of physical abilities, temperament and injuries among children with and without ADHD. It was hypothesized that children with ADHD who overestimate their physical ability will more likely experience injuries. There was no association found between injuries and children with ADHD nor between overestimation and injuries. However, children with ADHD were found to overestimate as compared to children without ADHD (Figure 4).

Several possibilities may have contributed to the findings including injury exposure, sample and comorbidity.

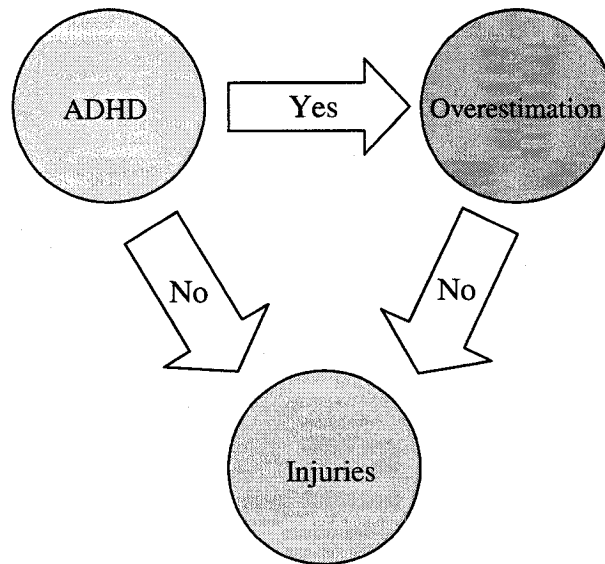


Figure 4. Association: ADHD, Overestimation, Injuries

Results suggest that overestimation is linked to ADHD but not to injuries. All children were able to accurately estimate their ability in the range that established their baseline as an accurate measure of ability. Overestimation was most apparent in the 8% beyond ability which suggests that this level of ambiguity tests their assessment skills better than the 13% beyond ability. These findings are consistent with previous research findings that children more accurately judge abilities at the within level and 13% beyond level (Plumert, 1995; Plumert & Schwebel, 1997; Schwebel & Plumert, 1999).

Consistent with previous research reports of children with ADHD who overestimate their self perceptions with respect to social, scholastic and behavior domains

(Hoza et al., 2002); children with ADHD in this study also overestimated their physical abilities. However, it is not clear why these children overestimate their abilities. Hoza and colleagues (2002) reported that boys with ADHD who overestimate their self perceptions do so in domains that they are most skill deficient. They argue that positive illusory self concepts may link to actual competence deficits as a self protective mechanism for these children. On the other hand, Owens and Hoza (2003) suggest that overestimation may be explained by pronounced executive function deficits, in particular disinhibition that is manifested as the lack of awareness of one's deficits. Researchers have suggested that overestimation may mediate the relationship between temperament and injuries (Plumert & Schwebel, 1997). If children are unaware of their deficits, they may be at risk for injury if they attempt activities beyond their ability. If overestimation is a self-protection mechanism in response to a socially charged situation, overestimation may be dependent on many other situational, child and social factors.

Children with ADHD who overestimate their abilities may be at increased risk for an injury however, no differences in overestimation scores were detected between groups of children who experienced injuries versus those who did not regardless of behavior disorder status. Although it is reasonable to suggest that children who overestimate their physical ability may attempt inappropriate tasks and place themselves at additional risk for injuries, the present study did not support this association. The present study results add to the controversy of the association between overestimation and childhood injury in that two previous studies found an association (Plumert, 1995; Plumert & Schwebel, 1997) but not in a subsequent study (Schwebel & Plumert, 1999). Similar questions are raised by reports of a positive relationship between risk taking and injuries except among

highly skilled athletes (Turner et al., 2004). Perhaps the association is dependent on other factors. Kontos (2004) studied a cohort of 260 adolescent soccer players and found that neither risk taking nor overestimation was associated with increased risk of injuries. On the contrary, he found that low perceived risk and low estimations of ability were associated with increased risk of injury. He suggests that self efficacy is the underlying mechanism for estimation. If so, children who overestimate do so as they are more confident in their ability to achieve the task. Kontos (2004) argues that children who are capable but lack confidence in their ability may be at more risk of unsuccessful outcome or alternatively multiple injuries may have negatively influenced the estimation of ability. Although estimation of ability may vary with the context in which it is studied, distinguishing between whether children are unaware of their deficits, competent or employing positive illusory self perceptions could significantly impact strategies to address inhibitory control in hopes of minimizing risk of injuries. Although this remains hypothetical, it is worthy of further exploration.

Although the ADHD children did overestimate, other factors may influence the association between overestimation and injury risk. As discussed previously, the underlying mechanism of estimation of physical abilities is one consideration but in addition there are other mechanisms that may alter the risk of an injury. Researchers have argued that there may be broad social contextual factors, including families that could be more related to injury risk than individual risk taking tendencies (McLeod, et al., 2003; Rivara, 1995; Soubhi, Raina & Kohen, 2004). For example, Morrongiello and Kiriakou (2004) suggested that mothers may engage in a number of different safety practices that could alter the child's risk of injury. Moreover, researchers have found that parenting

supervision of children with behavior disorders plays a critical role in the risk of children's injuries (Schwebel, Hodgins & Sterling, 2006). Pickett and colleagues (2006) argue that a home environment where the child is valued and respected and a school environment where the child feels safe and has a sense of belonging are protective against injury risk. It is possible that there are other mediating factors not measured by the simplistic model examining overestimation and indeed a more complex model is needed to explain a relationship.

Limitations

Several factors may have contributed to the lack of association between injuries, ADHD and overestimation of physical abilities. First, injuries were reported by parents based on recall of significant injury events. Several researchers have recently reported the lack of accuracy of parent injury reports over long periods of time (Cumming, Rivara, Thompson & Reid, 2005; Moshiri, Heuch, Astrom, Setel & Kvale, 2005; Pickett et al., 2006). This could account for fewer injuries being reported, minimizing the opportunity to detect any differences between the groups. A more optimal approach would have been to access the medical records of the children for more accurate injury reporting. Although there were no statistically significant differences, it is worth noting that there appears to be a trend to suggest that a greater proportion (73% versus 62%) of injuries were reported in children with ADHD. A sample of 71 in each group would be needed to detect this as a significant difference at $\alpha = .05$ and $\beta = .80$. In addition to sample size, comorbidity could be influential. One study reported that preschool children with comorbid ODD and ADHD were as likely to be injured as those children with ODD but not ADHD alone (Schwebel et al., 2002). This finding suggests that ODD may be a stronger contributor to

children's injuries than ADHD. The small number of comorbid behavior disorder children in the present study made it impossible to examine this factor but would be worthwhile to examine in future research. Third, controversial results of the association between overestimation and injuries have been reported (Plumert, 1995; Plumert & Schwebel, 1997; Schwebel & Plumert, 1999). Moreover, overestimation was only found to be associated with injuries among younger children (6 year olds). It is possible that the age of the present study participants is a contributing factor. It may be the lab tasks are inappropriate for older children or that overestimation is not relevant to injuries among older children. One final limitation of note is that the study was conducted in a simulated lab setting rather than a naturalistic setting. It is possible that children may perform differently in an actual social situation. Gardner and Steinberg (2005) reported that adolescents made riskier decisions when in a peer group than when alone. Context has been argued to critically influence perceptions (Slovic, 2001; Taylor-Gooby, 2002). Researchers have reported that situational factors such as location, activity and type of people present are related to greater of risk of injury than individual risk taking behaviors (McLeod et al., 2003). It is not clear whether this might be the case with these children. Measuring overestimation in a natural setting with peer presence would be useful to examine this potential effect.

Implications

The sample size in this study was small that may have limited the potential to detect significant injury differences between children with and without ADHD and any association with overestimation of physical abilities. In addition to conducting a study with a larger sample, examining the contribution of comorbidity could provide useful

insights. Further studies should include medically documented injuries in healthcare databases to improve ability to accurately measure injury rates.

It is possible that overestimation exists in a different pattern for children with ADHD, either independently or in combination with other temperament features. Researchers have reported that children with ADHD overestimate their competencies in other areas (social and academic) as a means of self protection (Hoza et al., 2002). Arguments of self protection (positive illusory self concept) and self awareness are plausible and warrant further exploration as strategies which could adversely impact the outcome depending on the underlying mechanism. Whether children with ADHD overestimate their physical abilities due to a lack of awareness of deficits or as a self protective strategy or a combination of both would be an important development in understanding and addressing this phenomenon and how it is associated with injury.

Although parent factors were not examined in this study, parental supervision had been posited as one of the most influential techniques in reducing injury risk for children (Morrongiello, Corbett, McCourt & Johnston, 2005; van Aken, Junger, Verhoeven, van Aken & Dekovic, 2006) and among children with behavior disorders (Schwebel, et al., 2006). Schwebel and Barton (2005) have suggested that parental supervision may moderate the link between inhibitory control and injury risk in that supervision may assist in more accurate estimation of abilities (Schwebel & Bounds, 2003). However, Schwebel and Bounds (2003) reported that although parents were more accurate judges of abilities than the children, the parents of temperamentally impulsive and undercontrolled children overestimated the child's abilities. This could draw into question whether parents' overestimation influences the children's level of estimation. It would be useful to explore

parenting strategies among children with behavior disorders in relation to the child's estimation of physical ability and injuries.

Conclusion

Childhood injury is a complex phenomena and likely dependent on multiple factors that contribute to the risk or protection from an injury event. In this study, overestimation of physical abilities, temperament and ADHD were examined with respect to childhood injuries. Although few relationships were established, it is likely that many more exist that interact with those measured, mediating the effects. It is equally possible there is an underlying mechanism of overestimation that can further explain the controversial association between overestimation and childhood injuries.

CHAPTER 3. QUALITATIVE INQUIRY

Introduction

There is evidence that children with ADHD are more likely to experience injury than children without ADHD (Brehaut et al., 2003; Bruce et al., 2007; Pastor & Reuben, 2006). The process by which this occurs is unclear. The underlying assumption of this study is that risk taking may be associated with risk of injury. How do children understand risk? How do children perceive self in relation to risk? For purposes of the present research, a broad interpretation of risk is proposed; construction of risk may have positive and negative outcomes, depending on the attributions and meaning assigned to each individual experience (Tulloch & Lupton, 2003). Building on the perspective of lay construction of risk, children with and without ADHD were approached to explore the concept of risk assessment using Photo Elicitation methods (Prosser & Schwartz, 1998).

Objective

To describe the process of assessing risk among children with and without ADHD.

Research Questions

1. How does the estimation of physical abilities fit with the process of risk assessment?
2. Does overestimation of physical abilities differ between children with and without injuries?
3. Does overestimation of physical abilities differ between children with and without ADHD?

Background

Children as Social Actors

We interpret the world based on what is perceived to be a reality. Streubert and Carpenter (1999) describe reality as "...developed and constructed over a lifetime of receiving, processing and interpreting information, as well as engaging in human interaction. The internalization of belief systems comes from the perception and construction of what is real for the individual" (p.4). Traditionally, children have been viewed as having limited capacity to interpret that reality (Prout, 2002; Punch, 2002). Typically, most research in this field has been dependent on parent's or teacher's reports with only few studies based on perspectives of the children themselves. Researchers have proposed that children are social actors trying to make sense of their world within their cultural context (Einarsdottir, 2005; Woodhead & Faulkner, 2000). Scott (2000) further argues that children have voices, opinions, observations, judgments that differ from parents and that rather than depend on proxy information from parents, it is important to consider the child informant as a unique and preferred source of information about his or herself.

Photo Elicitation

This study is based on the understanding that children possess knowledge of abstract phenomena in their lives. Being sensitive to a child's level of development, Scott (2000) suggests the use of individual or group interviews with children age seven years and above and proposes that visual stimuli may be useful for children under the age of eleven years. Photo elicitation gives children the opportunity to photograph places and things that represent their impression of their world. In addition, photo elicitation

provides a useful medium for children to communicate as they may not have acquired the skills or ability to communicate abstract ideas (Cappello, 2005; Clark-Ibanez, 2004). Using this method, one may elicit a rich description of their understanding (Dell Clark, 1999). One can come to understand how children make meaning of their world through their visual and oral stories. The pictures are regarded as representing real life experiences and are the creation of the children themselves. Individual interviews provide an opportunity to access the child's interpretation and meaning of their pictures.

A unique opportunity that this approach provides is that the issues are raised from the perspective of the children. Boyden and Ennew (1997) agree that photographs provide a useful medium in which children can capture activities that may be overlooked by other methods of documentation. Similar to other forms of empirical data, pictures may not provide an unbiased representation of the construct but as Prosser and Schwarz (1998) point out:

...they can show characteristic attributes of people, objects and events that often elude even the more skilled wordsmiths. Through the use of photographs we can discover and demonstrate relationships that may be subtle or easily overlooked. We can communicate the feeling or suggest emotion imparted by activities, environments and interactions. And we can provide a degree of tangible detail, a sense of being there and a way of knowing that may not readily translate into other symbolic modes of communication (p.116).

Adult perceptions of abstract concepts such as risk could vary considerably from those of children as we operate in a different social context than children. As adults, we have had many more lived experiences and our view of the world differs significantly. Many traditional methods of research depend on adult interpretation and represent the power relationship known to typically exist between adults and children. As a researcher, one must be conscious of such power relationships that underlie research with children as

children may have limited confidence and language to describe their experiences. Photo elicitation provides an opportunity to minimize the influence of the traditional power relationship as the researcher assumes a role of facilitator and the child takes an active role in describing his/her own reality (Clark-Ibanez, 2004; O’Kane, 2000). Photo elicitation not only assists in gaining a perspective from the viewpoint of the child but it also facilitates sampling from different social settings while examining the abstract concept of risk (Cappello, 2005).

Modified Grounded Theory – Constructivist Methods

The approach to the qualitative inquiry in this study was that of constructivism - modified grounded theory. The purpose of a constructivist approach is to “...build explanatory frameworks that specify relationships among concepts” (Charmaz, 2000, p.510). Charmaz further explains that a constructivist approach:

...recognizes that the viewer creates the data and the ensuing analysis through interaction with the viewed. Data do not provide a window on reality. Rather, the 'discovered' reality arises from the interactive process and its temporal, cultural, and structural contacts. The viewer then is part of what is viewed rather than separate from it. What a viewer sees shapes what he or she will design, measure and analyze (Charmaz, 2000, p. 524).

Using this approach one is able to interpret how the children construct their reality. Constructionism allows for the exploration of children’s perceptions and how they explain their actions (Charmaz, 2006). This reality offers a meaning that has been constructed through the interaction between the researcher and the children. Further elaboration by Streubert and Carpenter (1999) explain that full objectivity is not possible when interviewing given the social interaction that occurs. It is the intent of this inquiry to examine children’s descriptions of their perception of risk and that the researcher

“...attempts to determine the most parsimonious element that explains the phenomena” (Cutcliffe, 2005, p.425).

The qualitative research interview is viewed as “...a construction site of knowledge” (Kvale, 1996, p. 42). The transcribed data reflects both the perspective of the children and those perspectives that arise from the probing of the researcher. Thus the stories are co-created by both the children and the researcher, reflecting a shared reality. This approach provides “... a realist view as addresses human realities and assumes existence of real worlds that are not unidimensional – we act within and upon our worlds” (Charmaz, 2000, p.523). As such, the findings are a reality that is based on my interaction with the children and on my interpretation, perhaps one of many possible shared realities.

The relationship between a child participant and an adult researcher deserves attention with respect to the traditional inequity of power. As a health professional who advocates for children’s safety, it was potentially obvious to the children that I could be risk averse. This dynamic could have influenced their participation both because they were children and I was a health professional. It is not possible to eliminate such social differences other than to acknowledge them and attempt to neutralize them during interactions with the children. Every effort was made to give the children control and to acknowledge their role in the interpretation of their experiences as the expert and mine as the learner. Most children were delighted with such respect and eager to contribute. Although there is the potential for responder bias, I believe that giving the children an opportunity to make their own choices and share their reality is a means to better understanding the phenomena from their view.

In approaching the data collection, the researcher should assume a position of “...general wonderment, of unknowing, with little preconception, if any, of the key processes” (Cutcliffe, 2005, p. 423). Clearly, as an adult, and as the researcher, I had a very different perception of risk and freely acknowledge that the children’s perspectives are unique to them. I have my own history and subjective bias. I worked in emergency medicine for several years and witnessed many injuries among children. I have been researching children’s injuries for over a decade in search of a meaningful way to effectively prevent injuries. I developed a regional injury prevention program targeting community level interventions. Despite the intent of such programs, we have failed to see significant decreases in injury rates associated with the programs. Such failure has led me to explore interventions targeting individual behavior. I have followed, with great interest, the behavioral intervention research targeting either parents or children that has also had limited success in altering negative outcomes. As a result, my interests have migrated to examine children’s perceptions of risk as a potential arena for better understanding their view of risk and its association with injuries. I have also had personal experience with my own children as risk takers and often discussed their ideas about risk in relation to injuries. When informally discussing risk with adolescents who classify themselves as risk takers, they describe risk as ‘calculated’. They accept risk as something inherent in their lives but do not take risks without prior consideration of how to achieve optimal success in risk taking and minimize potential for negative consequences. Although I have limited understanding from a child’s perspective, I believe it may provide interesting insight and direction for the development of future injury prevention inquiry and intervention.

Method

Sample

Ten children aged 10-12 years with a physician-made diagnosis of ADHD and ten children with no ADHD diagnosis participated. In addition, all children were screened using a standard measure for behavior disorders, the Disruptive Behavior Disorder Rating Scale (Pelham et al., 1992). In addition to a diagnosis of ADHD, one half of the children with ADHD met the symptom criteria for comorbid ODD. Five children in each group (ADHD and non ADHD) had experienced injuries. This participant selection was done deliberately to provide exposure to behavior disorder and injuries. Theoretically, it was thought that choosing children with a range of experiences would provide greater diversity in perceptions of risk. Access to children for this study was limited by confidentiality in health care; therefore recruitment was dependent on families volunteering to participate. While all of the children were interested in the experience of participating in research, families of children with ADHD were also motivated by the possibility of better understanding the disorder and helping other families and children manage ADHD.

Children were from diverse socioeconomic backgrounds. A significant number of families appeared to have limited financial resources. Although many children had two parents in the home (married or step parents), about one half of the children were in single parent families. The majority of children were living in urban areas with about one third of the children living in suburban/rural communities. The majority of children were white, while three children were African Canadians. Most of the children interviewed were male, particularly in the ADHD group (9 out of 10), whereas in the non ADHD

group, both sexes were equally represented. All children were currently in Elementary school, with the exception of one child who was in school at the time of the interview but had spent the majority of the school year suspended.

Data Collection

Children and parents who provided consent were chosen from 56 children who had participated in the quantitative phase of the study protocol. Children were randomly selected based on groupings of injured with and without ADHD, and no injuries with and without ADHD. Children and their parents were contacted by phone to review the study and seek their interest in participating in this phase of the study. All but one child eagerly agreed to participate. Each camera was delivered to the child's home, then camera instructions and expectations were reviewed with the child and the parent. After receiving the camera back and developing the photos, interviews were conducted with each child. Interviews began in June, 2005 and concluded in May, 2006. Interviews were conducted across both groups of ADHD and non ADHD children concurrently with no structured order.

Each child was given a disposable camera, with 27 exposures and instructed in the correct use of the camera. The disposable camera was simplistic with an automatic focus and flash. Children were asked to take 12 photographs of things or places in their world that help them think about risk and safety. They were instructed that the pictures could be of their place of play, home, or sports activities. Minimal direction was given to encourage creativity and to discourage imparting my own bias about risk and safety on the child. They were advised that there is no wrong picture to take except taking a picture

that could put them personally in danger of an injury. For example, they were instructed it was reasonable to take a picture of a tree but not to climb the tree to take the picture.

Children were asked not to photograph other individuals which would necessitate gaining consent from individuals. If individual faces were not recognizable or if focusing on an object and a person happened to be in photo but was not the object of the photo, no consent was deemed necessary (Wang & Redwood-Jones, 2001) but if an identifiable person was posing in the photograph, then prior consent would be expected. If children photographed any recognizable individual, the face was blocked out. Parents were present throughout instructions and asked to provide supervision of photography sessions to reinforce instructions with respect to danger.

Children were asked to complete their picture taking task within two weeks. With very few exceptions, this was achieved. Once the photos were developed, each child was interviewed at a time and place convenient for them. Most interviews took place in the child's home within two weeks of return of the camera. The purpose of the interview was to provide an opportunity for the children to reflect on their photographs in an effort to learn how they construct the meaning of risk. Interviews were audio taped to ensure quality of descriptions was captured accurately and in the children's own words. All interviews were transcribed verbatim. Interviews typically lasted about one hour. Children were given a \$20 movie pass upon completion of data collection and interview in recognition of their contribution and time commitment.

Interviews

Children were interviewed individually to encourage each child to contextualize their own unique story. Although interviews were unstructured, typical probes were

consistently used such as; tell me about this picture? What do you find interesting about this picture? How does it make you think about risk? Prompts such as what makes it good or bad was also used to encourage the children to present their own ideas (Wang & Redwood-Jones, 2001). Potential influences when interpreting data include considerations of what was photographed, what was not chosen to photograph, selection of photograph to discuss, and recording of thoughts about photographs (Wang & Burris, 1997). Throughout their stories, children were encouraged to describe the situation and the circumstances that led to that picture taking. Children were asked to tell their stories about the pictures, what was going on, what they were thinking when they took the picture, who was with them, how did they decide on that particular picture. Once they had told their stories about all 12 pictures they were asked to choose three pictures that best represent high risk, some risk and low risk. They were then asked to describe why they choose each individual picture.

The children were encouraged to share other experiences relevant to our discussion. Other probes were introduced to seek clarification from their perspective such as "Tell me more about that". The first 13 interviews (7 from the ADHD group and 6 from the non ADHD group) provided data to develop a model of risk perception through exploration of new concepts and clarification of evolving themes. All interviews were conducted in similar format with the exception of the last seven in which more in depth inquiry about the developing model was explored once each child had fully explored their own concepts using their photographs. Children were asked to confirm or deny developing theory such as "Other children have told me... how does that fit with what you

are telling me”? Every attempt was made to give initial priority to the child’s story with further exploration of developing concepts at the end of the interviews.

The children needed little encouragement, they were eager to share their stories. Using photos was a useful approach as it put the children at ease, for the most part, and gave them control over the interview content and direction. In some interviews, children approached their pictures with reservation, seeming fearful that they had not got it right. I made a conscious effort to ensure the children felt at ease. Care was taken to positively acknowledge the child’s effort at the beginning and throughout every interview. At the beginning of each interview, children were praised for their creative pictures and were reassured that there was not a right or wrong answer, in fact, all their answers were correct as they belonged to them. I positioned myself as the learner who was interested in their ideas and they were the experts. I explained that I wanted them to help me understand their ideas. Charmaz (2000) emphasizes that using a constructivist approach “...necessitates a relationship with the respondents in which they can cast their stories in their terms” (p. 525). For some children, once a sense of trust was achieved, they were more engaged in story telling while others proceeded from the beginning with pride and keen enthusiasm to tell their stories.

Interviewing in their homes provided an added dimension to observe their world. Most families provided a private space for the interview but often sat in an adjacent room, within hearing distance. No parents stayed for the interviews but there was often a discussion after the interview. Most parents commented after the interview that they were curious about what their children were saying about risk as it is often difficult to get them

to discuss such concepts. All parents expressed an interest in receiving a report on the study findings.

Data Analysis

Initially the first few transcripts were read in their entirety several times allowing the development of an overall sense of the rich descriptions that were in the data. I kept a journal of impressions, developing ideas, context, observations and interactions during interviews. Memos provided a record of developing ideas and perceptions of themes. Interview transcripts were reread for reoccurring themes and additional expansion of initial themes. The themes arising from these interviews were incorporated into ongoing interviews for clarification and further exploration. Themes from each transcript were compared to each other for consistency of themes or the identification of new emerging themes. The comparative analysis permitted the development and refinement of emerging themes. A basic psychosocial process of “attending or nonattending” to a cognitive appraisal of risk emerged from constant comparisons of each transcript to each other.

Data collection proceeded simultaneously with data analysis. As themes evolved, more in depth exploration of the researcher’s interpretations were explored in subsequent interviews. At this point in the analysis, Charmaz (2000) emphasizes that the researcher should “...develop analytic interpretations of their data to focus further data collection, which they use in turn to inform and refine their developing theoretical analyses” (p. 509). Children were keen to confirm or deny whether the researcher’s ideas represented their perceptions. Data continued to be defined and categorized while continually interacting with the data. Data collection became more focused, exploring gaps, inconsistencies with the children in their interviews. Pictures and transcripts were

continually examined for similarities and irregularities between children's stories. Children were asked to explain themes that other children raised while ideas continued to build. An ongoing process of revisiting the data, interviews and pictures, and memos was done to refine my understanding of the process of risk perception.

Data were examined to seek conditions that gave rise to strategies and consequences. Initially each transcript was coded independently. An initial matrix of codes was developed but soon became an evolving document as categories emerged from the expansion of codes. This strategy attempted to exhaust the emerging codes and saturate the framework with all possibilities. Memos and diagrams formed the basis of the conceptual analysis. My interpretations informed interview probes into my assumptions and potential processes that were emerging. As a framework began to form, links between concepts were developed. These interpretations informed deeper analytic questions of me and the children, comparing across children's interviews.

Although theoretical sampling to refine emerging ideas was not employed during this phase of the analysis, children who represented both children with and without ADHD and children with and without injuries were purposively sampled to provide a diverse range of perspectives as possible given the inquiry. Charmaz (2006) argues that purposeful sampling is intended to develop depth to enhance theory construction rather than generalizability. Data collection did focus on filling the conceptual gaps in an attempt to check the fit and relevance of the categories. The developing categories were examined in an effort to explain the data and then to seek more insight into defining properties of the categories. Charmaz (2000) explains that the exploring "...when, how and to what extent, helps to define properties of categories, context in which they are

relevant, conditions under which they arise and what are consequences” (p. 520). As such, specific questions were asked around these developing categories. Concepts were developed that best explain what is happening in the data. Properties that children attached to risk, how they understood risk and when those properties were relevant contributed to the development of the framework of concepts (Appendix M). The resulting conditions, strategies and consequences attempted to get at the children’s meaning of risk using this constructivist approach (Charmaz, 2000).

Although I worked alone on the analysis, I was immersed in the data for over a year, both collecting and interpreting. I continually reviewed my thoughts and impressions, asked for contributions and perspectives from my committee members and peers in this field of inquiry. In addition, unique or dissimilar concepts were compared with others to create a comprehensive understanding of the evolving concepts. Data were examined for reoccurring themes and links between themes in an attempt to explain variation between themes.

Trustworthiness

Guba and Lincoln (1994) describe several issues that must be adequately addressed to ensure trustworthiness of qualitative inquiry. Credibility is established through prolonged engagement with data and that participants recognize findings to be true. I interacted with the data throughout the data collection phase and data analysis for a period of over one year; one could argue that prolonged engagement existed. Although no member checking was attempted at the end of data collection, children were asked throughout the data collection process to clarify, verify or dismiss my interpretation of findings. In particular the last seven children interviewed provided feedback on the

developing model. In addition, several colleagues and peers who are familiar either with children with ADHD or with childhood injuries graciously provided feedback on themes as they were being developed as well as the report of the findings.

A second component, dependability or how dependable are the results should be asked of the study findings. Findings are dependable in that they are embedded in the data, representing the interaction between the researcher and the children. All concepts and interpretations arose directly from the interaction with the children and were represented throughout the children's rich descriptions. Children confirmed findings in the latter phases of data collection when they were asked to confirm or clarify my interpretations of their reports.

Thirdly, confirmability speaks to an audit trail or a record of the researcher's activities to permit replicability of study and an appreciation of the thought processes that led to the researcher's conclusions. This is apparent in the thorough description of data collection and data analysis strategies that were undertaken. In addition, journal notes provide an account of process to reach these conclusions.

Lastly, transferability refers to whether the findings have meaning for others in similar situations. This may be the case but is not necessarily the intent of this analysis as the findings represent the co construction of meaning by the researcher and the children in this study. This is in contradiction to the traditional paradigm of grounded theory developed by Glaser and Strauss (1967) who claimed that theory should be generalizeable and reproducible. Such a perspective suggests that there is objective truth that leads to hypothesis development that can be tested to predict and explain behavior.

However, a constructivist approach implies there is interaction during data collection and analysis (Charmaz, 2000). Charmaz (2006) defines constructionism as:

...a social scientific perspective that addresses how realities are made. This perspective assumes that people, including researchers, construct the realities in which they participate. Constructivist inquiry starts with the experience and asks how members construct it. To the best of their ability, constructivists enter the phenomenon, gain multiple views of it, and locate it in its web of connections and constraints. Constructivists acknowledge that their interpretation of the studied phenomenon is itself a construction (p. 187).

One must be cognizant of the perspective that another researcher may not agree with my conclusions which is acceptable from a constructivist perspective as the findings represent my interpretation (Charmaz, 2006; Mantzoukas, 2004; Rolfe, 2006). The interpretation is intended to be explanatory with the goal of constructing theory for future testing. The findings may have similar meaning for others and indeed some of the present findings are similar to reports from previous research studies that I have cited. Morgan (2007) argues that it is not possible for "...research results to be either so unique that they have no applications whatsoever for other actors in other settings or so generalized that they apply in every possible historical and cultural setting" (p.72). Relevance or transferability must be determined by individual application to other settings and situations. The constructivist approach to this study is aimed at understanding children's perceptions of risk, looking for patterns and connections while offering an interpretation (Charmaz, 2006). Morgan (2007) advocates that transferability focuses on "...what people can do with the knowledge they produce and not on abstract arguments about the possibility or impossibility of generalizability" (p.72).

Findings

Seventeen children each took a minimum of twelve pictures. Two children misused the camera resulting in only four to six pictures and one other child did not complete the task, taking only three pictures. All pictures that the children took were included regardless of the quality of the picture. The pictures were presented to children in no specific order, one at a time. Once all pictures had been discussed, children were asked to choose three pictures, one that represented high risk, moderate risk and low risk.

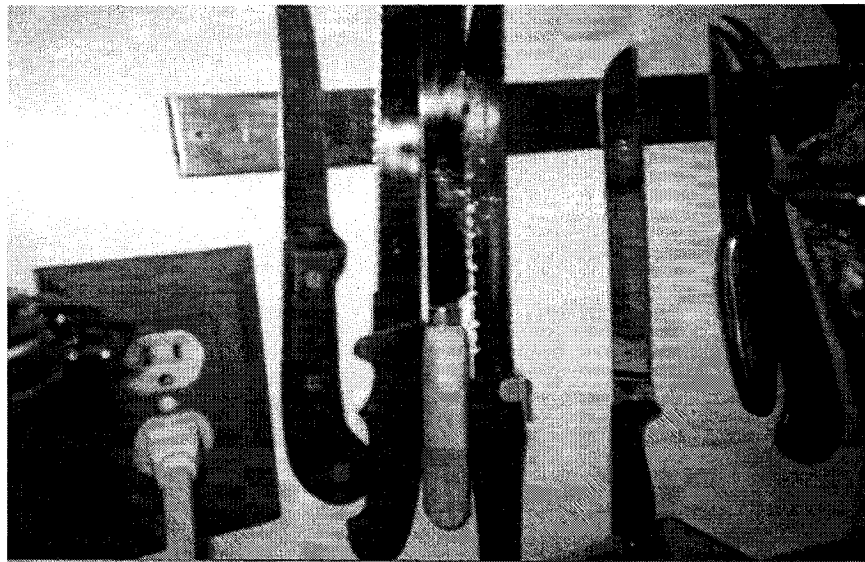


Figure 5. Knives

A variety of pictures were taken but some were more common than others. Among the common pictures were those of road safety signs, cars and trucks, safety gear, bikes, skateboards, trees, heights, knives, poisons, fire, water and electricity. The most unique pictures were those of guns or bullets, woods, graveyards, school bathrooms and a train. Although the pictures were often similar, the stories were quite distinctly different. Children were very articulate in their interpretations of the pictures, using events in their lives to describe their perceptions of risk and safety.

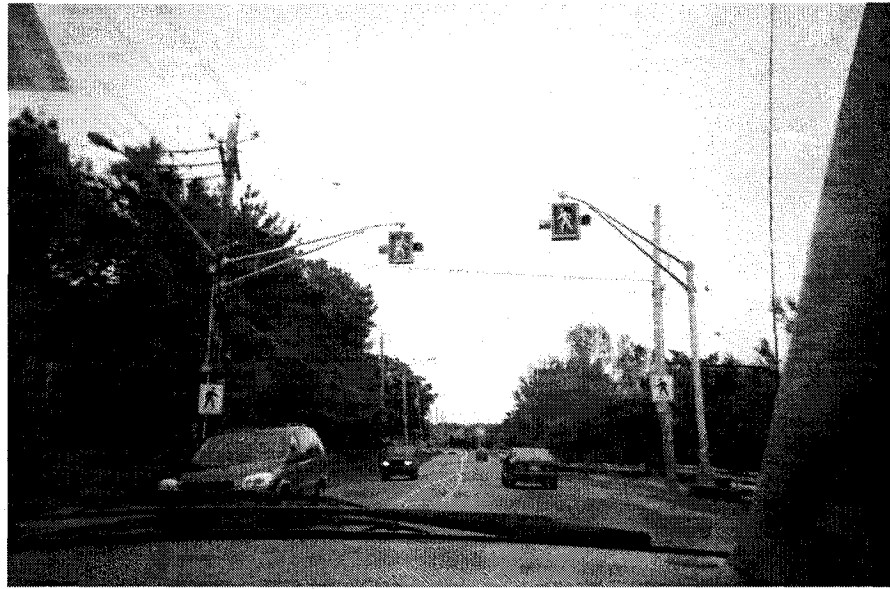


Figure 6. Crosswalk Lights

The framework children described for assessing risk appears to be a process in which all levels of context (individual, family, and community) are associated with attending or not to a process of thinking. Children associated thinking about personal strategies to assess individual risk with potential consequences. The process of thinking about risk was not independent of context. Each child framed an interpretation of risk around several factors that clustered at three different levels of: (1) the individual child, (2) family/friends, and (3) community (see Figure 5).

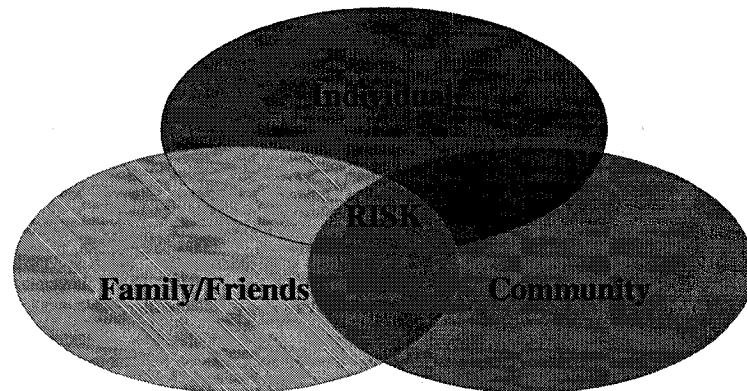


Figure 7. Context for Assessing Risk

At the individual level, the children described unintentional features that they felt were not in their control such as inattention or that they ‘just didn’t know’. These factors often influenced how they framed risk in their everyday experiences. Other areas included a range of feelings that had both positive and negative meaning associated with them. Such feelings as danger, fear, fun and excitement were most common and could be seen as a good or bad feeling. Children also described risk as part of normal growth and development, something that was just part of being a child, getting experience or getting attention. There was an intentional context to some of the children’s descriptions that was seen as breaking the rules or doing something they were not supposed to do. Beyond the individual level, the children talked about the influence of family and friends. Peer experiences and adult supervision were commonly referred to by the children as having an impact on their perceptions of risk. More broadly, they described the influence of

society, particularly in terms of school and media and even more specifically in terms of television advertisements and programs.

Concepts were grouped around conditions, strategies and consequences (Figure 6). Assessing risk also revolved around thinking or not thinking about their ability, about wearing the safety gear or respecting the rules, about the likelihood of the personal consequences or the implications of those consequences, both positive and negative. Attending to cognitive appraisal of risk was integral to their consideration of risk, sometimes clearly evident and other times notably absent. When thinking about consequences, the children described positive consequences in terms of achievement, keeping safe, and having fun. Negative consequences were seen as personal injury, punishment, hurt or even death.

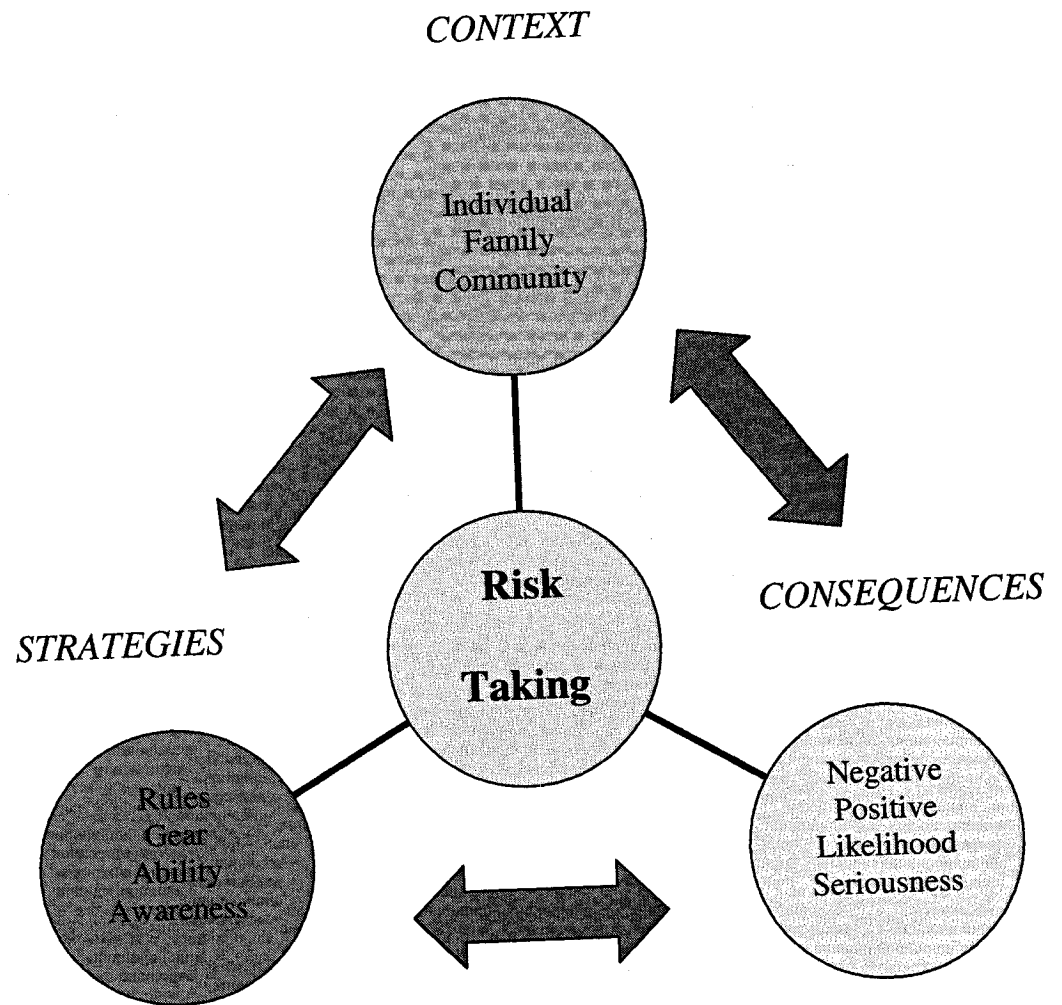


Figure 8. Framework for Assessing Risk

Context

Individual

At the individual level, four categories emerged; 1) unintentional 2) emotional, 3) developmental and 4) intentional.

Unintentional. The children perceived a lack of control over events. Factors such as inattention, didn't know, don't care, or something went wrong were common themes and were consistent across all interviews. Luck was also common but not consistent across interviews. Luck only arose in a few interviews among children with ADHD who had not been injured. Although luck did not seem to resonate with most of the children being interviewed, it was profoundly apparent for those who did.

Unintentionality referred to events that the children were aware of but they described them as if there was nothing they could have done to stop it or prevent it from occurring, as if something just went wrong. As this boy (10 years, ADHD) said, "I spilled water on it by accident....Like I didn't mean to. Like it just happened". The children implied that their actions were not intentional nor did they have any control over the event, either because it would occur anyway or they were just not paying attention. One boy said "Like sometimes I don't feel like I am in charge, sometimes something will just happen". Other children described there were situations when they did not know or did not care. One boy with ADHD pointed out, "I don't care, I just get up and keep doing it. Like if I fall the first time, I'll get up and try it again". However another boy (12 years, ADHD) described situations much differently, "Now, this, that is dangerous if you don't know anything about it, because it can burn something down".

Emotional. All children attached a number of both positive and negative emotions to risk. Typical descriptors included fun, exciting, thrill, and danger, stupid, scared, anger and fear. The children considered these feelings in association with activities that they considered risky, providing the context for which they considered each activity. This was consistent whether it was their behavior they were describing or an event they had observed their friends doing. One 11 year old (non ADHD) girl who told stories about horse riding said, "I love horses, I think it is fun. I like to ride them and jump them and it's fun to be around them....I have known people who have fallen off and broken arms but came back and rode them as soon as they could. I just love it so much I can't stop". Another boy (12 years, non ADHD) explained that risk is about having fun, "I find it really fun to have a risk to do and like to have something exciting in your life".

Developmental. Several factors that grouped as developmental tasks were revealed in the children's stories. One boy (12 years, ADHD) explained "A risk is a chance you take, and it comes by...a risk is basically another word for chance...everybody is going to take a chance in life". The children described risk as part of their development, something that existed and could not be separated from their everyday life. Regardless of the assessment of risk, the children understood risk to be a part of their growing up as this girl (12 years, non ADHD) explains: "Because without risks, you would probably stay in bed all day. Like the risk of getting out of bed would be accidentally falling out, like falling down or something. And the risk of skating would be falling down and hurting yourself or cutting yourself with the blade. But people do it anyway because without risk, there would be nothing pretty much".

Other children saw risk as contributing to growth, emotional integrity or physical development. When asked, one boy (11years, non ADHD) told this story of a friend taking a risk: "I took this picture because that day, like about an hour before I took this picture, my friend decided that he was going to jump onto the neighbour's roof from the scaffolding. So I said, that is pretty risky so I might as well take a picture of it". I asked, "Why do you think he thought he would do that?" He responded, "Because he is a moron, to say the least....He just does dumb things. He's trying to show off".

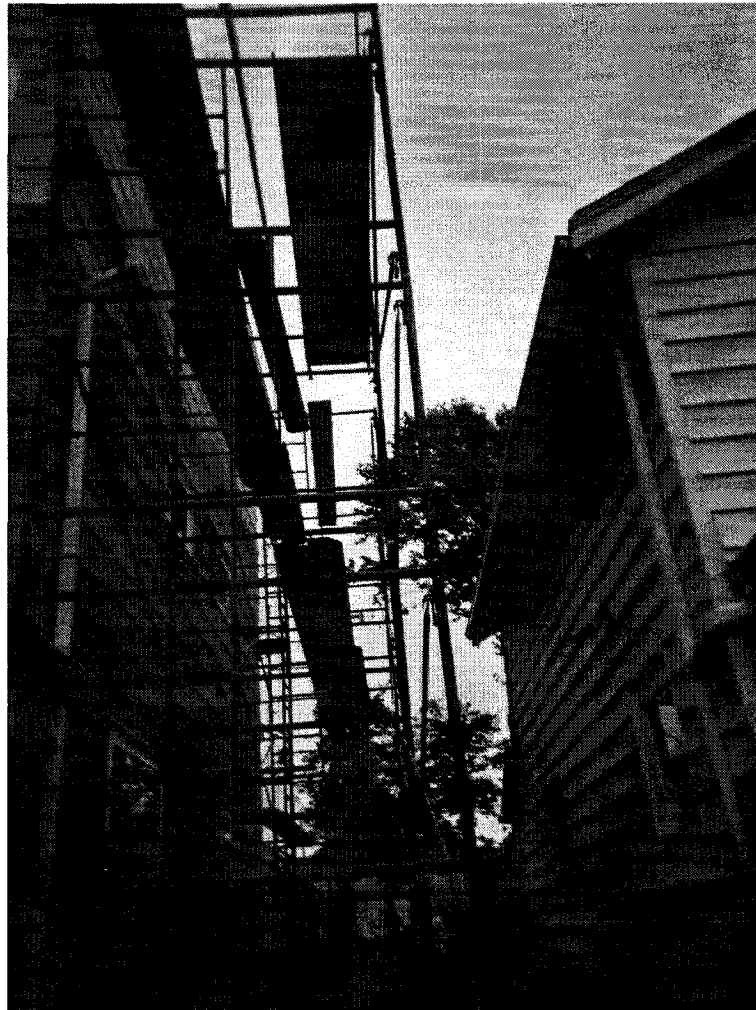


Figure 9. Scaffolding

Many of the stories included rich descriptions of getting attention, getting experience, or competing. One boy (11 years, non ADHD) was describing kids taking risks on the playground, "...kids want attention so they do stuff like that...Probably to make themselves feel good that they did something, peer pressure". Another boy with ADHD explained why he takes risks, "Because if you don't know you can do something, you've got to find out. That is half the time I take risks".



Figure 10. Child Swinging on a Tree

Many children referred to risk taking as a "boy" thing and associated increased risk in younger children who were not as well informed, responsible or as experienced as they were. As one girl (12 years, non ADHD) explained to me "That (risk taking) is just natural for boys" and another girl commented "(Girls) can just get their senses before boys do" and another boy (12 years, ADHD) simply understood that "Boys are more competitive for sure, unless it is a tom girl".

Intentional. Several of the children referred to intentional risk taking as those instances where the children are aware that they are not supposed to do something but choose to do it anyway. They describe opportunities to 'break the rules' as being risk taking events. One boy (12 years, ADHD) told a story that "I was supposed to go and help a friend find his amp because it got stolen. So we ran all the way around the school. We weren't even looking for the amp. We just ran around the school. And we wouldn't have done that if we knew we were allowed to....It's fun to break the rules. It's like a rush".

Family/Friends

Within the realm of family and friends, several unique categories emerged: belonging, experiences, information, and supervision.

Belonging. Most children discussed the influence of peer activities as a factor that influenced their response to a risk. Children told me that taking risks often depended on whether other friends were interested in doing an activity or not.

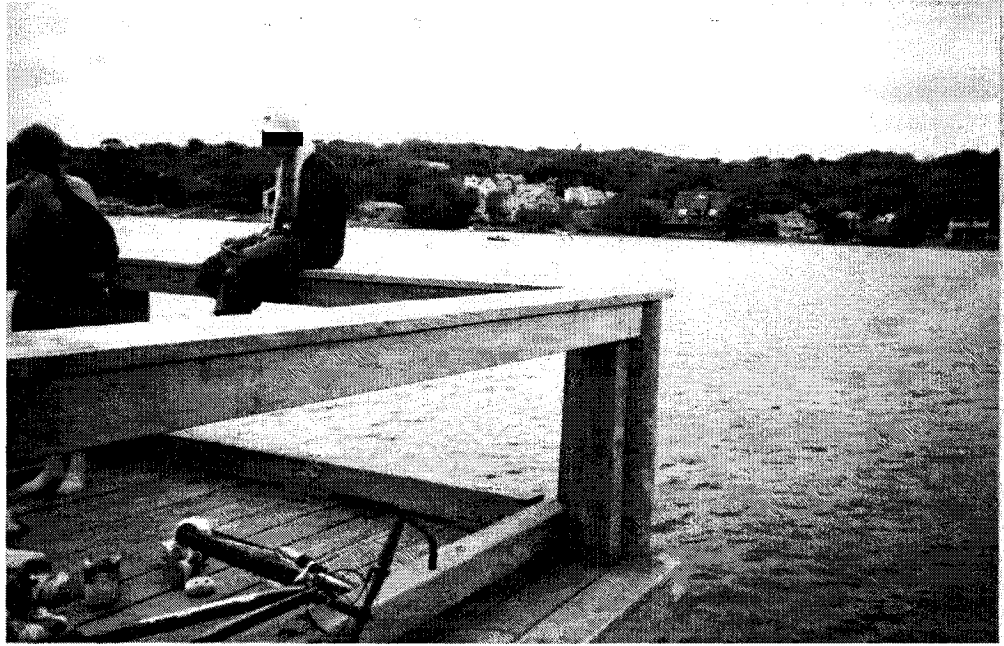


Figure 11. Youth Sitting on a Ledge

One girl (12 years, non ADHD) explained, “Like because a lot of people actually do sit on the ledge. And I do sometimes because well, everyone else is there - all of my friends....You don’t really want to be the odd ball when you are...like when you are younger because being the odd ball is kind of...kind of ruins your self confidence and stuff like that. So you want to do stuff that other people are considering”.

Experiences. Others’ experiences, family or friends, were a predominant factor in the children’s stories. When deciding how they knew about risk, the response was often similar to this 10 year old girl who commented, “My Mom gotten burned a few times” or “Because there is, like, a lot of people that my dad knows that got killed from that”. Often children talked about their friends’ experiences. Some discouraged them from engaging in the activity while others appeared to have limited meaning in terms of risk for them. One boy (12 years, ADHD) described his friend’s experience with knives, “I was thinking anyone can cut their fingers on those. Actually one of my friends was

cutting the carrot and all of a sudden it went shhhh. He took, it scraped off. It didn't cut through, it just scraped off like. And it was pretty severe". The children recalled stories about events that they considered risk taking had occurred and they recalled the consequences. For example, one 12 year old boy without ADHD said, "Like some people, like a long, long time ago, like when I was 5 or 6, somebody like climbed up this tree right here. And he fell down but he didn't die. He just got a major scratch right here, and he broke his arm".



Figure 12. Tree

Another girl (12 years, non ADHD) considered how her own experiences influenced her assessment of risk as “Well, because I have fallen off my bike many times, and it hurts a lot. And it just kind of makes you think about that”.

The children talked about their experiences as well as others experiences as influencing their insight for risk assessment, “By trying something, and if they hurt themselves, they will probably learn not to do it” or as this 11 year old boy (non ADHD) described, “Well, sometimes it just clicks in after you have done it for awhile and sometimes somebody gets hurt or you get hurt doing it”. When I asked how they decide about taking a risk, this boy (12 years, ADHD) replied it was about first or second hand experiences, “If you’ve had experience like with like something like...if it was the same thing that happened to your friend, like, then you obviously know not to touch it”.

Supervision. In addition to providing information, parents were respected and expected to provide supervision. The children believed that supervision was key to protect them and often relieved them of any personal responsibility for their own safety. One boy (10 years, ADHD) described neighbours who patrolled the local playground “...all kinds of people could have been getting hurt. And because the people who live right over there, they tell them to get down so they don’t get hurt. It’s just a help to make sure that nobody gets hurt on the playground”. Another 12 year old (ADHD) boy told a story about lifeguards, “Now this one is the lifeguard at the pool. In case someone is drowning and that, they can get in there and save them....if you like accidentally start drowning, they can help....(or) if older people were there so then they really couldn’t drown”.



Figure 13. Lifeguard

One boy (11 years, non ADHD) described his assessment of risk included having adult supervision; "If you're playing with something, know that it is safe. If you are doing something like you have to make sure you're not going to hurt anybody around you or yourself and also having an adult watching".

Community/Society

Information. Children consistently raised broader factors that created circumstances around risk assessment. At a societal level, road signs, warning labels, television safety ads as well as media that presented risk taking were common in their dialogue. Signage was often described as achieving its purpose of ensuring safety. The children understood that if the sign was present then one was protected.

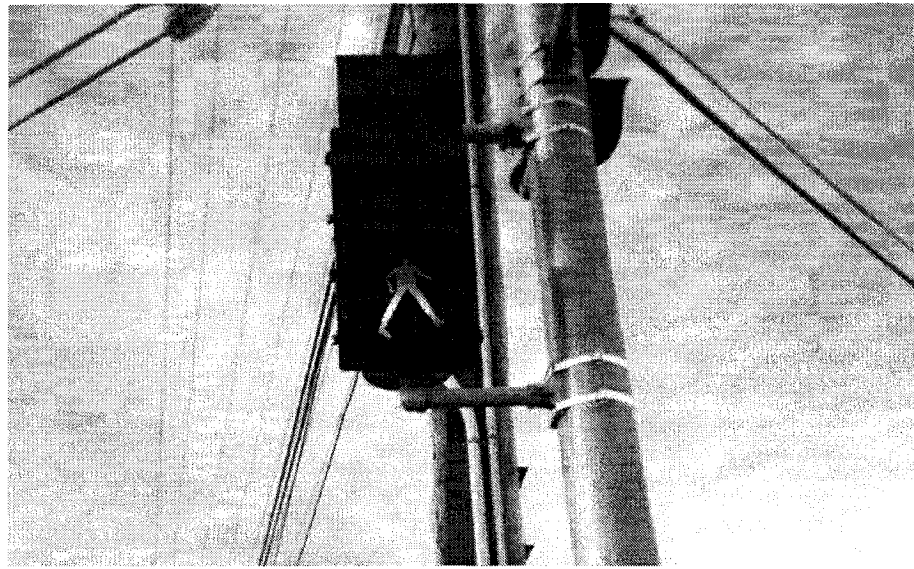


Figure 14. Crosswalk Signal

As one 12 year old (ADHD) boy explained, “It is the go crosswalk sign. It’s for cars to know. Because like people will actually know and to slow down a bit”. Most often television was described as a negative image but the children were clear in their assessment of the influence. One boy described a Subway commercial, “He thought because he ate a Subway sandwich that he was Superman. And this lady’s cat was stuck in a tree, and then he said, ‘I’ll get for you’. Then he jumped and tried to fly up the tree. And then he landed on his face....I thought it was dumb....because no one can fly. No person can fly”. When I asked another girl about why children do not realize risk she commented, “Because they see a lot of really bad stunts on TV, like James Bond type of thing where they like jump off a roof or something or crash through a window. And yeah, they don’t think about it because they see the people do it on TV do it, and they think they can do it too because the people on TV did it”. Clearly, media plays an influential role in children’s perceptions of risk. Information from a variety of sources was a factor

all children associated with their assessment of risk. They gathered information from school activities and parents. For the most part, information was seen as positive in that it taught them the 'rules' or the right way to do things.



Figure 15. Poisons with Warning Labels

Children often described lessons on poison, fire prevention and gun safety that they learned more formally. As this 12 year old (non ADHD) girl recalled, "In Grade 1 or Grade 2, I remember getting like a fire book and it said stuff like that. Like don't put your hand over pots and don't leave things unattended". Informal information from parents was common to most risk assessments. Many children expected their parents to provide that type of information and valued this source of information. However, occasionally information from parents resulted in negative consequences as this 12 year old (non ADHD) boy recalled, "Well, I just got a new skateboard and I was going to get my pads but then my mom said no, you will be fine, just go around. Then I just went up that hill

and I came down, it was faster than my other one, so when I jumped off I flipped over and hit my wrist on the ground”.

Strategies

The process of engaging in risk assessment was mediated by consciously thinking or not thinking. The children were very clear in their descriptions of their experiences with others and their own experiences. Thinking revolved around several key factors that influenced their decisions about whether an activity represented a risk or not and whether they would be willing to take that risk or not. Most of the assessment was at an individual level, consideration of their abilities and limits, an awareness of how to accomplish the task or be responsible for their success or failure, knowing the rules and deciding whether to attend to or ignore the rules, wearing the gear and expecting or accepting supervision contributed to their position.

Abilities/Limits

Children often recalled incidents when they tested their personal limits. A eleven year old (non ADHD) girl was describing children playing on her backyard trampoline saying, “Just trying to do stuff they can’t and then they go off, or they land the wrong way or like break a leg or arm or something”. One other boy (11 years old, non ADHD) recognized his limits saying he never climbed trees because “I am crap at climbing trees”.



Figure 16. Outdoor Trampoline

Rules/Gear

Many of the children were under the impression that if they wore safety gear, they were protected against harm, at least to a significant degree. One girl (10 years, non ADHD) was describing a safety vest with reflective tape, "For walking the roads 'cause the lines they make lights so that the people in the cars won't run into you when you're crossing the street". On the other hand, some children described the protection associated with wearing the gear. This boy with ADHD describes, "Well if he fell off the bike and landed on his head, the helmet would protect his head. But if he fell on the pavement without a helmet, it could cause death".



Figure 17. Hockey Gear

Another boy (12 years, ADHD) described riding his bike as "...it is safe if you ride safe and you have a helmet on, that is safe". Some of the children assessed the degree of protection that the gear could provide. One boy with ADHD tells a story about skateboarding and why he feels it is risky and he wears a helmet, "because actually someone up on the street where I go with my friends, someone killed themselves on a skateboard....like they fell off and they weren't wearing a helmet and they died". Another boy (12 years, ADHD) described wearing gloves when cutting bushes, "It depends on what type of gear. If it's just normal stuff, if it's only that thick, like the cloth is...if you are wearing like the big things that the walls of the gloves are like that thick, you might a little bit into the bone. But if you are wearing like little gloves, it is going to cut your finger right off".

For the most part, wearing safety gear was seen to provide significant protection and children often believed it could minimize risk and prevent injuries. When asked if

wearing gear influenced the amount of risk taking, one child (12 year old boy, ADHD) responded, “More gear. The more gear they wear, the more risk they take”. He went on to explain further that “If I asked my friend to pop a wheel, he will do a small pop wheel. And if he’s wearing all the gear and stuff, he’ll like....he’ll do a pop wheel, like a huge pop wheel. He’ll jump the bike right up”. Some children believed that while the gear provided protection it was not necessarily a guarantee against injury but could decrease the extent of the injury. This boy with ADHD indicated that gear provided protection but “Not all the time because if you hit the back of your head somewhat hard, you can kill yourself.....Helmets decrease the risk of you dying”.

Awareness

The children often associated awareness of danger with the seriousness of the outcomes as this boy described risk, “I think risky is like doing things that are dangerous or things that you know are dangerous, that you could get badly hurt”. One girl (11 years, non ADHD) summed up her impression of risk as “It means something is going to hurt you in some way. And it means, a risk means like staying away and it’s going to affect you so you have to be aware of that. That’s how I describe risk”. Although being aware was part of their strategy it did not always mean they gave it consideration as this boy (12 years, non ADHD) explains, “Anything that could be dangerous, anything that you do, and you know if could be dangerous. But you are still going to do it”.

Consequences

The overarching concept that children referred to was the likelihood and seriousness of the consequences of their assessment. Great thought and attention was given as to whether their behavior would or could lead to negative consequences and if

so, how severe or likely that impact would be for them. This was apparent in virtually all conversations and was often referred to repeatedly throughout the interviews. Some children were emphatic about this concept in their descriptions. Consequences were described in terms of physical and emotional consequences, likelihood and seriousness. One girl (12 years, non ADHD) summed it up as, “Risk, is something that can damage you or others or hurt you, physically or emotionally”. Some children only considered physical hurt and the degree of that hurt in terms of themselves or those around them while other children talked about ‘getting caught’ or being punished for going beyond the limit or breaking the rules. There was always a cognitive process of thinking or not thinking attached to consequences. One of the girls (12 years, non ADHD) was speaking of her brother who had ADHD and she commented that “He wouldn’t stop and think of the consequences” when he was playing. Another boy (12 years, non ADHD) described risk as, “Where people don’t think or they do something that is kinda bad. Like kinda bad or they just don’t think about what can happen...”.

Other children described thinking about consequences even when in the midst of an activity. For example, when one boy (12 years, ADHD) was asked if he thought about risk when he was skateboarding and he replied “ No, I think of it after the fact” as did another child who said “ Go ahead, do it. Forget about the consequences, do it now. Worry about the consequences later.” and then added, “When you are doing it, you don’t think about it. But right before you do it, you think about it a lot.....I hope I don’t get no broken legs or anything”. Another boy (12 years, ADHD) explained his approach as, “I don’t think about risk. I don’t think before I am going to do something. I just do it. I don’t think”. Some children described thinking about the consequences but felt they had little

control as one boy with ADHD talked about an awareness of thinking process, “I just think of something pushing me to do it and something holding me back, and something telling me what to do. Like sometimes I don’t feel like I am in charge”. Whereas another child with ADHD was telling stories about bullies and did think about consequences of his actions. He described his anger and his thoughts about fighting back. He said “I think about doing it but really I don’t do it. I want to do it so bad but I can’t because I always think about hurting the person, and I don’t want to hurt that person because I might get into trouble”.

In addition to thinking about the consequences, children assigned positive and negative value to the consequences. Positive consequences were described as personal achievement, protection/prevention of physical harm, safety and fun/thrilling. Among the negative consequences were predominantly physical hurt/death, danger and punishment.

Negative

Danger/Hurt/Death. Danger was most often associated with negative consequences of hurt or death. One boy (10 years, ADHD) described risk as “...doing things that are dangerous or things that you know that are dangerous, that you could get badly hurt.” Other children (12 years, non ADHD) concurred, “It (risk) could put you in danger. Or you could hurt yourself.” and “I was thinking I should put the knife in because this is dangerous and risky, and you could hurt yourself with it” (10 year old boy, ADHD).

All children referred to hurt as this boy (12 years, non ADHD) explained, “The risk you can take with your bike is you, is, is like biking on the road with cars and stuff and not wearing a helmet could be a big risk. Because if you crash you could do a lot of

damage.” Another girl (10 years, non ADHD) described hurt in relation to risk taking as “I get hurt a lot, like I get scratches running through the woods and everything. I am a risky person.”



Figure 18. Light Socket

One girl (12 years, non ADHD) was describing a picture of electrical wires and said, “The wires, it can, can electrocute you because it would really hurt and something can happen really bad to you.”

The degree of hurt was often apparent in their descriptions of the consequences as this boy (11 years, non ADHD) compared his risk taking friend to himself, “ Risking (for friend), probably anything that you could die from.....(however) I consider even just getting like a broken finger risk taking.” The degree of hurt was often used to judge the amount of risk associated with an activity as one boy (12 years, ADHD) described tools as high risk because “...it is easy to cut your hand off...because they could just be laying on the floor and they would be dead within seconds because it is a big cut and it’s a big hole.” Whereas another girl (11years, non ADHD) commented that she took risks but not

stupid risks as, “I kinda know I can hurt myself a bit but I won’t like really injure myself....just because like if it were really risky it would just be risky. Like you could hurt yourself.”

Punishment. Risk taking was sometimes associated with punishment as one boy (11 years, non ADHD) explained, “It can be also about getting into trouble with the law or getting grounded....going in a place that you can’t go and getting caught.” One child (12 years, ADHD) described his punishment as the consequence of his risk taking behavior, “I got kicked out of school for 6 months. No, really I got expelled. I got expelled and I’m not allowed back.” Consideration of the consequences was apparent for this boy (12 years, ADHD) who explained, “The taking a risk part is like going out and then doing it. If you want to go to jail then go and do it, and then you’ll serve your time in there.” Other children recognized the consequences but it was all relative and sometimes not a deterrent to subsequent activity, “I got in trouble a couple of times for doing it but I still do it.” (12 years, ADHD).

Positive

Achievement. Some children perceived risks as positive in terms of consequences. They described taking risks as an opportunity to grow and establish their ability to achieve tasks. I asked one boy (12 years, ADHD) why children take risks and his response was “Maybe just to do it and see if they can.” Other children conscientiously persisted in an effort to achieve as this boy (12 years old, ADHD) explained, “I think about being strong. And if I fall off, I can get back and do it again. You keep trying and trying until you can do it”. Another boy (12 years, ADHD) was telling a story about taking jumps on his bike, “When you are doing it, when you are already on the ramp or

something, you don't think about it (risk) at all...You think about how much air you are going to get or something like that." One boy (11 years old) with ADHD described competitive differences in children with ADHD and those without ADHD. "If they (ADHD children) are in a competitive mood, they are not thinking straight anyway. Like a kid with competitive mood, it is just like a dial-up internet and a high speed internet. Theirs just goes wooph, something is going to happen to me....ADHD, they are like: 'Come on I can do this' and then go fly. I am going to fly high and I am going to show them that I am better than them...but a kid, like a normal kid would just be like 'something is going to happen. If I don't land this jump right, I am going to get hurt real bad' ".



Figure 19. Riding Surf Board in Swimming Pool

Risk taking was often seen as 'testing their limits', the children perceived successful accomplishment of the task as their personal achievement. This was viewed important as a consequence and could influence their assessment of risk. Others saw it as

social acceptance rather than physical accomplishment as this boy (12 years, ADHD) explained, “Well, when I hit my principal in the mouth, everybody was right scared of me and they always wanted to be on my good side.”

Safety/Protection/Prevention. Risk was often described in the context of wearing the gear to provide protection against negative consequences. Ensuring protection was associated with either minimizing or negating negative outcomes as this boy (12 years, non ADHD) describes, “Hockey gear, because you can get yourself hurt by not playing with gear. That goes for everything. Like bikes and all that, not wearing the proper gear you can get hurt.”

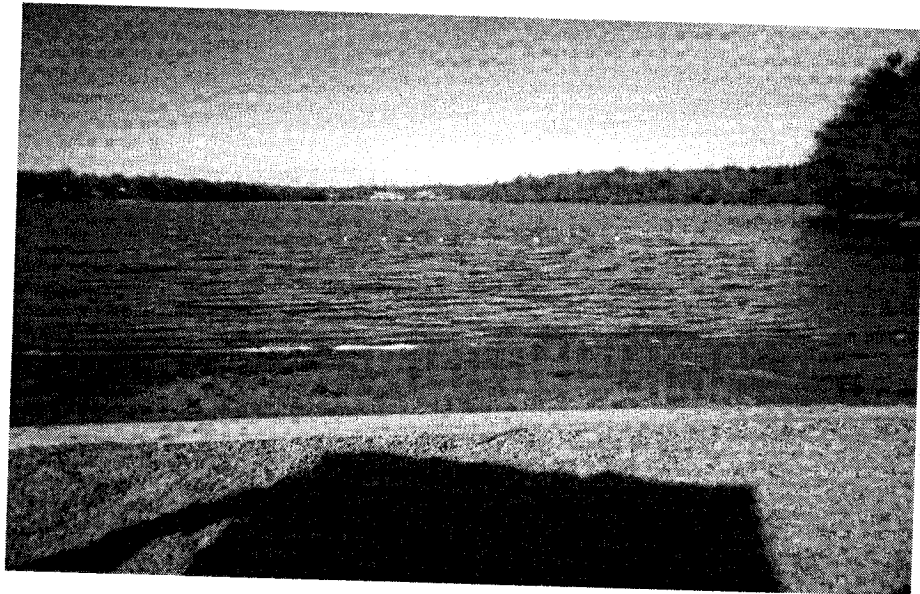


Figure 20. Swimming Buoys in Lake

Some children were convinced that wearing the gear prevented any untoward consequences, as this boy (10 years, ADHD) said wearing a helmet was important as “it would protect your head so you wouldn’t get brain damage.” and similarly this boy (12 years, ADHD) said, “Like if you go and play with like your bike and you go off a bike ramp, it keeps you safe by wearing a helmet and stuff.” One boy (10 years, ADHD) was

describing his experience when swimming. He explained that knowing his limits could protect him, “Like instead of like just keep on going, you know that you will be safer if you go back instead.”

Fun/Thrill/Cool. Other consequences the children considered positive were the emotional experience of fun, thrill and being cool. One of the boys (12 years, ADHD) shared a story about his brother’s risk taking, “Like he just got caught for stealing a \$60,000 car and he loved the adrenalin for like stealing a car.” Another boy (12 years, ADHD) simply said, “It’s just fun to break the rules. It’s like a rush.” Others described thrill rides like this boy (12 years, non ADHD) who described a good risk as riding a roller coaster because, “It’s a big risk cause it could crash but it’s really fun.” I asked why children take risks and one boy (12 years, ADHD) offered this explanation, “to see the thrill of it...and the adrenalin.” When I asked what does that feel like, he responded “It makes them feel like they can do anything.”



Figure 21. Jumping into Swimming Pool

Likelihood

All of the children associated risk with the likelihood of personal consequences and often this was related to the seriousness of the consequences for them individually. Children used descriptors such as 'could', 'can', 'would', and 'might' in conjunction with 'if you do'. This girl (10 years, non ADHD) suggested that "Risk would be something that you'd do that you're not safe and you're not 100% sure that it would work. It could put you in danger, or you could hurt yourself". They were clearly able to make causal links between activities and consequences of their behaviors. One boy with ADHD said, "Well bad risk is something that you know you will hurt yourself. You know that it will hurt you and you still do it anyway". Another boy without ADHD compared his assessment of risk to that of his "risk taking" friend. "Well, he might say it is unlikely that this will happen but it could happen so I'll try it. Whereas with me, it could happen so I am not going to do it".

I asked the children what kinds of risks there were and this girl (12 years, non ADHD) explained, "Sometimes there are good risks. Like buying a lotto ticket, that is a good risk because you never know, you might get something. But you risk just losing \$2 for buying the ticket. And there is a bad risk. Like jumping off a bridge, that is a bad risk because you are pretty sure that you are going to get hurt". Another boy (11 years, non ADHD) described a good risk as "There are no bad consequences". The type of risk was linked with not only the outcome but also the likelihood of the consequences. When children were asked to qualify why they made choices about degree of risk, they framed their assessment in terms of likelihood as, "I decided that is high risk because it is easy to cut your hand off" (12 years old, boy, ADHD).

I asked the children about whether they felt that children actually think about the likelihood of getting hurt when assessing a risk and they were clear in their analysis that some do and some don't. One boy (12 years, ADHD) said "50/50, half of them do and half of them don't". In addition to not always thinking about likelihood, one boy offered an explanation for a difference for children with ADHD. He commented that ADHD children do think about likelihood as much as other children but "It is just they don't think as fast. They think just as much, they just don't think as fast. It doesn't come to their head as much". Other children (12 year old boy, ADHD) described likelihood in terms of taking a chance, "Sometimes in chess, you take a risk. Yes, because you lose a pawn and you take a pawn...(risk), it's a chance. Like it depends on if you get caught or don't get caught, if you break a bone or don't break a bone, fall off or don't fall off".

Seriousness

Intertwined with likelihood was the seriousness of the potential consequences of their behaviors. The seriousness ranged from suffering a few scratches to death and everything in between. One boy (11 years, non ADHD) considered risk taking as "I kinda know I can hurt myself a bit but I won't like really injure myself". Another boy (11 years, non ADHD) recalled a story about his friend attempting to climb scaffolding around a house under construction as compared to jumping from a wall. He described risk taking in relation to the amount of hurt, "You could die if you fell off the scaffolding and you might only get a...I mean it could still be bad but nothing really serious (from jumping from a wall)". Their descriptions were usually in relation to degree of personal hurt as one boy (12 years, non ADHD) tells about his tree fort, "It's not very high off the ground. So if I fell it wouldn't hurt that much". Some of the children explained that it was not

always intentional and that if they had known it would hurt, they would have altered their behavior. “If I had known it was going to cut me, I wouldn’t have done it. Because my friend said I was doing it for attention. But it really hurt and I wouldn’t have done it if I knew it was going to hurt that bad. I thought they were safety scissors” (12 year old boy, ADHD).

Some of the children spoke about breaking the rules and the consequences of such activities. They linked rules to consequences as one boy (12 years, ADHD) explained that he does not tell his teacher off, “Because I would get into so much trouble, it wouldn’t be funny”. He had not only considered the likelihood but also the seriousness of those consequences for his behavior. Breaking the rules was usually associated with consequences of getting caught or being punished.

Model of Appraisal

This study represents a novel approach to the exploration of children’s perception of risk. Through the rich data collected, the meaning children ascribe to risk and the process of assessing risk became apparent. The basic process emerging was one of attending or not attending to cognitive process of thinking about risk. Children described conditions of thinking in relation to intentions and consequences of their actions. On the other hand, not attending to thinking was associated with no control over strategies and no responsibility for consequences. Children described cognitive strategies associated with risk taking as assessing the risk, listening to adults or the rules, knowing what to do or limits of ability, being responsible or aware, getting experience or something they needed to do, considering the consequences, positive and negative and in terms of the likelihood and seriousness. Conditions were described as fun, scared, feeling good, not

caring, getting attention, and being cool, peer pressure, competition, disregard for rules, stupid, danger and instinct, luck and no control. Children described that understanding came from previous experience, other's experience, and information sources such as adults, school, TV/media, and safety signs that influenced their perceptions. They described consequences of being hurt, death, punishment, achievement, lack of consequences, and emotions of scared, fun, excitement, fear and danger.

Cognitive appraisal, conscious thinking or not thinking in the process of assessing risk was obvious. For some children there was a conscious effort to assess risk and others reported that it just happened. When asked about why kids get injured, this girl (12 years, non ADHD) offered her explanation as "Because they don't really think about the risk, and they just do it. They just do it without thinking at all". However, another boy with ADHD implied there was thinking but the consequences were dismissed, "Risk is like you go out to do something, and just do it, and they don't really care what the consequences". When talking about how things can be risky, this girl (10 years, non ADHD) described, "...because, they really don't think that people could hurt themselves or like they really don't know and they don't think of what could happen". Children who described a process of not thinking also believed that an adult was responsible for supervision and ensuring safety. A few children believed that instinct just happened and there was no need to think about it. Some described a sense of accountability or on the other hand, a lack of control and lack of responsibility. The conditions that gave rise to not consciously thinking included lack of consideration of the consequences, not considering ability, wearing the gear, adult supervision, inattention, not careful, and something just went wrong. Some children depicted that events occur that they have no

control over whereas other children assume responsibility for their actions and consider the options and consequences when approaching a risk. All children described consequences that were universally negative but some children also found positive rewards in taking risks.

Summary

Risk taking is a complex set of processes that children engage in relative to the context of their situation, using a diverse set of strategies and with consideration of potential consequences. Risks appear as a common event and are often viewed as an integral developmental process by these children. They understand that risk is inherent in their lives but risk taking is a process that for some, they can have some control of. Risk taking is undoubtedly related to consciously thinking or not thinking about the likelihood and seriousness of consequences, both positive and negative. They perceive that, in addition to themselves, family, friends and society all have an impact on their perception of and their participation in risk taking activities. The children differed with respect to thinking about the consequences and taking control of their choices while considering the likelihood and seriousness of personal consequences. The development of risk assessment is neither linear nor uniquely individual but rather a process of engagement between children and their environment as demonstrated by the stories of the children participating in this study.

Overestimation

Transcripts were compared and contrasted to examine children's representation of overestimation in their accounts of risk taking. Children with ADHD reported overestimating their ability to successfully accomplish the task whereas there were no

children without ADHD who described overestimation. Overestimation was reported by children with ADHD and with injuries (Figure 7). All children did describe that knowing their abilities and knowing their limits was part of their assessment of risk but for some, with more consciousness than others. Some case studies may help illuminate these relationships.

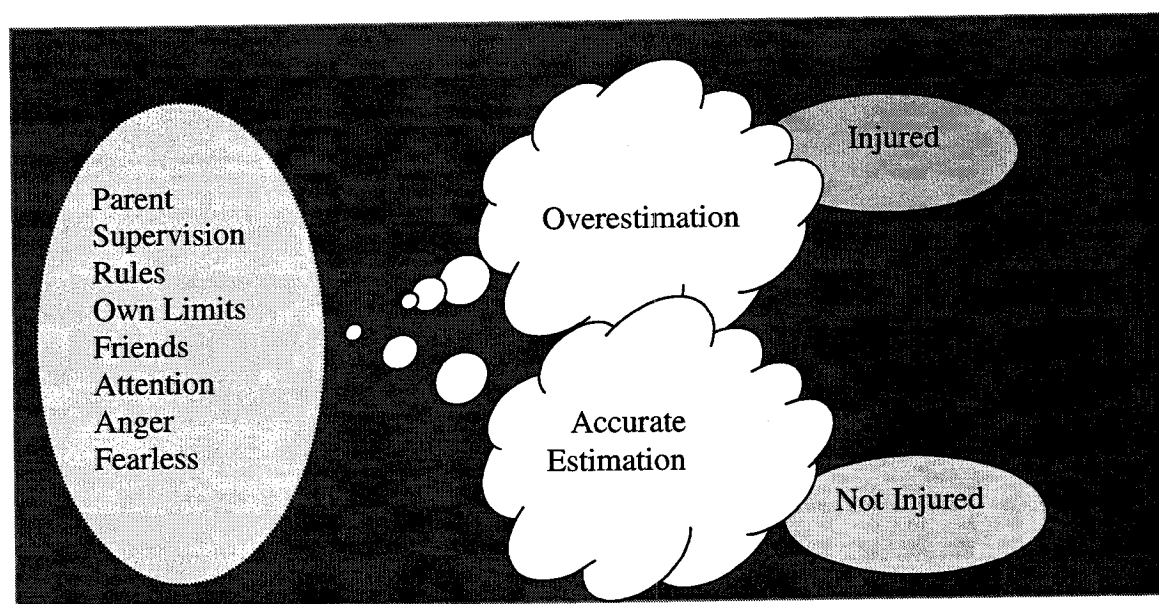


Figure 22. Overestimation and Risk

Overestimation and Risk Taking

Overestimation and Injured

Sam was a 12 year old boy who lived with his mother and older brother in a rented apartment outside of the city in a non residential area. Sam had ADHD and had had several injuries in the past. Sam's mother, Jill, described both of her sons as having ADHD. The older boy had been in jail on several occasions for theft and drug offenses. Sam had been expelled from school most of last year and suspended on several occasions during the past year. Jill worked full time and described her frustration and challenges of

ensuring Sam got the attention and support he needed to be successful both socially and academically. Jill was very attentive and nurturing with Sam. Sam was affectionate with his mother and described a strong affiliation for his family. He was polite and articulate, eager to participate in the study although easily distracted. Sam appeared committed to complete the project but had difficulty following the instructions, losing the camera and having it confiscated by his school principal. He took more time than any of the other children to complete the task and when completed, he had not taken all the pictures as asked but rather took some random pictures of his school mates and friends. However, he was willing and able to tell stories about his experiences with risk taking. He described overestimation as, "I thought I was able to do a skateboard trick, and it ended up hitting me. And the skateboard came up and hit me in the testicles. So that didn't turn out so well." He seemed to be unaware of his abilities and saw a challenging activity or situation as something he could attempt. Most of his experiences had been negative and it is not clear how or if that influenced his decision making about his ability and risk taking.

Another boy, Terry, 10 years old, had been injured and had ADHD. He lived in a low income area of the city in a rented townhouse with several siblings, both parents and his grandmother. Both parents worked. His mother was very interested in the study but rarely at home although his grandmother was always at home. He was a very thoughtful boy, and spent some time pondering the pictures. He took mostly pictures of his siblings and cousins. He frequently mentioned his extended family and regular family events. His sister sat in on the interview with us and was very intrigued by what he had done. He seemed to be very grateful for the opportunity to participate, proud of his work and ability to make a contribution, and was quite eager to tell me his stories. One of his

interesting stories about swimming portrayed his experience with overestimation. He had taken a picture of a stream by his church and described that it could be dangerous if one did not know how to swim and the outcome could be drowning.



Figure 23. Swirling Water in Stream

Later in the interview he told me a story about his experience swimming with his family, “We were in a hotel, and then there was a swimming pool. We always went there. And then my Mom always told me to stay in the shallow end and not to go to the deep end. But I would always go to the deep end with a life jacket. But then I took the life jacket off. And then I couldn’t swim, and then I almost drowned. But then I got to the shallow end in time.” I asked “Why do you suppose you did that?” He replied, “Because I thought I could swim, and I couldn’t.” Terry understood that he had overestimated his abilities and that there could have been negative consequences for his decision. He seemed fully aware of his role in estimating his abilities and the link between overestimation and consequences from this experience.

Accurate Estimation and No Injuries

Adam was a 12 year old boy who had no previous injuries. He lived with his mother and her partner. His parents were separated but he spent significant amount of time with his father who also had ADHD. He lived in a townhouse outside of the city in a well populated community. Many stories were about his friends and his family and most were outdoor activities. He was among the most articulate of all the children I interviewed, eager to tell me all the stories that he could with little effort. He talked very openly about his ADHD and what he had learned from his father about his experience with ADHD. He was telling me about riding his trick bike over jumps with his friends and described, "Kids with ADHD are more competitive and also they are very, very, very show-offy, way more than kids who don't have ADHD. And like they can kind of get angrier quickly. Also, they don't think so fast too. And like they are not as afraid of stuff too. Like kids that don't have ADHD, they will and they will do jumps until they get more practice. Some kids with ADHD just go wooph, right up the big jump. And that is how they practice instead of going from the little to the big. I kind of started off in the medium to the big instead of going little, medium, big." And later he added, "ADHD, they are like, 'Come on, I can do this.' And then go fly, I am going to fly high and I am going to show them that I am better than them." Adam very eloquently described how he approached risk in that his self assessment was often socially located in demonstrating ability. He spoke about how children with ADHD are "wired" differently and they may approach risk differently from other children. He seemed very aware of his ability and had a strategy for taking risks.

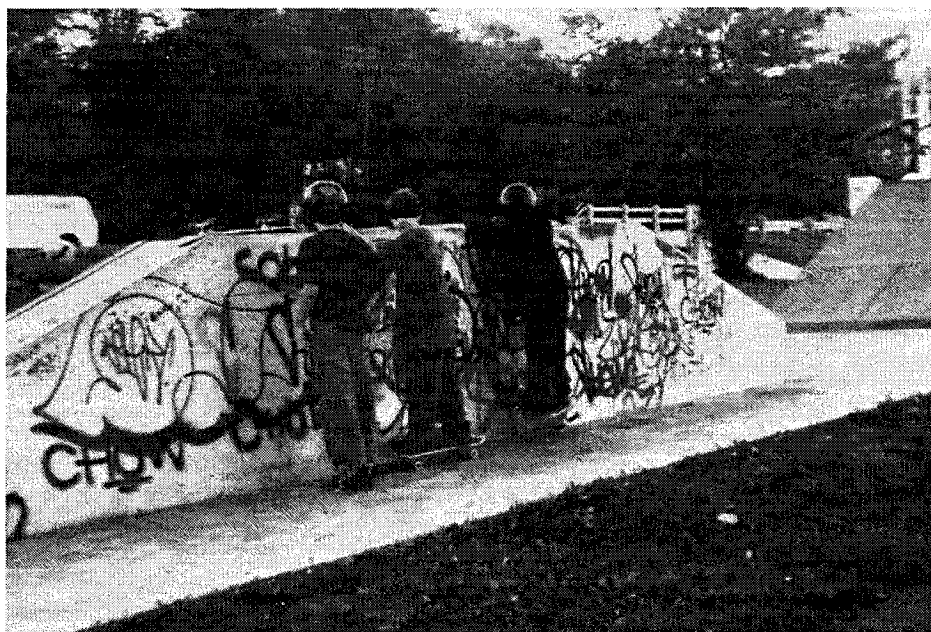


Figure 24. Skateboarders in Skateboard Park

Peter was a 12 year old boy with ADHD who had no injuries. He lived with both parents and an older brother. They lived in a single dwelling in suburban community. Peter's mother was very engaged in the project and attentive to Peter. She took time to assist Peter with the photography task, the family posed for the pictures in disguise to ensure there was no chance to identify the individual. They invested much thought and effort to ensure the task was appropriately completed. Peter was a very engaging boy, hardly able to sit still, asking as many questions as I did. He was very thoughtful and intelligent. He was very proud to share his pictures and included sound effects for each story. He was consistent throughout all of his stories that taking precautions and be aware was the key to minimize risk. He focused on safety and things that could enhance safety and on knowing his limits, "I don't want to use the tools. I don't know how to use them. I get my Dad."



Figure 25. Tools

Although most of the children talked about knowing the rules or respecting the signs or parents, some recognized that they also must play a role in determining the risk for themselves prior to engaging in an activity. Most of the children articulated their ability, some acknowledging their limits while others admitted they overestimated their ability. It is interesting to note that only children with ADHD talked about overestimating their ability and was more apparent among children who had suffered injuries.

Discussion

These study findings provide a novel venue for appreciating the work of children in assessing risk in their world. These children describe perceptions that are influenced by others as they integrate a series of contextual features and individual characteristics into the process of risk assessment. Farmer and Peterson (1995) were among the first researchers to examine perception of injury risk among children with ADHD. They

proposed that a complex process of interactions between the child and the environment underlies injury risk and is key to understanding children's injuries. This process model suggests that children's individual characteristics interact with environmental factors at different stages as antecedent events, responses and consequences. More recently, Schwebel and Barton (2005) further advanced this approach to consider the moderation, mediation and mediated moderation of factors in relation to childhood injuries. They describe two theoretical models that incorporate research to date in this field. One model portrays the interaction of child temperament, estimation of risk and parenting whereas the second, models sex, attribution of risk and parenting. The authors propose the hypothetical mediated moderation models contribute to formalizing our approach in understanding the processes contributing to children's injuries. The present study provides further insight into the underlying mechanisms, from a child's perspective, that can improve our approaches in understanding the linkages between individual and environmental factors.

Context

Children's attributes of unintentionality, operationalized as comments about events being out of their control or that they didn't know about negative consequences, is consistent with previous research of locus of control. Children with an internal locus of control believe that the outcomes are in response to their actions whereas those with an external locus of control assume events occur as a result of luck, fate or authority. Researchers have reported that children who attribute injury risk to bad luck also report less risk of injury, creating an optimism bias (Morrongiello & Rennie, 1998). Another possible link is inhibitory control which has been repeatedly associated with injury risk

(Schwebel, 2004; Schwebel & Barton, 2005; Schwebel & Bounds, 2003; Schwebel & Plumert, 1999). Children who are less able to suppress behavior in novel situations may respond that their behavior was out of their control and that things just happened. It is plausible that children's locus of control and inhibitory control are contributing factors in terms of how they position themselves with respect to perception of risk.

Peer presence has been well established as an influential factor in children's risk taking. For example, Morrongiello and Rennie (1998) concluded that children may gauge the amount of risk based on their interpretations of confidence communicated by a peer. Moreover, they suggest that boys are as likely to engage in risk taking even if the peer is hurt. This was not consistently the case in this study as children reported attending to cues of likelihood of hurt in some instances whereas other children dismissed others' experiences. McLeod and colleagues (2003) reported that extrinsic factors including activity and type of people present were associated with degree of injury risk. They further argue that prevention efforts should focus on situational factors rather than individual level factors. It appears that situational factors such as peers and experience may mediate risk perception.

The children described adult supervision as significantly influencing their risk taking in that it permitted more latitude in taking risks, assuming less risk. Although some researchers have reported that parents do not view supervision as a contributing factor to risk of injury (Munro et al., 2006), others have reported that supervision is a significant factor. For example, researchers argue that not only is supervision key (Morrongiello & Dawber, 1998; Morrongiello et al., 2005; Morrongiello et al., 2004; Schwebel & Bounds, 2003) but supervisory style (quality and amount) can be linked to

childhood injuries (Schwebel et al., 2006). Furthermore, researchers propose that supervision, specifically injury prevention practices, is influenced by social context of the child, family and community (Saluga et al., 2004). One group of researchers found a moderating effect of supervision styles that was associated with maternal locus of control (Damashek et al., 2005). They reported that high risk children of mothers with external locus of control experienced more injuries. Lack of parental supervision was hypothesized to be a result of lack of confidence in parenting skills, lack of information, and lack of responsibility and/or in response to the child's high risk behavior. Whatever the reason, it would be helpful to more fully understand what motivates parental supervision and how that may impact on children's perceptions of risk. The link between supervision and maternal locus of control and moreover, the link between maternal locus of control and child's locus of control in relation to perception of risk and subsequent association to injuries would be an interesting area to examine.

Concerns could be raised about the children who perceive less risk with adult supervision. Interestingly, researchers have reported that closer supervision is a protective mechanism against risk of injuries (Morrongiello et al., 2005; Morrongiello et al., 2004). Gerrard, Gibbons and Gano (2003) have also reported that parent communication about risk can decrease willingness to engage in risk behaviors among adolescents (Cleveland, Gibbons, Gerrard, Pomery & Brody, 2005). Similarly, other researchers have found that positive parenting among temperamentally difficult children was associated with fewer injuries (Schwebel et al., 2006). Brown and colleagues (2005) reported that parenting supervision is greater when the parent senses their child is vulnerable. Similarly, researchers have reported that children with greater sensation seeking, impulsive and

injury risk behaviors were associated with greater supervision (Morrongiello et al., 2005). It is possible that this has implications for the model proposing an interaction between parenting, temperament and injuries (Schwebel & Barton, 2005) such that children who perceive themselves as less vulnerable and perhaps, do more so, as parents increase their supervision. However, researchers have also hypothesized that supervision may cause under controlled children to judge their abilities more cautiously (Schwebel & Barton, 2005; Schwebel & Bounds, 2003). Given that positive parenting may be protective in terms of injuries, it may be that children are better able to estimate their ability and attempt more appropriate risks successfully or indeed the risks are limited by parent interventions. This underlying concept of whether they attempt less risky activities or they are better able to judge their risk has yet to be examined.

The children reported that media influenced their perception of risk similar to recent reports by Glik and colleagues (2006). They analyzed media content from popular children's television programs and concluded that injury risk is inaccurately portrayed. They reported that programs depicted unrealistic risk behavior with few negative consequences, less severe and serious consequences and few safety behaviors. Given the amount of time children spend watching programs, it is entirely possible that such portrayals could influence risk perceptions. On a positive note, children in the present study did recall safety information that was presented in the school setting although it is not clear what impact such information has on risk taking behaviors. This is an area of exploration for future study, understanding the influence of prevention strategies and media on children's perceptions of risk and how they reconcile and integrate two potentially different influences.

Strategies

Estimation of abilities has been central to a program of research examining individual level factors underlying children's injuries. Researchers have found that young children who overestimate their abilities have higher rates of injuries (Plumert, 1995; Plumert & Schwebel, 1997, Schwebel, 2004b). They argue that overestimation is associated with less accurate assessment of risk that can lead to increased risk of injuries. On the other hand, Kontos (2004) found that overestimation of ability among athletes is positively associated with risk taking although risk taking was not associated with injuries. He hypothesized that athletes who are confident in their abilities are more likely to calculate risk appropriately. Similarly, authors of a systematic review reported that risk taking was associated with injuries but not among high skilled, risk taking sports (Turner et al., 2004). Although the authors do not offer a similar explanation, it is possible that children in extreme sports perceive abilities and risk differently. Although these findings are associated with athletes, it may have application for other groups of children.

Given that all children who described overestimation had ADHD, it may be possible that perception of abilities is associated with several dimensions such as cognitive deficits, altered perception of self competence and an awareness of actual abilities (Kontos, 2004; Owens & Hoza, 2003). In particular, a team of researchers have been examining positive self perceptions that are reportedly inaccurate in children with ADHD (Hoza et al., 2002; Hoza et al, 2004). They have found that ADHD children overestimate their scholastic competence, social acceptance and behavioral conduct (Hoza et al., 2002) and that overestimation was most apparent in areas of greatest deficit (Hoza et al., 2004). Others have reported that children with ADHD overestimate their

social and academic abilities but when given success feedback, they subsequently make more accurate estimations for social but not academic abilities (Ohan & Johnston, 2002). Other researchers have proposed that risk perception is a reaction to a social situation (Gerrard et al., 2003). It may be that children have impaired cognitive processes and difficulty interpreting social cues in a novel, socially charged situations that lead to inaccurate assessment of abilities.

Children reported that wearing safety gear minimized their risk. Risk compensation has been a topic of ongoing debate with little research to establish any association (Thompson, Thompson & Rivara, 2001). The theory underlying risk compensation in children suggests that if children wear protective equipment, they will perceive greater safety that results in greater risk taking. Researchers recently reported that children using protective equipment described themselves as risk takers although empirically no relationship was found between protective equipment use and behavioral indicators of risk taking (Pless, Magdalinos & Hagel, 2006). On the other hand, researchers have found that children perform more recklessly when wearing gear than not, providing initial evidence of risk compensation (Morrongiello, Wadpole & Lasenby, 2006). It is interesting to note that children in the present study also described themselves as greater risk takers when they were wearing gear but it is unclear if this translates into greater risk of injury. Given the limited research in this area, more empirical evidence could create a better understanding and perhaps identify potential mechanisms that interact to alter such relationships.

Consequences

Thinking about consequences in relation to likelihood and seriousness, and both positive and negative, was predominantly present in the majority of interviews. Farmer and Peterson (1995) reported that children with ADHD anticipated fewer negative consequences, less severe injuries and less distress over injuries. They concluded that these children estimated their personal risk less accurately, suggesting an overall decreased sense of vulnerability. In addition, researchers have reported that young children's lower perceptions of vulnerability were associated with increased risky behavior (Boles, Roberts, Brown & Mayes, 2005). Perceptions of vulnerability have been associated with social events (Gerrard et al., 2003). For example, whether the child is performing for the benefit of friends or has a parent supervising could alter the child's sense of vulnerability. Moreover, children with ADHD who experience positive illusionary self concepts (Hoza et al., 2002) may have an impaired sense of vulnerability. Similar to the present study findings, McLeod and colleagues (2003) argue, children's conceptualization of risk taking appears to move beyond the individual level and also includes situational factors of peers, family, social and the community. Other researchers would agree that a variety of social, experiential and cultural factors affect judgment about risk and risk taking depends on risk acceptance and the perceived benefits of engaging in a risky behavior (Green, Turner, Purdie & McClure, 2003).

Overestimation and Injuries

Although overestimation was evident among children with ADHD and also present for those children who were injured, it was not consistently present for all injured children. The small sample makes it difficult to draw firm conclusions but remains a

theory that requires further assessment to develop this to cover a range of situations. In terms of injuries, it may be that injury experience influences perception of risk. Greening and colleagues (2005) found that personal experience was a significant predictor of risk perception. It would be useful to explore the children's past experiences with injuries and risk taking in terms of outcomes and influence on their development of accurate estimation of ability in relation to perception of risk.

Model of Appraisal

There appears to be a continuum of unconscious to conscious thinking associated with perception of risk. The majority of children fell into the 'not thinking' group in that these children expressed a sense of no control, things just happen or things happen because of luck while a few children described planning to take a risk and taking responsibility for that action.

A helpful model of risk taking that could assist with interpreting the findings is one of social reaction proposed by Gerrard and colleagues (2003). They present an insightful risk taking theory that has striking semblance to the findings in this study. They argue that "...the assumption that reasoned thought or intentions necessarily precede risky and precautionary behavior is not accurate, especially among adolescents" (p. 75). Their research has demonstrated that adolescents do not plan risky behavior but rather risky behavior is a reaction to a social situation in which risk is present. Behavioral willingness (not planning) and intentions (contemplating) is key to their theory which resonates with the present study.

In the present study, there was a group of children who intended to take a risk, who consciously reported they would take a risk if they had the opportunity and that

contemplation was part of the process of assessing risk. On the other hand, the majority of children described not thinking about the risk or consequences, perhaps paralleling a willingness to take a risk but not necessarily intending to take that risk. Gerrard et al. (2003) describe two paths to risk taking (conceived primarily as a social event) as intentional (planned risk taking) and behavioral willingness (not consciously planning to take a risk but not planning to avoid one). They describe the children in the willingness path as those who have not thought much about the risk or the consequences. The unique pattern among this group of children is that they "...have not made a decision to not engage in the behavior" (Gerrard et al., 2003, p.76). In other words, although they do not plan to take a risk, in a given situation they may take a risk without thinking about it as they have not intentionally planned *not* to take that risk. Moreover, they found that willingness explains more of the variance in risk behavior than intentions and does so dependently and independently of intentions.

In addition to an unplanned behavior, a second attribute is associated with behavioral willingness, that of no responsibility for action or consequence (Gerrard et al., 2003). They explain, "...willingness to engage in a risk behavior is a reaction to a risk-conducive situation and, therefore, involves relatively little precontemplation or consideration of the behavior or the planned negative consequences associated with it" and further that "... willingness involves less internal attribution of responsibility for the behavior or its attendant consequences" (p.79). Alternatively, those children intending to take a risk take responsibility for their actions and its consequences. This could be particularly helpful in understanding the context of children with ADHD who may be less

likely to make the connection (Milich & Lorch, 1994) and have different patterns of attributions (Hoza et al., 2000; Hoza, Pelham, Waschbusch, Kipp, & Owens, 2001).

In this study, those children who did not think about consequences and assumed no responsibility for their behavior or outcomes may represent those who are willing but not intentional risk takers. Whereas those children who described thinking about their decision to take a risk and assuming responsibility for the consequences, may be best described as those children consciously intending to take a risk. Moreover, Gerrard and colleagues (2003) argue that "...previous conflicting findings regarding the relation between risk perceptions and behavior may be explained by failure to account for the fact that risk perceptions inhibit willingness to take advantage of risk opportunities more than they inhibit intentions to engage in risk behavior" (p. 80). The findings of this study support the theory that not only is there a relationship between risk perception and risk behavior but perhaps it is mediated by behavioral willingness.

This takes the discussion back to my original inspiration for inquiry; those risk takers whose mothers were not concerned about their risk taking as they felt they were calculating the risk appropriately so as to minimize the negative consequences. Consider those children who do intentionally take risks, prepare for them and anticipate the potential outcomes, positive and negative. These children may be less likely to experience a negative outcome and if so, are likely to use that experience to inform future risk perceptions. On the other hand, those children who react in a social situation with no premeditated plan of action but are willing to take the risk, likely have limited or no perception of the actual risk and potential consequences or unrealistic beliefs about consequences. They are perhaps the children at greatest risk for negative consequences.

Moreover, these children are less likely to incorporate this experience into future risk perceptions as they do not attribute responsibility to themselves. This bears resemblance to the explanations of positive illusory bias observed in children with ADHD who do not perceive themselves as impaired so they are unlikely to be motivated to change behavior (Hoza et al., 2002). Perhaps these children are most vulnerable for injury. Taking all these factors together one gets a very complex picture of risk assessment and how it might be different for children with ADHD. For example, children with ADHD often have an external locus of control creating an optimism bias and limited responsibility for outcomes. In addition, these children have impaired inhibitory control in that they are less able to control behavior in novel circumstances and they overestimate their abilities. Consider that underlying the response to all these potential influences is a willingness (not planning) or intention (planning) to engage in risk behavior. The outcomes could be significantly altered depending on their intentions.

Implications

This theory has significant implications for an intervention strategy given the traditional approach to injury prevention has been to draw attention to potential negative consequences. Such an approach is problematic as the majority of children in this study did not think about the risk or assume any responsibility for the outcomes. An alternative strategy, similar to that of SmartRisk Foundation (<http://www.smartrisk.ca>), is to promote consideration of potential risk taking situations and alternative strategies for approaching the situation. There is a time sensitive effect of this approach, in that it should occur once youth have a willingness attitude but not necessarily intending to take the risk (Gerrard et al., 2003). Gerrard and colleagues (2003) propose that initiatives targeting social skills to

manage potential risk situations are likely to yield the most benefit. The other issue, these researchers argue that is equally important, is the recognition that children in this age group are naturally curious and need to explore. Positive parenting can have a significant role to play in assisting children to recognize risk, their willingness to participate in risk situations, and preparing them to manage the demands of social situations. In other words, managing risk rather than eliminating it.

For those children with ADHD, there were both positive and negative consequences whereas for children with no ADHD, there were only negative consequences. This provides another dimension beyond the findings reported by Farmer and Peterson (1995) who found that ADHD children reported fewer and less severe negative consequences of risk taking behavior. The findings of this present study may be associated with the need to take risks to gain peer acceptance which may be seen as a positive consequence, reinforcing the theory that risk is a reaction to a social situation. The children in this study may perceive that successful performance when taking risks can influence their acceptance by their peers similar to the theory of positive illusionary self concept in relation to social acceptance reported by (Hoza et al., 2002). If positive illusionary self concept is an underlying construct there are opportunities to enhance children's self esteem to strengthen their ability to accurately attend to the demands of social situations.

Interventions for children with ADHD are more complex and not likely to be effective without multiple interventions. Several researchers have argued convincingly that risk taking is not an independent process but that it is dependent on both the opportunity and the propensity to take a risk (Brynes, 2003; Gerrard et al., 2003). These

researchers further propose that choices are embedded in beliefs, values and goals that reflect thinking, experiences and cues. Intervention opportunities could be conceptualized at two levels, opportunity (supervision, rules, and gear) and propensity (willingness, intention) as a reaction to ability, experiences, peers, and information. Risk perception may be conceived as requiring both cognitive and social strategies within a given situation. Based on their research, Schwebel and Barton (2005) describe a model whereby the relationship between temperament and injury is mediated by parenting style (quality and quantity). This model is promising for future studies that address opportunity and propensity with respect to social situation.

Summary

Important to consider is the opportunity to equip children with the capacity to consider their options and take responsibility for their choices. Those children who do not think about risk, sense no control over the outcomes despite an apparent awareness of both positive and negative consequences of risk taking could most likely benefit. Acknowledging that risk taking is an inevitable and important part of growth and development provides a refreshing perspective that children can make “smart choices”. This philosophy is embraced by SmartRisk Foundation (<http://www.smartrisk.ca>), a Canadian injury prevention initiative that equips children and youth with alternate strategies to make choices about risk. Researchers have demonstrated that this approach has merit (Koven, McColl, Ellis & Pickett, 2005) finding an association between youth with modifiable risk taking behaviors and injuries.

Building a process to assess risk and consider consequences may give children and youth the skills to more accurately examine risk at an individual level. Risk taking is

inherent in normal growth and development; however, minimizing negative risk and promoting positive risk taking could lead to more optimal outcomes for children. Children need to develop the confidence and capacity to assess their abilities and inherent risks; equipping them with the ability and assurance that they have responsibility to think about the risk and the consequences, could strengthen their successful risk taking. The traditional approach of supervising to minimize risk or simply telling our children “not to do” does not give them the opportunity to develop skills that could assist them in assessing risk independently. A balance that acknowledges their level of ability to assess risk and participate in a process of thinking about risk in socially charged situations could be beneficial to their development of independent thinking. Such skills are transferable to other dimensions of their development, potentially enhancing positive outcomes in a variety of health arenas.

Traditionally, health professionals have positioned injury prevention strategies from their perspective with little understanding from the perspective of those who experience risk taking events, children. These findings advance our knowledge of potentially appropriate strategies to effect change in risk taking that could influence risk of injury. This study used a unique approach to qualitatively explore the meaning of risk from children’s perspectives. It is clear there are multiple contexts that children relate to and several complex processes that mediate or moderate their perceptions. Integrating this understanding builds our knowledge about the contribution of risk perception to injury events and can inform future injury prevention initiatives.

CHAPTER 4. DISCUSSION

Background – Mixed Methods

The purpose of this study was to further our understanding of why children with ADHD experience more injuries. The study design used a mixed methods approach with the intent of examining the tensions created between findings of quantitative and qualitative inquiry. Mixed methods research has been broadly defined as “...research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry” (Tashakkori & Creswell, 2007, p. 4). In the quantitative inquiry, child attributes (temperament, overestimation and ADHD) associated with injuries were examined and in the qualitative inquiry, attributes that children associated with injury (individual, family and community level) were examined. Each study provides a unique perspective and the findings taken together can offer a third perspective. Bryman (2006b) advocates, “Mixed methods research is not necessarily just an exercise in testing findings against each other. Instead, it is about forging an overall or negotiated account of the findings that brings together both components of the conversation or debate” (p. 21). Researchers contend that if findings from qualitative and quantitative studies converge, then more confidence can be placed on the knowledge generated through the results (Teddlie & Tashakkori, 2003). On the other hand, if findings are divergent, then further explanation is required. Farmer and colleagues (2006) explain that “...instances of dissonance between data sets provide an opportunity for further analysis to explore the source of the differences” (p. 392). Researchers claim that divergent findings can lead to

a different and unique theory that may not have been possible with either inquiry alone (Creswell et al., 2003; Miller, 2003).

When comparing study findings from a dialectical approach where both studies represent different paradigms, one might expect divergent findings. Bryman (2007) suggests that by mixing methods, one increases the potential of unpredictable and perhaps unanticipated outcomes. The findings from these two studies were divergent; overestimation was not associated with injuries in the quantitative inquiry but was described in the data of the qualitative study. Children described knowing their abilities was central to assessing the risk that was involved and whether or not it was appropriate to attempt. However, estimation was embedded within a broad context of many factors and for some children they were unaware of any association. This divergence of findings suggests potential new avenues for theory development. As other researchers have noted:

Divergent empirical findings should not always be considered as an indicator of a poor research design; instead, they may be considered as a pointer to new theoretical insights...In principle, inconsistencies between qualitative and quantitative findings can be explained in one of two ways: 1) as results of mistakes made in the application of the data collection or data analysis methods, 2) as a consequence of the inadequacy of the applied theoretical concepts (Erzberger & Kelle, 2003, p. 476).

Although the methodological soundness of either the quantitative or qualitative inquiry could account for the differences, it is important to explore the differences from a theoretical perspective as well (Erzberger & Kelle, 2003). Moreover, researchers argue that it is necessary to "...seek theoretical concepts and statements that can change the divergence of results to convergence or complementarity" (Erzberger & Kelle, 2003, p.

479). To develop a new theoretical understanding, logical inference was the strategy used. Logical inference is described as "...neither inductive nor deductive but represents a special kind of logical reasoning whose premises are a set of empirical phenomena and whose conclusion is an explanatory hypothesis" (Erzberger & Kelle, 2003, p. 479).

Reliability and Validity

A common language does not exist for rigor in mixed methods but Johnson and Turner (2003) suggest using the terms, validity and trustworthiness, interchangeably. In other words, is the research worthy and credible? It is important to emphasize that the theoretical and conceptual integrity of each inquiry was preserved within each study tradition, as described earlier. Assuming both inquiries were valid, the findings were compared and contrasted to develop theoretical inferences. It is important to consider inference quality, which can be thought of as the validity or credibility of conclusions. Miller (2003) describes four types of inference; 1) enumerative induction, 2) inductive analogy, 3) perfect induction and 4) eliminative induction. Enumerative induction refers to inductive generalizability in that what is observed in a group is true for all in same group whereas inductive analogy is drawing conclusions about a single case observation based on comparison with previous observations. The third type of induction, perfect induction, is described as deductive conclusions in that what is true of each case is true for all. Lastly, eliminative induction refers to; "A process of induction where there is a systematic attempt to eliminate rival or alternative claims to a hypothesis. The idea is that the remaining alternative is probably the "cause" of the hypothesis" (p. 429). The approach to developing theoretical inferences was through the use of eliminative

induction, a process that provides legitimacy or credibility to interpretations (Onwuegbuzie & Teddlie, 2003).

Several potential explanations were explored in an attempt to find a theoretical fit to explain the divergent findings. Several theories were considered but only one theory provided the most plausible fit with the findings from both studies and that could explain each of the study findings independently and potentially account for the divergent findings. Tashakkori and Teddlie (2003) describe four components of interpretive rigor when combining methods; 1) cross-inference consistency, 2) theoretical consistency, 3) interpretive agreement and 4) interpretive distinctiveness. In response to each of these dimensions of inference quality, the inferences drawn in this study follow the findings from both inquiries, the interpretations fit with current research on risk taking, and inferences are consistent and fit with both qualitative and quantitative inquiry.

Meta Inferences from Mixed Methods

Although overestimation was associated with ADHD in both inquiries, it was not found to be associated with injuries in the quantitative inquiry; but it was included in children's construction of risk perceptions with ADHD who did experience injuries in the qualitative inquiry (Figure 8). It seems that children do attend to estimation of abilities in relation to perception of risk and children with ADHD do overestimate their abilities that could be associated with injuries.

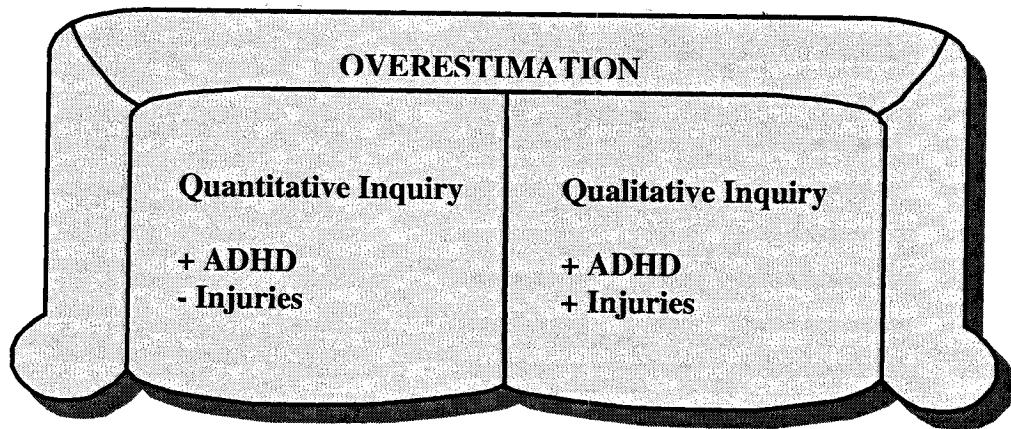


Figure 26: Overestimation: Two Inquiries

Several possible explanations may offer some further perspectives on the divergent findings; 1) direction of association, 2) other mediating variables, and 3) social reaction theory. First, direction of association may explain the divergent findings. Overestimation may be unique for this group of children, meaning that children do attend to estimation of physical abilities in both inquiries but the degree or the direction of the association differs. There is precedent for this explanation from other areas of research. In particular, two researchers found overestimation to be *protective* of injuries in athletes (Kontos, 2004; Turner, 2004) whereas overestimation has been linked to *increased* risk of injury in non-athletes (Plumert & Schwebel, 1997). Kontos (2004) and Turner (2004) concluded that children who are extreme risk takers and overestimate abilities, are less likely to be injured. Although it is important to note that the study participants and methods were very different in each of these studies, these controversial findings draw into question the role of overestimation in relation to the risk of injury. It is possible that the association, positive or negative, between overestimation and injuries may vary dependent on the group under study. In other words, the association between overestimation and injury may be influenced by child characteristics other than ADHD.

In the present qualitative study, children described estimation of abilities or knowing your limits as a contributing factor to determining risk. Risk was seen as doing something that you were not 100% sure you could be successful at. In the quantitative inquiry, overestimation was associated with the group of children with ADHD and these children did not experience more injuries; it is possible that children with ADHD overestimate their abilities but overestimation plays a protective role against injuries for this group of study children, moderating the risk of an injury for some. In other words, children who overestimate actually have calculated the risk and have considered their ability, concluding they are competent to accomplish the task with minimal risk of injury. While it is perceived by others (peers or adults) that they are overestimating, they are actually accurately assessing their ability or risk of injury. Although an inverse association was not detected, it is possible that in this small sample the potential effects were not demonstrated. If this were so, concepts of positive illusory self and deficits in executive functioning may not be viable theories for apparent overestimation of physical abilities as it is possible that these children may more accurately assess their ability than we believe.

Second, it is possible that the association between overestimation and injuries is affected by other factors, such as those described by the children in the qualitative inquiry, and this may explain the divergent findings. While overestimation of physical abilities was not statistically associated with injuries in the quantitative study, estimation of abilities was embedded in the rich descriptions among many other complex influences. In other words, it may be that estimation of abilities is significantly associated with injury (in contrast to the study findings), but this association was masked in the present study by other contextual factors that were not measured. For example, Schwebel and Barton

(2005) describe a model whereby the relationship between temperament and injury is mediated by parenting style (quality and quantity). Moreover, parent communication about risk perceptions has been reported to mediate willingness to engage in risk behaviors among adolescents, reducing risk taking (Gerrard et al., 2003). The findings of the present qualitative study support the influence of parent supervision in addition to other contextual factors of previous injury experience, information, peers, safety gear that may play a role in children's perceptions of risk. Given the complexity of multiple factors described by the children, it is likely that other variables, not measured quantitatively, could contribute to this relationship. It is possible that overestimation exists but the relationship to injury is influenced by any number of these variables. Parent factors were not measured in this present study but should be considered in future inquiry.

Third, social reaction theory (Gerrard et al., 2003) could explain the gap between the two study findings, and this is perhaps the most intriguing explanation of the discrepancy between the two studies. As described in Chapter 3, these researchers propose that adolescents' perception of risk taking is mediated by behavioral willingness. If we follow through with this theory, children with ADHD who overestimate their physical ability may do so as a reaction to the social conditions at the time they are presented with a risky situation. The children who are willing to take a risk (the "willingness" group) but are not necessarily planning to do so, react to social stimulus to take a risk without thinking. Individual, family, peer and society factors could influence their perception of risk such that overestimation is influenced by several factors not considered in the quantitative inquiry but clearly present in the qualitative inquiry. On the other hand, children who overestimate their physical ability may do so as a reasoned,

planned response to a risk situation (the “intentional” group). In other words, they intend to take a risk, and although they appear to be overestimating, they are actually accurately estimating their ability. In either scenario, overestimation could exist, however, the difference lies in the intent and therefore, the outcome.

This model of risk taking provides a plausible explanation to the dilemma of interpreting the findings between the two study perspectives. For those children who overestimate in the willingness group, there is little consideration or thought given to the consequences or the risk involved and they do not hold themselves accountable for actions or outcomes. Overestimation allows them to engage in a risk taking event without assuming responsibility as they did not plan for the event, ‘it just happened’ or no need to consider consequences as they assume parental supervision or wearing the gear was expected to protect them. For those children in the intentional group, overestimation is not actually an inaccurate judgment of their ability as they have calculated the ability required to master the risk and are confident in their ability to do so. They have considered consequences and assume responsibility for their actions. If this model is applied to the interpretation of the combined study findings, overestimation could exist for both studies although the relationship between overestimation and injuries is not evident due to the intervening role that ‘planning to take a risk’ may play. In other words, it could provide protection against or it could increase risk of injury. Given this explanation, overestimation may differ between groups by whether they plan to engage in a risk based on anticipated consequences. Perhaps overestimation does exist but the issue is more complex, how does anticipation of consequences influence overestimation? In other words, children who overestimate and do not consider consequences (willingness

group) are at greater risk of injury than those children who overestimate and are aware of consequences (intentional group). Miller (2003) cautions; “As with all inductions, the conclusion is not certain (in the deductive sense) but rather probabilistic” (p. 429). Nonetheless, this theory logically fits with both inquiries. If this theory were so, it would be important to focus future inquiry on ability to accurately evaluate consequences in addition to estimation of abilities.

Summary

It is apparent that overestimation may be a factor that could be mediated by ‘willingness to take a risk’ that is linked to social context. Those children, who are willing to take a risk, may be motivated by a social situation to overestimate their abilities, similar to the theory of positive self illusionary bias reported by Hoza and colleagues (2002). On the other hand, they may intentionally take a risk with an awareness of abilities that may appear to others to be an overestimation; however they may be accurately judging their ability. Beyond estimation of abilities, ability to accurately evaluate consequences may significantly contribute to the association between overestimation and injuries. This only remains a theory that was not tested in this study but does provide a plausible explanation for the divergent findings and insight into the complex mechanisms underlying children’s risk of injury.

Discussion

Researchers have argued that qualitative and quantitative research approaches are distinct paradigms and that it is impossible to combine findings across them (Morse, 2003). Others argue that the two approaches can be combined using mixed methods, thereby enhancing confidence in both sets of findings (Tashakorri & Teddlie, 2003).

Furthermore, Bryman (2007) argues that “Bringing quantitative and qualitative findings together have the potential to offer insights that could not otherwise be gleaned’ (p.9). The purpose of this inquiry was to examine the tensions created when using these two approaches to develop and evaluate a theory of overestimation and perception of risk in children with ADHD.

For purposes of this discussion, the findings were viewed as complementary in that there is a degree of convergence using the definition provided by Jones and Bugge (2006); “Convergence could be described as the point where different methods/studies/researchers identified complementary findings about the same part of the concept...Through their convergence, they built a greater depth to our understanding” (p. 618). Although upon initial comparison of the findings, they appeared divergent, there was also convergence. In particular, the cognitive process that potentially underlies overestimation provides a point of convergence of findings from these two methods of inquiry. The complementary point was that of intention and willingness, ability to consider consequences, a cognitive process that is responsive to social situations.

Using inferential reasoning, it is possible to develop a new theoretical hypothesis as a result of examining the tensions created by comparing the findings of the two studies. However, the new hypothesis must fulfill at least one of the three criteria,” 1) lead to increase of empirical content, 2) reduce internal conceptual problems or 3) increase adaptability of the theory” (Miller, 2003, p.483). The newly developed hypothesis from the comparison of the combined findings in this study fit these criteria in that it explains the divergent observations, provides logical coherence and it is a theory that has been applied in other risk taking research. The theory arising from the

examination of both data findings suggest that the cognitive process (overestimation) is not associated with injuries independently but is mediated by individual propensity (willingness and intention) in response to opportunity defined by the social situation (peers, family, community).

Children with ADHD do overestimate their abilities but whether that is intentional or unintentional may be the salient factor in determining outcome. For example, those children who overestimate intentionally engage in a process of thinking about the risk and the consequences in relation to their abilities. These children may be most likely to successfully maneuver the risk without the negative consequence of an injury. In contrast, children who overestimate unintentionally and have not thought about potential consequences may be more likely to engage in a risky situation they were not planning to partake in, had not planned for potential consequences, putting themselves at risk for an injury. This suggests that a cognitive process exists but within a socially defined context that may be interpreted differently by children who are willing than those who are intentionally engaging in risk behavior. Providing children with cognitive strategies alone to manage risky behavior is likely ineffective unless skills to manage socially charged situations are incorporated and consideration of alternate consequences are processed.

Implications of Mixed Methods Inquiry

Estimation of physical ability, among other factors, was apparent even if the children's construction of risk was more complex than overestimation alone. Although the relationship was not detected quantitatively, a potential interpretation of this finding was made possible through the findings from the qualitative data. The children's stories do provide a broader understanding of the contribution of overestimation to the risk of

injury and emphasize the complexity of the association. In the quantitative inquiry, risk was measured at an individual level whereas in the qualitative inquiry, the children described their abilities beyond the individual level to include influences such as social situations that included wearing gear, rules, supervision, peers, and information from school and media. Clearly, there are other contextual factors that could contribute to a model of risk taking. The theoretical concepts developed in this research could provide a useful background for further developing and testing a conceptual model of risk taking that includes consideration of consequences. Such research could lead to the development of a more parsimonious model of multiple risk factors and their interactions that can better explain the variability of injury patterns.

One of the challenges of interpreting the findings was the lack of consistent definitions of risk. Others agree that studies examining the association between risk taking and injuries would be more useful if based on consistent definitions and measures (Musselwhite, 2006). Developing a comprehensive and sensitive measure of risk taking with consistent definitions based on these study findings could be an initial start.

Overestimation alone does not explain the association between injuries among children with ADHD and this research suggests there is a complexity of factors to consider. Children who are unable to accurately perceive the risk and are willing to take a risk are perhaps the most vulnerable children, however this requires further research. If the theory of social reaction is plausible, a number of issues are raised, particularly for those children with ADHD who overestimate their ability, inaccurately interpret social cues (Hoza et al., 2002, Hoza et al., 2004) and are willing to take a risk. These children could attribute less personal responsibility for their behavior and fewer consequences,

therefore be a group of children least likely to respond to traditional injury prevention strategies.

Typical cognitive strategy interventions have had limited success in reducing injuries. Perhaps the lack of success can be explained through these study findings that suggest that perception of risk is embedded in multiple layers of interactions. Other researchers have pointed out that risk taking occurs in groups where there is emotional stimulus and therefore judgment about risk is a complex process of cognitive, emotional and social factors (Steinberg, 2003; Gerrard, et al., 2003). If the proposed model of risk taking is a cognitive process, mediated by willingness and not thinking about consequences that are influenced by the specific social and emotional circumstances of the child, then a comprehensive approach could prove beneficial. Cognitive focused strategies that facilitate the consideration of specific behaviors (emotional and social) and the consequences could assist children to develop a repertoire of potential response strategies. Shure (2003) suggests that developing these skills equips children with alternative solution thinking and consequential thinking. The goal is to teach these children to think not what to think.

Summary

Bussing and colleagues (2005) summarize the limitations of mixed methods designs as "...combining incommensurable worldviews and conflicting results, the lack of shared terminology and language, researchers' insufficient training and experiences in both qualitative and quantitative methodology, and insufficient time to focus deeply on one methodology" (p.97). I think perhaps I have experienced each one of the potential limitations at any given point throughout this research project. However, it was possible

to overcome the perceived challenges, integrate the findings from two different paradigms and advance our knowledge. The proposed theoretical concept underlying the association between overestimation and injuries requires testing to establish the existence of such a relationship.

It seems that the initial research inquiry to examine why children with ADHD suffer more injuries raises more questions and requires further examination. Although the increased risk for injury among children with ADHD is a well established phenomenon, the mechanism underlying this association is less evident. This study has further developed our understanding that risk taking is likely a cognitive process that considers abilities and consequences, which vary in response to social and emotional situations, resulting in risk taking that can have both positive and negative outcomes. The challenge remains to test this theory in hopes of developing effective interventions to enhance positive outcomes for a vulnerable group of children. Future intervention studies comparing these attributes would be helpful to establish potential impact to alter unacceptable injury trends among children with ADHD.

References

- Alexander, C. S., Kim, Y. J., Ensminger, M., Johnson, K. E., Smith, B. J., & Dolan, L. J. (1990). A measure of risk taking for young adolescents: reliability and validity assessments. *Journal of Youth and Adolescence*, 19, 559-569.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th text revision ed.). Washington, DC: American Psychiatric Association.
- Angus, D. E., Cloutier, E., Albert T., Chenard, D., Shariartmadar, A., Pickett, W., & Hartling, L. *The economic burden of unintentional injury in Canada*. Toronto: Smartrisk; 1998.
- Ballinger, C., & Payne, S. (2002). The construction of the risk of falling among and by older people. *Aging and Society*, 22, 305-324.
- Barkley, R. A. (1997). Behavioral inhibition, sustained inattention and executive functions: constructing a unifying theory of ADHD. *Psychological Bulletin*, 121, 65-94.
- Bauer, A., Rosca, P., Khawalled, R., Gruzniowski, A., Grinshpoon, A. (2003). Dangerousness and risk assessment: the state of the art. *Israel Journal of Psychiatry Related Science*, 40, 182 -190.
- Bijur, P., Golding, J., Haslum, M., & Kurzon, M. (1988). Behavioral predictors of injury in school-aged children. *American Journal of Diseases in Children*, 142, 1307-1312.
- Boles, R. E., Roberts, M. C., Brown, K. J., & Mayes, S. (2005). Children's risk taking behaviors: the role of child-based perceptions of vulnerability and temperament. *Journal of Pediatric Psychology*, 30, 562-570.
- Boyden, R., & Ennew, B. (1997). Photographs within the sociological research process. In J. Prosser (Ed.). *Image based research. A sourcebook for qualitative researchers*. London: Falmer Press.
- Brehaut, J. C., Miller, A., Raina, P., & McGrail, K. M. (2003). Childhood behavior disorders and injuries among children and youth: a population-based study. *Pediatrics*, 111, 262-269.
- Brown, K. J., Roberts, M. C., Mayes, S., & Boles, R. E. (2005). Effects of parental viewing of children's risk behaviors on home safety practices. *Journal of Pediatric Psychology*, 30, 571-580.

- Bruce, B., Kirkland, S., & Waschbusch, D. (2007). The relationship between childhood behavior disorders and unintentional injury events. Manuscript submitted for publication.
- Bryne, J. M., Bawden, H. N., Beattie, T., & DeWolfe, N. A. (2003). Risk for injury in preschoolers: relationship to attention deficit hyperactivity disorder. *Child Neuropsychology*, 9, 142-151.
- Brynes, J. P. (2003). Changing views on the nature and prevention of adolescent risk taking. In D. Romer (Ed.) *Reducing adolescent risk toward an integrated approach*. (pp. 11-18). Thousand Oaks: Sage Publications.
- Bryman, A. (2006a). Paradigm peace and the implications for quality. *International Journal of Social Research Methodology*, 9, 111-126.
- Bryman, A. (2006b). Integrating quantitative and qualitative research: how is it done? *Qualitative Research*, 6, 97-113.
- Bryman, A. (2007). Barrier to integrating quantitative and qualitative research. *Journal of Mixed Methods Research*, 1, 8 – 22.
- Bussing, R., Koro-Ljungberg, M. E., Gary, F., Mason, D. M., & Garvan, C. W. (2005). Exploring help-seeking for ADHD symptoms: a mixed methods approach. *Harvard Review Psychiatry*, 13, 85-101.
- Canadian Institute Health Information. 2003. <http://www.cihi.ca/wedo/hsdad.shtml>.
- Canadian Institute of Health Information. (2004). www.cihi.ca.
- Cappello, M. (2005). Photo interviews: Eliciting data through conversations with children. *Field Methods*, 17, 170-182.
- Charmaz, K. (2000). Grounded Theory. Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln, (Eds.), *Handbook of qualitative research 2nd ed* (pp. 509-535). Thousand Oaks: Sage Publications.
- Charmaz, K. (2005). Grounded Theory for the 21st Century: Applications for advancing social justice studies. In N. K. Denzin & Y. S. Lincoln, (Eds.), *The sage handbook of qualitative research 3rd ed* (pp.507-536). Thousand Oaks: Sage Publications.
- Charmaz, K. (2006). *Constructing grounded theory. A practical guide through qualitative analysis*. London: Sage Publications.
- Clark-Ibanez, M. (2004). Framing the social world with photo-elicitation interviews. *American Behavioral Scientist*, 47, 1507-1527.

- Cleveland, M. J., Gibbons, F. X., Gerrard, M., Pomery, E. A., & Brody, G. H. (2005). The impact of parenting on risk cognitions and risk behavior: A study of mediation and moderation in a panel of African American adolescents. *Child Development, 76*, 900 – 916.
- Coppens, N. M. (1986). Cognitive characteristics as predictors of children's understanding of safety and prevention. *Journal of Pediatric Psychology, 11*, 189-202.
- Creswell, J. W., Plano Clark, V., L., Guttman, M. L., & Hanson, W. E. (2003). Advanced mixed methods design. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research*. (pp.209-240). Thousand Oaks: Sage Publications.
- Cutcliffe, J. R. (2005). Adapt or adopt: developing and transgressing the methodological boundaries of grounded theory. *Journal of Advanced Nursing, 51*, 421-428.
- Cummings, P., Rivara, F. P., Thompson, R. S., & Reid, R. J. (2005). Ability of parents to recall the injuries of their young children. *Injury Prevention, 11*, 43 – 47.
- Damashek, A. L., Williams, N A., Sher, K. J., Peterson, L., Lewis, T., & Schweinie, W. (2005). Risk for minor childhood injury: an investigation of maternal and child factors. *Journal of Pediatric Psychology, 30*, 469-480.
- Davidson, L. (1987). Hyperactivity, antisocial behavior and childhood injury: a critical analysis of the literature. *Journal of Developmental Behavior Pediatrics, 8*, 335-340.
- Dell Clark, C. (1999). The autodriven interview. Photographic viewfinder into children's experience. *Visual Sociology, 14*, 39-50.
- Deiner, M. B., & Milich, R. (1997). Effects of positive feedback on the social interactions of boys with ADHD: a test of the self protective hypothesis. *Journal of Clinical Child Psychology, 26*, 256-265.
- DiScala, C., Lescohier, I., Barthel, M., & Li, G. (1998). Injuries to children with attention deficit hyperactivity disorder. *Pediatrics, 102*, 1415- 1421.
- Dixon-Woods, M., Agarwal, S., Young, B., Jones, D., & Sutton, A. (2004). Integrative approaches to qualitative and quantitative evidence. Healthy Development Agency. www.hda.nhs.us
- Dumas, D., & Pelletier, L. (1999). A study of self perception in hyperactive children. *American Journal of Maternal/Child Nursing, 24*, 12-19.

- Ellis, L. K., & Rothbart, M. K. (2001) Revision of the Early Adolescent Temperament Questionnaire. www.Bowdoin.edu/~sputnam/rothbart-temperament-questionnaires.
- Einarsdottir, J. (2005). Playschool in pictures: children's photographs as a research method. *Early Childhood Development and Care*, 175, 523-542.
- Erzberger, C., & Kelle, U. (2003). Making inferences in mixed methods: rules of integration. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research*. (pp.457-490). Thousand Oaks: Sage Publications.
- Farmer, J. E., & Peterson, L. (1995). Injury risk factors in children with attention deficit hyperactive disorder. *Health Psychology*, 14, 325-332.
- Farmer, T., Robinson, K., Elliott, S. J., & Eyles, J. (2006). Developing and implementing triangulation protocol for qualitative research. *Qualitative Health Research*, 16, 377-394.
- Frick, P. J. (1998). *Conduct Disorders and Serious Antisocial Behavior*. New York: Plenum Press.1998
- Frick, P. J., & Morris, A. S. (2004). Temperamental and developmental pathways to conduct problems. *Journal of Clinical Child and Adolescent Psychology*, 33, 54-68.
- Gardner, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: an experimental study. *Developmental Psychology*, 41, 625-635.
- Gerrard, M., Gibbons, F. X., & Gano, M. L. (2003). Adolescents' risk perceptions and behavioral willingness. In D. Romer (Ed.) *Reducing adolescent risk toward an integrated approach* (pp.75-83). Thousand Oaks: Sage Publications.
- Gielen, A., & Sleet, D. (2003). Application of behavior-change theories and methods to injury prevention. *Epidemiologic Reviews*, 25, 65-76.
- Glik, D., Kinsler, J., Todd, W. A., Clarke, L., Fazio, K., Miyashiro, R., Perez, M., Vielmetter, E., & Flores, R. C. (2006). Unintentional injury depictions in popular children's television programs. *Injury Prevention*, 11, 237-241.
- Glik, D., Kronenfeld, J., & Jackson, K. (1991). Predictors of risk perceptions of childhood injury among parents of preschoolers. *Health Education Quarterly*, 18, 285-301.

- Glik, D., Kronenfeld, J., & Jackson, K. (1993). Safety behaviors among parents of preschoolers. *Health Values, 17*, 18-27.
- Green, J., & Hart, L. (1998). Children's views of accident risks and prevention: a qualitative study. *Injury Prevention, 4*, 14-21.
- Green, M., Turner, C., Purdie, D. M., & McClure, R. (2003). Injury related risk behavior – a study of Australian skydiver. *Journal of Science and Medicine in Sport, 6*, 166-175
- Greene, J. C., & Caracelli, V. J. (2003). Making paradigmatic sense of mixed methods practice. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research*. (pp. 91 - 110). Thousand Oaks: Sage Publications.
- Greening, L., Stoppelbein, L., Chandler, C. C., & Elkin, T. D. (2005). Predictors of children's and adolescents' risk perception. *Journal of Pediatric Psychology, 30*, 425-435.
- Gresham, F. M., MacMillan, D. L., Bocian, K. M., Ward, S. L., & Forness, S. R. (1998). Comorbidity of hyperactivity – impulsivity – inattention and conduct problem: risk factors in social, affective and academic domains. *Journal of Abnormal Psychology, 26*, 393-406.
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The landscape of qualitative design* (pp. 195-222). California: Sage.
- Hapgood, R., Kendrick, D., & Marsh, P. (2001). Do self reported safety behaviors predict childhood unintentional injuries? *Injury Prevention, 7*, 14-17.
- Harris, M. J., & Kotch, J. B. (1994). Unintentional infant injuries: sociodemographic and psychosocial factors. *Public Health Nursing, 11*, 90- 97.
- Health Canada. (1998). *Canadian Injury Data*. Ottawa, Ontario: Health Protection Branch, Bureau of Reproductive and Child Health.
- Hinshaw, S. (1987). On the distinction between attentional deficits/hyperactivity and conduct problems/aggression in child psychopathology. *Psychological Review, 101*, 443-463.
- Hoare P., & Beattie, T. (2003). Children with attention deficit hyperactivity disorder and attendance at hospital. *European Journal of Emergency Medicine, 10*, 98-100.
- Horn, W. F., Wagner, A. L., & Ialongo, N. (1989). Sex differences in school-aged children with pervasive attention deficit hyperactivity disorder. *Journal of Child Psychology, 17*, 109 – 125.

- Hoza, B., Pelham, W. E., Milich, R., Pillow, D., & McBride, K. (1993). The self perceptions and attributions of attention deficit disordered and nonreferred boys. *Journal of Abnormal Child Psychology*, 21, 271 – 286.
- Hoza, B., Gerdes, A. C., Hinshaw, S. P., Arnold, L. E., Pelham, W. E., Molina, B. S., Abikoff, H. B., Epstein, J. N., Greenhill, L. L., Hechtman, L., Odbert, C., Swanson, J. M., & Wigal, T. (2004). Self-perceptions of competence in children with ADHD and comparison children. *Journal of Consulting and Clinical Psychology*, 72, 383 - 391.
- Hoza, B., Pelham, W. E., Waschbusch, D. A., Kipp, H. L., & Owens, J. S. (2001). Academic task persistence of normally achieving ADHD and control boys: Performance, self-evaluations, and attributions. *Journal of Consulting and Clinical Psychology*, 69, 271-283.
- Hoza, B., Waschbusch, D. A., Pelham, W. E., Molina, B., & Milich, R. (2000). Attention-deficit/hyperactivity disordered and control boys' responses to social success and failure. *Child Development*, 71, 432-446.
- Hoza, P., Pelham, W. E., Dobbs, J., Owens, J. S., & Pillow, D. R. (2002). Do boys with attention-deficit/hyperactivity disorder have positive illusory self-concepts? *Journal of Advanced Psychology*, 111, 268-278.
- Johnson, B., & Turner, L. A. (2003). Data collection strategies in mixed methods research. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research*. (pp. 297-320). Thousand Oaks: Sage Publications.
- Joffe, H. (2003). Risk: from perception to social representation. *British Journal of Social Psychology*, 42, 55-73.
- Jones, A., & Bugge, C. (2006). Improving understanding and rigor through triangulation: an exemplar based on patient participation interaction. *Journal of Advanced Nursing*, 55, 612 - 621.
- Kaufert, P., & O'Neil, J. O. (1993). Analysis and dialogue of risk in childbirth & clinicians. Epidemiology & Inuit Women. In S. Lindenbaum and M. Lock (Eds.) *Knowledge, power and practice: The anthropology of medicine and everyday life*. (pp. 32-55). University California Press: California.
- Kelley, P., Mayall, B., & Hood, S. (1997). Children's accounts of risk. *Childhood*, 14, 305-324.
- Kendall, J., Hatton, D., Beckett, A., & Leo, M. (2003). Children's accounts of attention-deficit/hyperactivity disorder. *Advances in Nursing Science*, 26, 114-130.

- Kennedy, C. M., & Lipsitt, L. P. (1998). Risk-taking in preschool children. *Journal of Pediatric Nursing, 13*, 77-84.
- Kennedy, C. M., & Rodriguez, D. A. (1999). Risk taking in young Hispanic children. *Journal of Pediatric Care, 13*, 126-135.
- Kontos, A. P. (2004). Perceived risk, risk taking, estimation of ability and injury among adolescent sport participants. *Journal of Pediatric Psychology, 29*, 447-455.
- Koven, R., McColl, M. A., Ellis, P., & Pickett, W. (2005). Multiple risk behaviors and its association with head and neck injuries: a national analysis of young Canadians. *Preventive Medicine, 41*, 240-246.
- Kvale, S. (1996). *InterViews. An introduction to qualitative research interviewing*. Thousand Oaks: Sage Publications.
- Lahey, B. B., Miller, T. I., Gordon, R. A., & Riley, A. W. (1999). Developmental epidemiology of the disruptive behavior disorders. In H. C. Quay & A. E. Hogan (Eds.), *Handbook of disruptive behavior disorders* (pp. 23-48). New York: Kluwer Academic / Plenum Publishers.
- Lalloo, R. & Sheiham, A. (2003). Risk factors for childhood major and minor head and other injuries in a nationally representative sample. *Injury, 34*, 261-266.
- Mantzoukas, S. (2004). Issues of representation within qualitative inquiry, *Qualitative Health Research, 14*, 994-1007.
- Massetti, G. M., Pelham, W. E., & Gnagy, E. M. (2005, June). Situational variability of ADHD, ODD, and CD: Psychometric properties of the DBD interview and rating scale for an ADHD sample. Paper presented at the Annual Meeting of the International Society for Research in Child and Adolescent Psychopathology, New York, NY.
- Matthys, W., Cuperus, J. M., & Van Engeland, H. (1999). Deficient social problem solving in boys with ODD/CD, with ADHD, and with both disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 38*, 311-321.
- Maxcy, S. (2003). Pragmatic threads in mixed methods research in the social sciences: the search for multiple modes of inquiry and the end of the philosophy of formalism. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research*. (pp. 51-90). Thousand Oaks: Sage Publications.
- McLeod, R., Stockwell, T., Rooney, R., Stevens, M., Phillips, M., & Jelinek, G. (2003). The influence of extrinsic and intrinsic risk factors on the probability of sustaining an injury. *Accident Analysis & Prevention, 35*, 71-80.

- McWhirter, J. M., & Wetton, N. M. (1994). Children's perceptions of risk. *Journal of Health and Safety, 10*, 21-29.
- Meaux, J. B. (2000). Stop, look, listen: the challenge to children's with ADHD. *Issues in Comprehensive Pediatric Nursing, 23*, 1-13.
- Milich, R., & Dodge, K. A. (1984). Social information processing in child psychiatric populations. *Journal of Abnormal Child Psychology, 12*, 471-490.
- Milich, R., & Lorch, E. P. (1994). Television viewing methodology to understand cognitive processing of ADHD children. In T. H. Ollendick & R. J. Prinz (Eds.), *Advances in Clinical Child Psychology* (pp. 177-201). New York: Plenum Press.
- Miller, S. (2003). Impact of mixed methods and design on inference quality. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research* (pp. 423-456). Thousand Oaks: Sage Publications.
- Mitchell, W. A., Crawshaw, P., Bunton, R., & Green, E. E. (2001). Situating young people's experiences of risk and identity. *Health, Risk & Society, 3*, 217-233.
- Molina, B. S., Abikoff, H. B., Epstein, J. N., Greenhill, I. L., Hechtman, L., Odbert, C., Seanson, J. M., & Wigal, T. (2004). Self-perceptions of competence in children with ADHD and comparison children. *Journal of Consulting and Clinical Psychology, 72*, 382-391.
- Morgan, D. L. (1998). Practical strategies for combining qualitative and quantitative methods: applications to health research. *Qualitative Health Research, 8*, 362-376.
- Morgan, D. L. (2007). Paradigms lost and pragmatism regained. Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research, 1*, 48 -76.
- Morrongiello, B. A. (2004). Do children's intentions to risk take relate to actual risk taking? *Injury Prevention, 10*, 62 -64.
- Morrongiello, B. A. (2005). Caregiver supervision and child-injury risk: I. Issues in defining and measuring supervision; II. Findings and directions for future research. *Journal of Pediatric Psychology, 30*, 536-552.
- Morrongiello, B. A., Corbett, M., McCourt, M., & Johnston, N. (2005). Understanding unintentional injury risk in young children II. The contribution of caregiver supervision, child attributes, and parent attributes. *Journal of Pediatric Psychology, 31*, 540-551.

- Morrongiello, B. A., & Dawber, T. (1998). Toddlers' and mothers' behavior in an injury-risk situation: implications for sex differences in childhood injuries. *Journal of Applied Developmental Psychology, 19*, 625-639.
- Morrongiello, B. A., & Kiriakou, S. (2004). Parents' home-safety practices for preventing six types of childhood injuries: What do they do, and why? *Journal of Pediatric Psychology, 29*, 285 -297.
- Morrongiello, B.A., Midgett, C., & Shields, R. (2001). Don't run with scissors; young children's knowledge of home safety rules. *Journal of Pediatric Psychology, 26*, 105-115.
- Morrongiello, B. A., Ondejko, L., & Littlejohn, A. (2004). Understanding toddlers' in-home injuries: I. Context, correlates, and determinants. *Journal of Pediatric Psychology, 29*, 415-431.
- Morrongiello, B. A., & Rennie, H. (1998). Why do boys engage in more risk taking than girls? The role of attributions, beliefs, and risk appraisals. *Journal of Pediatric Psychology, 23*, 33-43.
- Morrongiello, B. A., Walpole, B., & Lasenby, J. (2006). Understanding children's injury-risk behavior: Wearing safety gear can lead to increased risk taking. *Accident Analysis & Prevention*, doi:10.1016/j.aap.2006.10.006.
- Morse, J. M. (2003). Principles of mixed methods and multimethod research design. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research* (pp. 189- 208). Thousand Oaks: Sage Publications.
- Moshiro, C., Heuch, I., Astom, A. N., Setel P., & Kvale, G. (2005). Effect of recall on estimation of non-fatal injury rates: a community based study in Tanzania. *Injury Prevention, 11*, 48 -52.
- Munro, S. A., van Niekerk, A., & Seedat, M. (2006). Childhood unintentional injuries: the perceived impact of the environment, lack of supervision and child characteristics. *Child: Care, Health & Development, 32*, 269-279.
- Musselwhite, C. (2006). Attitudes towards vehicle driving behavior: categorizing and contextualizing risk. *Accident Analysis and Prevention, 38*, 324-334.
- O'Kane, C. (2000). The development of participatory techniques: facilitating children's views about decisions which affect them. In P. Christensen & A. James (Eds.). *Research with children perspectives and practices* (pp. 136-159). London: Falmer Press.

- Ohan, J. L., & Johnston, C. (2002). Are the performance overestimates given by boys with ADHD self-protective? *Journal of Clinical Child and Adolescent Psychology, 31*, 230-241.
- Onwuegbuzie, A. J., & Teddlie, C. (2003). A framework for analyzing data in mixed methods research. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research* (pp. 351- 384). Thousand Oaks: Sage Publications.
- Owens, J. S., & Hoza, B. (2003). The role of inattention and hyperactivity/impulsivity in the positive illusory bias. *Journal of Clinical and Consulting Psychology, 71*, 680-691.
- Pastor, P. N., & Reuben, C. A. (2006). Identified attention-deficit/hyperactivity disorder and medically attended, nonfatal injuries: US school-age children, 1997-2002. *Ambulatory Pediatrics, 6*, 38 -44.
- Pelham, W. E., Gnagy, E. M., Greenslade, K. E., & Milich, R. (1992). Teacher ratings of DSM-III-R symptoms for the disruptive behavior disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 31*, 210-218.
- Peterson, L., & Saldana, L. (1996). Accelerating children's risk for injury: mother's decisions regarding common safety rules. *Journal of Behavioral Medicine, 19*, 17-331.
- Pickett, W., Dostaler, S., Craig, W., Janssen, I., Simpson, K., Shelley, S. D., & Boyce, W. F. (2006). Association between risk behavior and injury and the protective roles of social environments: an analysis of 7235 Canadian school children. *Injury Prevention, 12*, 87 - 92.
- Pickett, W., Garner, M. J., Boyce, W. F., & King, M. (2002). Gradient in risk for youth injury associated with multiple-risk behaviors: a study of 11,329 Canadian adolescents. *Social Science and Medicine, 55*, 1055-1068.
- Pless, I. B., Magdalinos, H., & Hagel, B. (2006). Risk-compensation behavior in children. Myth or Reality? *Archives of Pediatric Adolescent Medicine, 160*, 610-614.
- Plumert, J. M. (1995). Relations between children's overestimation of their physical abilities and accident proneness. *Developmental Psychology, 31*, 866-876.
- Plumert, J. M., & Schwebel, D. C. (1997). Social and temperamental influences on children's overestimation of their physical abilities: links to accidental injuries. *Journal of Experimental Child Psychology, 67*, 317-337.

- Prosser, J., & Schwarz, D. (1998). Photographs within the sociological research process. In J. Prosser (Ed.) *Image-based research. A source book for qualitative researchers* (pp. 115-130). Pennsylvania: Falmer Press.
- Prout, A. (2002). Researching children as social actors: an introduction to the children 5-16 programme. *Children & Society*, 16, 67-76.
- Public Health Agency of Canada. (2000). <http://phac-aspc.gc.ca>.
- Punch, S. (2002). Research with children. The same or different from research with adults? *Childhood*, 9, 321-341.
- Rapp, R. (1993). Accounting for amniocentesis. In S. Lindenbaum and M. Lock (Eds.). *Knowledge, power and practice: the anthropology of medicine and everyday life* (pp. 55-79). University California Press: California.
- Rivara, F. P. (1995). Developmental and behavioral issues in childhood injury prevention. *Developmental and Behavioral Pediatrics*, 16, 362-370.
- Rivara, F. P. (2002). Prevention of injuries to children and adolescents. *Injury Prevention*, 8, iv5-iv8.
- Roberts, H., Smith, S. J., & Bryce, C. (1995). *Children at Risk? Safety as a Social Value*. Philadelphia: Open University Press.
- Robertson, A. (2002). Embodying risk, embodying political rationality: women's accounts of risks for breast cancer. *Health, Risk and Society*, 2, 219-235.
- Rolfe, G. (2006). Validity, trustworthiness and rigour: quality and the idea if qualitative research. *Journal of Advanced Nursing*, 53, 304-310.
- Rowe, R., Maughan, B., & Goodman, R. (2004). Childhood psychiatric disorders and unintentional injuries: findings from a national cohort study. *Journal of Pediatric Psychology*, 29, 119-130.
- Russell, K. M. (1996). Health beliefs and social influence in home safety practices of mothers with preschool children. *Image: Journal of Nursing Scholarship*, 28, 59-64.
- Russell, K. M. (1998). Preschool children at risk for repeat injuries. *Journal of Community Health Nursing*, 15, 179-190.
- Saluga, G., Brenner, R., Morrongiello, B. A., Haynie, D., Rivera, M., Cheng, T. L. (2004). The role of supervision in child injury risk: definition, conceptual and measurement issues. *Injury Control and Safety Promotion*, 11, 17 -22.

- Sandelowski, M. (2003). Tables or tableaux? The challenges of writing and reading mixed methods studies. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research* (pp. 321- 350). Thousand Oaks: Sage Publications.
- Schwebel, D. C. (2004a). Temperament risk factors for children's unintentional injury: the role of impulsivity and inhibitory control. *Personality and Individual Differences*, 37, 567-578.
- Schwebel, D. C. (2004b). The role of impulsivity in children estimation of physical estimation: implications for children's unintentional injury risk. *American Journal of Orthopsychiatry*, 74, 584-588.
- Schwebel, D. C., & Barton, B. K. (2005). Contributions of multiple risk factors to child injury. *Journal of Pediatric Psychology*, 30, 553-561.
- Schwebel, D. C., & Bounds, M. L. (2003). The role of parents and temperament in children's estimation of physical ability: Links to unintentional injury prevention. *Journal of Pediatric Psychology*, 28, 505-516.
- Schwebel, D. C., Hodgins, J. B., & Sterling, S. (2006). How mothers parent their children with behavior disorders: implications for unintentional injury risk. *Journal of Safety Research*, 37, 167-173.
- Schwebel, D. C., Brezaussek, C. M., Ramey, S. L., & Ramey, C. T. (2004). Interactions between child behavior patterns and parenting: implications for children's unintentional injury risk. *Journal of Pediatric Psychology*, 29, 93 -104.
- Schwebel, D. C., & Plumert, J. M. (1999). Longitudinal and concurrent relations among temperament, ability estimation, and injury proneness. *Child Development*, 70, 700-712.
- Schwebel, D. C., Speltz, M., Jones, K., & Bardina, P. (2002). Unintentional injury in preschool boys with and without early onset of disruptive behavior. *Journal of Pediatric Psychology*, 27, 727-737.
- Scott, J. (2000). Children as respondents; the challenge for quantitative methods. In P. Christensen & A. James, (Eds.), *Research with children. perspectives and practices* (pp. 98-119). London: Falmer Press.
- Sellstrom, E., & Bremberg, S. (1996). Perceived social norms as crucial determinants of mother's injury-preventative behavior. *Acta Paediatrica*, 85, 702-707.
- Shure, M. B. (2003). A problem-solving approach to preventing early high-risk behaviors in children and preteens. In D. Romer (Ed.) *Adolescent risk taking toward an integrated approach* (pp. 85-93). Thousand Oaks: Sage Publications.

Slovic, P. (1987). Perceptions of risk. *Science*, 236, 280-285.

Slovic, P. (2001). The risk game. *Journal of Hazardous Material*, 86, 17-24.

Slovic, P., & Peters, E. (2006). Risk perception and affect. *Current Directions in Psychological Science*, 15, 322 – 325.

SMARTRISK, <http://www.smartrisk.ca>

Soubhi, H., Raina, P., & Kohen, D. (2004). Neighbourhood, family, and child predictors of childhood injury in Canada. *American Journal of Health Behavior*, 28, 397 – 409.

Speltz, M. L., Gonzales, N., Sulzbacher, S., & Quan, L. (1990). Assessment of injury risk in young children: a preliminary study of the injury behavior checklist. *Journal of Pediatric Psychology*, 15, 373-383.

Steinberg, L. (2003). Is decision making the right framework for research on adolescent risk taking? In D. Romer (Ed.) *Adolescent risk taking toward an integrated approach*. (pp. 18-25). Thousand Oaks: Sage Publications.

Stevens, J., Quittner, A. L., Zuckerman, J. B., & Moore, S. (2002). Behavior inhibition, self-regulation of motivation in children with attention deficit hyperactive attention disorder. *Developmental Neuropsychology*, 21, 117 -139.

Streubert, H. J., & Carpenter, D. R. (1999). *Qualitative research in nursing. Advancing the humanistic imperative*, 2nd ed. Philadelphia: Lippincott.

Tashakkori, A., & Creswell, J. W. (2007). The new era of mixed methods. *Journal of Mixed Methods*, 1, 3 – 7.

Tashakkori, A., & Teddlie, C. (2003). The past and future of mixed methods research: from data triangulation to mixed model designs. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research* (pp. 671-702). Thousand Oaks: Sage Publications.

Taylor-Gooby, P. (2002). Varieties of risk. *Health, Risk and Society*, 4, 109-111.

Teddlie, C., & Tashakkori, A. (2003). Major issues and controversies in the use of mixed methods in the social and behavioral sciences. In A. Tashakkori and C. Teddlie (Eds.) *Handbook of mixed methods in social & behavioral research* (pp. 3-50). Thousand Oaks: Sage Publications.

Thompson, N. J., & Morris, R. D. (1994). Predicting injury risk in adolescent football players: the importance of psychological variables. *Journal of Pediatric Psychology*, 19, 415-429.

- Thompson, D. C., Thompson, R. S., & Rivara, F. P. (2001). Risk compensation theory should be subject to systematic reviews of the scientific evidence. *Injury Prevention*, 7, 86-88.
- Tulloch, J., & Lupton, D. (2003). *Risk and Everyday Life*. London: Sage Publications.
- Turner, C., McClure, R., & Pirozzo, S. (2004). Injury and risk-taking behavior a systematic review. *Accident Analysis and Prevention*, 36, 93-101.
- UNICEF, 2001. A league table of child deaths by injury in rich nations. Innocenti Report Card No. 2, February 2001. Florence: UNICEF, Innocenti Research Centre.
- Van Aken, C., Junger, M., Verhoeven, M., van Aken, M. A. G., & Dekovic, M. (2006). Externalizing behaviors and minor unintentional injuries in toddlers: common risk factors? *Journal of Pediatric Psychology*. doi:10.1093/jpepsy/jsj118.
- Wadsworth, J., Burnell, I., Taylor, B., & Butler, N. (1983). Family type and accidents in preschool children. *Journal of Epidemiology and Community Health*, 37, 100 - 104.
- Wang, C., & Burris, M. (1997). Concept, methodology and use of photovoice for participatory needs assessment. *Health Education and Behavior*, 24, 368 - 387.
- Wang, C., & Redwood-Jones, Y. (2001). Photovoice Ethics. *Health Education and Behavior*, 28, 560-572.
- Wazana, A. (1997). Are there injury-prone children? A critical review of the literature. *Canadian Journal of Psychiatry*, 42, 602-610.
- Wilkins, K., & Park, E. (2004). Health Reports. Statistics Canada Catalogue 82-003-XIE, 15 (3), 43-50.
- Woodhead, M., & Faulkner, D. (2000). In P. Christensen & A. James (Eds.), *Research with children. Perspectives and practices* (pp. 9-35). London: Falmer Press.
- Woodward, M. (1999). *Epidemiology study design and data analysis* (pp. 89-92). Boca Raton: Chapman and Hall/CRC.
- Wright, K. D., Waschbusch, D. A., & Frankland, B. W. (in press). Combining data from parent rating and parent interview when assessing ADHD. *Journal of Psychopathology and Behavioral Assessment*.

Appendix A. Study Invitation Poster



***“Risk Assessment Among Children
with and without ADHD”***

Research Project

Are you between 10 and 12 years old?

If you answered “yes”, you may be eligible to take part in a study looking
at how children make decisions about risk.

If you would like to receive more information about how you can become
involved in this study, please call:

Beth Bruce

at

470-8037

or Toll free

1-888-470-5888

Leave your name and number and your call will be returned.

**If you become
a study participant, you will be compensated for your time and commitment to
the study**

Appendix B. Letter of Introduction



Letter of Introduction

Study Title: Risk assessment among Children with and without ADHD

Investigator: Beth Bruce, RN, PhD (c), Interdisciplinary Research, IWK Health Centre; Faculty of Graduate Studies, Dalhousie University, Principal Investigator

Understanding why children have accidents is an important step in learning how to prevent them. One way to better understand is to find patterns and try to change those patterns. For example, we know that boys and older children or children who have Attention Deficit Hyperactivity Disorder (ADHD) are more likely to have an accident. Although we know a fair bit about boys and older children, we know very little about why children with ADHD have more accidents. Children's ideas about risk may be one possible reason why children with ADHD experience more accidents. You are being invited to participate in this study to help us better understand whether risk is associated with injuries.

What Will Happen

Taking part in this study means you will have 2 visits with the researcher, Beth Bruce. At the first visit, this information form will be explained and you will be asked to sign the same form as your parent/guardian signs saying that you want to be in the study. For this study, you will be asked fill out a questionnaire about your behavior. You will then be asked to decide whether you can do a task such as reaching for a toy on a shelf and try doing some tasks such as reaching and jumping and your parent will fill in some forms. Some children will also be asked to complete another task using a camera. They will be given a camera, instructed on how to use the camera, and asked to take 12 pictures of things that help them think about safety and risk. The pictures may be of their place of play, home, school or sports activities that show how they think about risk/safety. After two weeks, I will develop the pictures and ask each child to meet with me for a second visit to tell me what your pictures are about, what is interesting about them and how they make them think about safety and risk. This conversation will be recorded on a tape recorder.

You do not have to go in this study. If you go in this study and then change your mind that is okay. You will receive \$20.00 in movie money for completing the study. Any information that you give to me will be kept private. Your name will not be on any study papers and no one but study staff will know that it was you who was in the study.

Contacts

If you and your child are interested in participating, please contact Beth Bruce by email, beth.bruce@iwk.nshealth.ca, or a message can be left by phone, 470-8037 or toll free 1-888-470-5888. If you have any questions or concerns at any time during the study, I am available at the same numbers as above.

Sincerely,

Beth Bruce

Appendix C. Child Assent



Child Assent

Study Title: Risk assessment among Children with and without ADHD

Investigator: Beth Bruce, RN, PhD (c), Interdisciplinary Research, IWK Health Centre; Faculty of Graduate Studies, Dalhousie University, Principal Investigator

Understanding why children have accidents is an important step in learning how to prevent them. One way to better understand is to find patterns and try to change those patterns. For example, we know that boys and older children or children who have Attention Deficit Hyperactivity Disorder (ADHD) are more likely to have an accident. Although we know a fair bit about boys and older children, we know very little about why children with ADHD have more accidents. Children's ideas about risk may be one possible reason why children with ADHD experience more accidents. You are being invited to participate in this study to help us better understand whether risk is associated with injuries.

What Will Happen

Taking part in this study means you will have 2 visits with the researcher, Beth Bruce. At the first visit, this information form will be explained and you will be asked to sign the same form as your parent/guardian signs saying that you want to be in the study. For this study, you will be asked fill out a questionnaire about your behavior. You will then be asked to decide whether you can do a task such as reaching for a toy on a shelf and try doing some tasks such as reaching and jumping and your parent will fill in some forms. Some children will also be asked to complete another task using a camera. They will be given a camera, instructed on how to use the camera, and asked to take 12 pictures of things that help them think about safety and risk. The pictures may be of their place of play, home, school or sports activities that show how they think about risk/safety. After two weeks, I will develop the pictures and ask each child to meet with me for a second visit to tell me what your pictures are about, what is interesting about them and how they make them think about safety and risk. This conversation will be recorded on a tape recorder.

You do not have to go in this study. If you go in this study and then change your mind that is okay. You will receive \$20.00 in movie money for completing each phase of the study. Any information that you give to me will be kept private. Your name will not be on any study papers and no one but study staff will know that it was you who was in the study.

Contacts

If you have any questions or concerns at any time during the study, I am available by email, beth.bruce@iwk.nshealth.ca or a message can be left by phone, 470-8037 or toll free 1-888-470-5888.

Appendix D. Information and Authorization Form



Information and Authorization Form

Study Title: Risk assessment among Children with and without ADHD

Investigator: Beth Bruce, RN, PhD (c), Interdisciplinary Research, IWK Health Centre; Faculty of Graduate Studies, Dalhousie University, Principal Investigator

Introduction

Your child is being invited to take part in the research study named above. It is important that you understand the purpose of the study, how it may affect your child, the risks and benefits of taking part in this study and what you and your child will be asked to do, before you decide if you want your child to take part. This information and authorization form is to help you decide if it is in your child's best interest to take part in this study. Your child does not have to take part in this study. Taking part is entirely voluntary (your choice). If you have any questions that this form does not answer, I will be happy to give you further information.

Purpose of the Study

Understanding why children have accidents is an important step in learning how to prevent them. One way to better understand is to find patterns and try to change those patterns. For example, we know that children who are male, who are older or who have a behavior disorder, such as attention deficit/hyperactivity disorder (ADHD) are more likely to suffer an injury. Although we know a fair bit about gender and age, we know very little about why children with ADHD have more injuries. Children's assessment of risk is one possible reason why children with ADHD experience more injuries. You are being invited to participate in this study to help us better understand whether risk is associated with injuries. I would like to learn more about how children decide whether something is risky or safe. The study is under my direction, Beth Bruce.

Study Design

Sixty children, 30 children with a medical diagnosis of Attention Deficit Hyperactive Disorder (ADHD) and 30 with no ADHD between the ages of 10-12 years are being asked to participate in this study. Children with ADHD will be identified from the IWK clinic database and volunteers from the community will be sought for children with no ADHD diagnosis. All children will participate in the first phase of the study, completion of the physical tasks. This will require one visit in which this information and authorization form will be explained and signed if you agree to have your child participate. You will be asked a few questions about your child's health before he/she is enrolled in the study to make sure there are no factors that would exclude him/her from participating. Your child will be asked to complete a questionnaire and four supervised

tasks of reaching and stepping that should take about 45 minutes to complete and you will be asked to complete two questionnaires about injuries and child behaviors.

Twenty of the sixty children, 10 children with ADHD and 10 children with no ADHD will be asked to complete a second task. These children will be selected at random based on their injury history of multiple or no injuries. If your child participates in the second task, your child will be given a camera and instructed on how to use the camera and will be asked to take 12 photographs of things, places, or people that represent safe and unsafe ideas. The pictures may be of their place of play, home, school or sports activities that your child thinks will show how he/she thinks about risk/safety. After two weeks, I will process the photographs and ask your child to meet with me to describe his/her photos, what is interesting about them and how they make him/her think about safety and risk. This visit will be about 45 minutes and the conversation will be tape recorded for analysis. The visit can be arranged at your home or place of convenience for you.

Your child does not have to go in this study. If you and your child go in this study and then change your mind that is okay. Any information that your child gives to me will be kept private. Your child's name will not be on any study papers and no one but study staff will know who was in the study.

Potential Harms

Your child will be advised that there is no wrong picture to take except taking a picture that could put them personally at risk. For example, they will be instructed it is okay to take a picture of a tree but not to climb the tree to take the picture. You will be asked to provide supervision of photography sessions to reinforce this instruction. Your child will be asked not to photograph other individuals. If your child should photograph any recognizable individual, the photograph will be destroyed and not used in the study. If your child should experience any injury, you should seek appropriate medical attention and notify me as soon as possible.

Potential Benefits

There are no guarantees that your child will personally experience any benefits from participating in this study although there is the possibility that he/she may think about safety and risk with more awareness. Knowledge gained from this study may help develop an approach to prevent injuries for children.

Alternatives to the Study

Before you decide to enroll in this study, you should know that your child does not have to take part on the study. There is presently no known effective prevention of childhood injuries among children with ADHD.

Withdrawal from Participation

Participation in the study is entirely voluntary (your choice). You may decide to not enroll your child or you may wish to withdraw him/her from the study at any time. If you chose to withdraw all data collected will be withdrawn. This will not affect your child's care by his/her doctor or at the IWK Health Centre in any way. Your child's participation

in the study may be ended if in the opinion of the study staff it is not safe or reasonable for him/her to continue. If the study is changed in any way that could affect your decision to continue to have your child to participate, you will be told about the changes and you may be asked to sign a new authorization form.

Confidentiality

Any information that is learned about your child will be kept private. Study staff will have access to your child's study and medical records. In addition, the records may be shown to personnel of Research Services Office of the IWK Health Centre and the regulatory authorities in Canada. If the results of the study are published in the medical literature, the publication will not contain any information that would identify you or your child. Study records will be stored in a locked area and will be kept for 10 years past the age of majority as required by the IWK Research Ethics Board.

Costs and Reimbursement

Participation in the study will not result in any expenses to you or your child. The camera and processing will be provided to your child free of charge. In recognition of you and your child's time and commitment to the study, parking expenses will be covered and your child will receive \$20 in movie money for completion of each phase of the study.

Research Rights

Your signature on this form will show that you have understood to your satisfaction the information about the research study. If your child becomes ill or injured as a result of participating in this study, you should seek medical attention. You should be aware that no provision has been made to compensate you or your child for damages (e.g., lost time from work, disability or discomfort).

By signing this document you are not waiving any of your or your child's legal rights, nor are you releasing the investigator and institution from their legal and professional responsibilities.

If you have any questions at any time during or after the study about these rights or about research in general and you would like an independent opinion, you may contact the Research Office of the IWK Health Centre at 470-8765, Monday to Friday between 9am and 5 pm.

Contact Person

If you have questions or concerns following your child's enrollment, you may call the investigator, Beth Bruce at 470-8037, toll free 1-888-470-5888 or email beth.bruce@iwk.nshealth.ca. In an emergency, you should contact your family physician or go to the Emergency Department. In the event that participation in this study leads to any reactions or serious events, please contact the investigator as soon as possible.

Communication of Results

Research results will be made available to you at the completion of the study. Please contact the researcher, Beth Bruce, at 470-8037 or beth.bruce@iwk.nshealth.ca if you wish to have a copy of the results.

Would you like to receive a copy of the results of the study

Yes _____ No _____

Address: _____

Study Title: Risk assessment among Children with and without ADHD

Participant ID: _____ Participant INITIALS: _____

Parental or Guardian Authorization

I have read or had read to me this information and authorization form and have had the chance to ask questions which have been answered to my satisfaction before signing my name. I understand the nature of the study and I understand the potential risk of reaction. I understand that I have the right to withdraw my child from the study at any time without affecting my child's care in any way. I have received a copy of the Information and Authorization Form for future reference. I freely agree to have my child participate in this research study.

 Name of Child Participant (Print) Signature of Child Participant

 Name of Parent/Guardian (Print) Signature of Parent (Guardian)

Date: _____ Time: _____

Statement by Person Providing Information on Study

I have explained the nature and demands of the research study and judge that the Parent/Guardian/Participant named above understands the nature and demands of the study.

Name (Print) _____ Position _____

Signature: _____ Date: _____ Time: _____

Statement by Person Obtaining Consent

I have explained the nature of the consent process to the person authorized and judge that they understand that participation is voluntary and that they/their child may withdraw at any time from participating.

Name (Print) _____ Position _____

Signature: _____ Date: _____ Time: _____

Other people present at time of signing:

Name (Print) _____ Position _____

Signature: _____ Date: _____ Time: _____

Appendix E. Demographic Profile

Demographic Profile

Participant ID: _____

Age: _____

Gender: M () F ()

Injury History: Please record all injuries requiring medical attention (Family doctor office visit, emergency room visit or hospital stay) that your child has experienced since beginning elementary school (age five years).

Year and/or age of child	Type of injury	Office visit/ emergency room/ hospital stay	Comments

Appendix F. Disruptive Behavior Disorder Rating Scale

Participant ID: _____

Your Relationship to Child: Mother Father Guardian

INSTRUCTIONS: Check the column that best describes this child. You may put DK next to any item that you don't know or don't wish to answer	Not At All	Just A Little	Pretty Much	Very Much
1. Often interrupts or intrudes on others (e.g., butts into conversations or games)				
2. Has run away from home overnight at least twice while living in parental or parental surrogate home (or once without returning for a lengthy period)				
3. Often argues with adults				
4. Often lies to obtain goods or favors or to avoid obligations (i.e., 'cons' others)				
5. Often initiates physical fights with other members of his or her household				
6. Has been physically cruel to people				
7. Often talks excessively				
8. Has stolen items of nontrivial value without confronting a victim (e.g., shoplifting, but without breaking and entering; forgery)				
9. Is often easily distracted by extraneous stimuli				
10. Often engages in physically dangerous activities without considering possible consequences (not for the purpose of thrill-seeking), e.g., runs into street without looking				
11. Often truant from school, beginning before age 13 years				
12. Often fidgets with hands or feet or squirms in seat				
13. Is often spiteful or vengeful				
14. Often swears or uses obscene language				
15. Often blames others for his or her mistakes or misbehavior				
16. Has deliberately destroyed others' property (other than by fire setting)				
17. Often actively defies or refuses to comply with adults' requests or rules				
18. Often does not seem to listen when spoken to directly				
19. Often blurts out answers before questions have been completed				
20. Often initiates physical fights with others who do not live in his or her household (e.g., peers at school or in the neighborhood)				

INSTRUCTIONS: Check the column that best describes this child. You may put DK next to any item that you don't know or don't wish to answer

	Not At All	Just A Little	Pretty Much	Very Much
21. Often shifts from one uncompleted activity to another				
22. Often has difficulty playing or engaging in leisure activities quietly				
23. Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities				
24. Is often angry and resentful				
25. Often leaves seat in classroom or in other situations in which remaining seated is expected				
26. Is often touchy or easily annoyed by others				
27. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)				
28. Often loses temper				
29. Often has difficulty sustaining attention in tasks or play activities				
30. Often has difficulty awaiting turn				
31. Has forced someone into sexual activity				
32. Often bullies, threatens, or intimidates others				
33. Is often 'on the go' or often acts as if 'driven by a motor'				
34. Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)				
35. Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)				
36. Has been physically cruel to animals				
37. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)				
38. Often stays out at night despite parental prohibitions, beginning before age 13 years				
39. Often deliberately annoys people				
40. Has stolen while confronting a victim (e.g., mugging, purse snatching, extortion, armed robbery)				
41. Has deliberately engaged in fire setting with the intention of causing serious damage				
42. Often has difficulty organizing tasks and activities				
43. Has broken into someone else's house, building, or car				
44. Is often forgetful in daily activities				
45. Has used a weapon that can cause serious physical harm to others (e.g., a bat, brick, broken bottle, knife, gun)				

Appendix G. Scoring Disruptive Behavior Disorder Rating Scale

University at Buffalo
Center for Children and Families
318 Diebold Hall
3435 Main Street
Buffalo, NY 14214
716-829-2244

SCORING INSTRUCTIONS FOR THE DISRUPTIVE BEHAVIOR DISORDER RATING SCALE

There are two ways to determine if a child meets the criteria for DSM IV diagnoses of Attention-Deficit/Hyperactivity Disorder, Oppositional Defiant Disorder, or Conduct Disorder. The first method involves counting symptoms for each disorder using the Disruptive Behavior Disorders (DBD) rating scale. The second method involves comparing the target child's factor scores on the DBD Rating Scale to established norms. The factor scores method is preferable for diagnosis of females (e.g., using a 2 SD cutoff), as the symptom counting method often results in underdiagnosis of female children. Please note that Items 10, 14, and 21 are from DSM-III-R and are not included in the scoring for a DSM-IV diagnosis.

Method 1: Counting Symptoms

To determine if a child meets the symptom criteria for DSM IV diagnoses of Attention-Deficit/Hyperactivity Disorder, Oppositional Defiant Disorder, or Conduct Disorder as measured by the DBD Parent / Teacher Rating Scale, count the number of symptoms that are endorsed "pretty much" or "very much" by either parent or teacher in each of the following categories: Note that impairment and other criteria must be evaluated in addition to symptom counts.

Attention-Deficit/Hyperactivity Disorder

_____ Attention-Deficit/Hyperactivity Disorder - Inattention Symptoms
(items 9, 18, 23, 27, 29, 34, 37, 42, 44)

6 or more items must be endorsed as "pretty much" or "very much" to meet criteria for **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type**. The six items may be endorsed on the teacher DBD, the parent DBD, or can be a combination of items from both rating scales (e.g., 4 symptoms endorsed on the teacher DBD and 2 separate symptoms endorsed on the parent DBD). The same symptom should not be counted twice if it appears on both versions (parent and teacher) of the rating scale.

_____ Attention-Deficit/Hyperactivity Disorder - Hyperactivity/impulsivity Symptoms
(items 1, 7, 12, 19, 22, 25, 30, 33, 35)

6 or more items must be endorsed as "pretty much" or "very much" on the parent and/or the teacher DBD to meet criteria for **Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type**.

If 6 or more items are endorsed for Attention-Deficit/Hyperactivity Disorder - inattention and 6 or more items are endorsed for Attention-Deficit/Hyperactivity Disorder - hyperactivity/impulsivity, then criteria is met for **Attention-Deficit/Hyperactivity Disorder, Combined Type**.

Some impairment from the symptoms must be present in two or more settings (e.g., school, home)

Oppositional Defiant Disorder

_____ Oppositional Defiant Disorder (items 3, 13, 15, 17, 24, 26, 28, 39)

A total of 4 or more items must be endorsed as "pretty much" or "very much" on either the parent or the teacher DBD to meet criteria for **Oppositional Defiant Disorder**.

Conduct Disorder

_____ Conduct Disorder - aggression to people and animals (items 6, 20, 31, 32, 36, 40, 45)
_____ Conduct Disorder - destruction of property (items 16, 41)
_____ Conduct Disorder - deceitfulness or theft (items 4, 8, 43)
_____ Conduct Disorder - serious violation of rules (items 2, 11, 38)

A total of 3 or more items in any category or any combination of categories must be endorsed as "pretty much" or "very much" on either the parent or the teacher DBD to meet criteria for **Conduct Disorder**.

Method 2: Using Factor Scores

Factor scores for the two ADHD and ODD dimensions for teacher ratings on the DBD are reported in Pelham, et al (1992), Teacher ratings of DSM-III-R symptoms for the disruptive behavior disorders: *Journal of the American Academy of Child and Adolescent Psychiatry*, 31, 210-218. The factor scores for DSM IV factors are the same as for the DSM III-R factors reported in that paper. To determine how a child's scores compare to normative data, compute the average rating for the items from each factor (listed below) using the following scoring: Not at all = 0, Just a little = 1, Pretty Much = 2, Very much = 3. Then, using the information from the attached table of norms, determine where the child falls in relation to other children. A variety of cutoff scores can be used (e.g., 2 standard deviations above the mean).

Factors	
Oppositional / Defiant	(items 3, 13, 15, 17, 24, 26, 28, 39)
Inattention	(items 9, 18, 23, 27, 29, 34, 37, 42, 44)
Impulsivity / Overactivity	(items 1, 7, 12, 19, 22, 25, 30, 33, 35)

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Appendix H. Early Adolescent Temperament Questionnaire Revised

© Lesa K. Ellis and Mary K. Rothbart, 1999.

Early Adolescent Temperament Questionnaire - Revised Short Form

Directions

On the following page you will find a series of statements that people might use to describe themselves. The statements refer to a wide number of activities and attitudes.

For each statement, please circle the answer that best describes how true each statement is **for you**. There are no best answers. People are very different in how they feel about these statements. Please circle the first answer that comes to you.

You will use the following scale to describe how true or false a statement is about you:

<u>Circle number:</u>	<u>If the statement is:</u>
1	Almost always untrue of you
2	Usually untrue of you
3	Sometimes true, sometimes untrue of you
4	Usually true of you
5	Almost always true of you

NOTE: Please make certain to answer all questions on BOTH SIDES of the page.

Participant ID: _____

How true is each statement for you?	Almost always untrue	Usually untrue	Sometimes true, sometimes untrue	Usually true	Almost always true
1) It is easy for me to really concentrate on homework problems.	1	2	3	4	5
2) I feel pretty happy most of the day.	1	2	3	4	5
3) I think it would be exciting to move to a new city.	1	2	3	4	5
4) I like to feel a warm breeze blowing on my face.	1	2	3	4	5
5) If I'm mad at somebody, I tend to say things that I know will hurt their feelings.	1	2	3	4	5
6) I notice even little changes taking place around me, like lights getting brighter in a room.	1	2	3	4	5
7) I have a hard time finishing things on time.	1	2	3	4	5
8) I feel shy with kids of the opposite sex.	1	2	3	4	5
9) When I am angry, I throw or break things.	1	2	3	4	5
10) It's hard for me not to open presents before I'm supposed to.	1	2	3	4	5
11) My friends seem to enjoy themselves more than I do.	1	2	3	4	5
12) I tend to notice little changes that other people do not notice.	1	2	3	4	5
13) If I get really mad at someone, I might hit them.	1	2	3	4	5
14) When someone tells me to stop doing something, it is easy for me to stop.	1	2	3	4	5
15) I feel shy about meeting new people.	1	2	3	4	5
16) I enjoy listening to the birds sing.	1	2	3	4	5
17) I want to be able to share my private thoughts with someone else.	1	2	3	4	5
18) I do something fun for a while before starting my homework, even when I'm not supposed to.	1	2	3	4	5
19) I wouldn't like living in a really big city, even if it was safe.	1	2	3	4	5
20) It often takes very little to make me feel like crying.	1	2	3	4	5
21) I am very aware of noises.	1	2	3	4	5
22) I tend to be rude to people I don't like.	1	2	3	4	5

How true is each statement for you?	Almost always untrue	Usually untrue	Sometimes true, sometimes untrue	Usually true	Almost always true
23) I like to look at the pattern of clouds in the sky.	1	2	3	4	5
24) I can tell if another person is angry by their expression.	1	2	3	4	5
25) It bothers me when I try to make a phone call and the line is busy.	1	2	3	4	5
26) The more I try to stop myself from doing something I shouldn't, the more likely I am to do it.	1	2	3	4	5
27) I enjoy exchanging hugs with people I like.	1	2	3	4	5
28) Skiing fast down a steep slope sounds scary to me.	1	2	3	4	5
29) I get sad more than other people realize.	1	2	3	4	5
30) If I have a hard assignment to do, I get started right away.	1	2	3	4	5
31) I will do most anything to help someone I care about.	1	2	3	4	5
32) I get frightened riding with a person who likes to speed.	1	2	3	4	5
33) I like to look at trees and walk amongst them.	1	2	3	4	5
34) I find it hard to shift gears when I go from one class to another at school.	1	2	3	4	5
35) I worry about my family when I'm not with them.	1	2	3	4	5
36) I get very upset if I want to do something and my parents won't let me.	1	2	3	4	5
37) I get sad when a lot of things are going wrong.	1	2	3	4	5
38) When trying to study, I have difficulty tuning out background noise and concentrating.	1	2	3	4	5
39) I finish my homework before the due date.	1	2	3	4	5
40) I worry about getting into trouble.	1	2	3	4	5
41) I am good at keeping track of several different things that are happening around me.	1	2	3	4	5
42) I would not be afraid to try a risky sport, like deep-sea diving.	1	2	3	4	5
43) It's easy for me to keep a secret.	1	2	3	4	5
44) It is important to me to have close relationships with other people.	1	2	3	4	5
45) I am shy.	1	2	3	4	5

How true is each statement for you?	Almost always untrue	Usually untrue	Sometimes true, sometimes untrue	Usually true	Almost always true
46) I am nervous of some of the kids at school who push people into lockers and throw your books around.	1	2	3	4	5
47) I get irritated when I have to stop doing something that I am enjoying.	1	2	3	4	5
I wouldn't be afraid to try something like mountain climbing.	1	2	3	4	5
48) I put off working on projects until right before they're due.	1	2	3	4	5
49) When I'm really mad at a friend, I tend to explode at them.	1	2	3	4	5
50) I worry about my parent(s) dying or leaving me.	1	2	3	4	5
51) I enjoy going places where there are big crowds and lots of excitement.	1	2	3	4	5
52) I am not shy.	1	2	3	4	5
53) I am quite a warm and friendly person.	1	2	3	4	5
54) I feel sad even when I should be enjoying myself, like at Christmas or on a trip.	1	2	3	4	5
55) It really annoys me to wait in long lines.	1	2	3	4	5
56) I feel scared when I enter a darkened room at home.	1	2	3	4	5
57) I pick on people for no real reason.	1	2	3	4	5
58) I pay close attention when someone tells me how to do something.	1	2	3	4	5
59) I get very frustrated when I make a mistake in my school work.	1	2	3	4	5
60) I tend to get in the middle of one thing, then go off and do something else.	1	2	3	4	5
61) It frustrates me if people interrupt me when I'm talking.	1	2	3	4	5
62) I can stick with my plans and goals.	1	2	3	4	5
63) I get upset if I'm not able to do a task really well.	1	2	3	4	5
64) I like the crunching sound of autumn leaves.	1	2	3	4	5

Appendix I. Scoring Procedure for Early Adolescent Temperament Questionnaire

SCORING PROCEDURE

EARLY ADOLESCENT TEMPERAMENT QUESTIONNAIRE - REVISED

Scale scores for the Early Adolescent Temperament Questionnaire - Revised represent the mean score of all scale items applicable to the child, as judged by the caregiver. Scales' scores are to be computed by the following method:

1. Sum all numerical item responses for a given scale. Note that:
 - a) If caregiver omitted an item, that item receives no numerical score;
 - b) If caregiver checked the "does not apply" response option for an item, that item receives no numerical score;
 - c) Items indicated with an R are reverse items and must be scored in the following way:

7 becomes 1	3 becomes 5
6 becomes 2	2 becomes 6
5 becomes 3	1 becomes 7
4 remains 4	

2. Divide the total by the number of items receiving a numerical response. Do not include items marked "does not apply (N/A)" or items receiving no response in determining the number of items.

For example, given a sum of 47 for a scale of 12 items, with one item receiving no response, two items marked "does not apply," and 9 items receiving a numerical response, the sum of 47 would be divided by 9 to yield a mean of 5.22 for the scale score.

Appendix J. Scale Definitions Early Adolescent Temperament Questionnaire Revised

Early Adolescent Temperament Questionnaire-Revised

Scale Definitions –Short Form Temperament Scales

Activation Control: The capacity to perform an action when there is a strong tendency to avoid it.

Affiliation: The desire for warmth and closeness with others, independent of shyness or extraversion.

Attention: The capacity to focus attention as well as to shift attention when desired.

Fear: Unpleasant affect related to anticipation of distress.

Frustration: Negative affect related to interruption of ongoing tasks or goal blocking.

High Intensity Pleasure/Surgency: The pleasure derived from activities involving high intensity or novelty.

Inhibitory Control: The capacity to plan, and to suppress inappropriate responses.

Pleasure Sensitivity: Amount of pleasure related to activities or stimuli involving low intensity, rate, complexity, novelty, and incongruity.

Perceptual Sensitivity: Detection or perceptual awareness of slight, low-intensity stimulation in the environment.

Shyness: Behavioral inhibition to novelty and challenge, especially social.

Behavioral Scales

Aggression: Hostile and aggressive actions, including person- and object-directed physical violence, direct and indirect verbal aggression, and hostile reactivity.

Depressive Mood: Unpleasant affect and lowered mood, loss of enjoyment and interest in activities.

**Appendix K. Scale Assignments Early Adolescent
Temperament Questionnaire Revised**

EATQ-R Scale Assignments

**Composition of scales and scale alphas based on item analysis,
EATQ-R initial study, N=177 (92 females, 85 males). Age=10.59-
15.99 years, mean age=13.78.**

**Scales are scored such that a high score on a scale indicates that
the individual is high in that attribute. Reversed scored items
indicated by "R".**

Activation Control, N=5, Alpha=.76, correlation w/long form=.96

- 7) R I have a hard time finishing things on time.
 - 18) R I do something fun for awhile before starting my homework, even when I'm not supposed to.
 - 30) If I have a hard assignment to do, I get started right away.
 - 39) I finish my homework before the due date.
 - 49) R I put off working on projects until right before they're due.
-

Affiliation, N=5, Alpha=.75, correlation w/long form=.95

- 17) I want to be able to share my private thoughts with someone else.
 - 27) I enjoy exchanging hugs with people I like.
 - 31) I will do most anything to help someone I care about.
 - 44) It is important to me to have close relationships with other people.
 - 54) I am quite a warm and friendly person.
-

Aggression, N=6, Alpha=.80, correlation w/long form=.91

- 5) If I'm mad at somebody, I tend to say things that I know will hurt their feelings.
- 9) When I am angry, I throw or break things.
- 13) If I get really mad at someone, I might hit them.
- 22) I tend to be rude to people I don't like.
- 50) When I'm really mad at a friend, I tend to explode at them.
- 58) I pick on people for no real reason.

Attention, N=6, Alpha=.67, correlation w/long form=.97

- 1) It is easy for me to really concentrate on homework problems.
 - 34) R I find it hard to shift gears when I go from one class to another at school.
 - 38) R When trying to study, I have difficulty tuning out background noise and concentrating.
 - 41) I am good at keeping track of several different things that are happening around me.
 - 59) I pay close attention when someone tells me how to do something.
 - 61) R I tend to get in the middle of one thing, then go off and do something else.
-

Depressive Mood, N=6, Alpha=.69, original long form scale

- 2) R I feel pretty happy most of the day.
 - 11) My friends seem to enjoy themselves more than I do.
 - 20) It often takes very little to make me feel like crying.
 - 29) I get sad more than other people realize.
 - 37) I get sad when a lot of things are going wrong.
 - 55) I feel sad even when I should be enjoying myself, like at Christmas or on a trip.
-

Fear, N=6, Alpha=.65, original long form scale

- 32) I get frightened riding with a person who likes to speed.
 - 35) I worry about my family when I'm not with them.
 - 40) I worry about getting into trouble.
 - 46) I am nervous of some of the kids at school who push people into lockers and throw your books around.
 - 51) I worry about my parent(s) dying or leaving me.
 - 57) I feel scared when I enter a darkened room at home.
-

Frustration, N=7, Alpha=.70, correlation w/long form=.95

- 25) It bothers me when I try to make a phone call and the line is busy.
- 36) I get very upset if I want to do something and my parents won't let me.
- 47) I get irritated when I have to stop doing something that I am enjoying.
- 56) It really annoys me to wait in long lines.
- 60) I get very frustrated when I make a mistake in my school work.
- 62) It frustrates me if people interrupt me when I'm talking.
- 64) I get upset if I'm not able to do a task really well.

Inhibitory Control, N=5, Alpha=.69, correlation w/long form=.93

- 10) R It's hard for me not to open presents before I'm supposed to.
 - 14) When someone tells me to stop doing something, it is easy for me to stop.
 - 26) R The more I try to stop myself from doing something I shouldn't, the more likely I am to do it.
 - 43) It's easy for me to keep a secret.
 - 63) I can stick with my plans and goals.
-

Pleasure Sensitivity, N=5, Alpha=.78, correlation w/long form=.96

- 4) I like to feel a warm breeze blowing on my face.
 - 16) I enjoy listening to the birds sing.
 - 23) I like to look at the pattern of clouds in the sky.
 - 33) I like to look at trees and walk amongst them.
 - 65) I like the crunching sound of autumn leaves.
-

Perceptual Sensitivity, N=4, Alpha=.71, correlation w/long form=.90

- 6) I notice even little changes taking place around me, like lights getting brighter in a room.
 - 12) I tend to notice little changes that other people do not notice.
 - 21) I am very aware of noises.
 - 24) I can tell if another person is angry by their expression.
-

Shyness, N=4, Alpha=.82, correlation w/long form=.94

- 8) I feel shy with kids of the opposite sex.
 - 15) I feel shy about meeting new people.
 - 45) I am shy.
 - 53) R I am not shy.
-

Surgency, N=6, Alpha=.71, correlation w/long form=.94

- 3) I think it would be exciting to move to a new city.
- 19) R I wouldn't like living in a really big city, even if it was safe.
- 28) R Skiing fast down a steep slope sounds scary to me.
- 42) I would not be afraid to try a risky sport, like deep-sea diving.
- 48) I wouldn't be afraid to try something like mountain climbing.
- 52) I enjoy going places where there are big crowds and lots of excitement.

Appendix L. Estimation of Physical Abilities Scoring Sheet

Vertical Reaching Task

1. Baseline Height _____
2. Within height _____
 - a. Can do yes _____ no _____
 - b. Does do yes _____ no _____
3. 8% Beyond baseline height _____
 - a. Can do yes _____ no _____
 - b. Does do yes _____ no _____
4. 13% Beyond baseline height _____
 - a. Can do yes _____ no _____
 - b. Does do yes _____ no _____

Horizontal Reaching Task

1. Baseline Distance _____
2. Within distance _____
 - a. Can do yes _____ no _____
 - b. Does do yes _____ no _____
3. 8% Beyond baseline distance _____
 - a. Can do yes _____ no _____
 - b. Does do yes _____ no _____
4. 13% Beyond baseline distance _____
 - a. Can do yes _____ no _____
 - b. Does do yes _____ no _____

Stepping Task

1. Baseline Distance _____
2. Within distance _____
 - a. Can do yes _____ no _____
 - c. Does do yes _____ no _____
5. 8% Beyond baseline distance _____
 - a. Can do yes _____ no _____
 - b. Does do yes _____ no _____
6. 13% Beyond baseline distance _____
 - a. Can do yes _____ no _____
 - b. Does do yes _____ no _____

Clearance Task

1. Baseline Height _____
2. Within height _____
 - a. Can do yes no
 - b. Does do yes no
3. 8% Beyond baseline height _____
 - a. Can do yes no
 - b. Does do yes no
4. 13% Beyond baseline height _____
 - a. Can do yes no
 - b. Does do yes no

Appendix M. Coding Matrix

CONTEXT CONDITIONS Under what circumstance	PROCESS STRATEGIES Actions/responses	OUTCOMES CONSEQUENCES Outcomes
Sex	Think consequences	Danger
Competition	Not thinking	Hurt
Get experience	Likelihood	Sick or not
Peer pressure	Seriousness	Death
Don't care	Know limits	Punishment
No control	Know ability	Fun
Need to	Know what to do	Excitement
No experience	Be responsible	Achievement
Others experience	Adult supervision	Protection
Information	Listen rules/labels	Prevention
(TV/school/parents)	Wear gear	Safe
Emotion	Be Careful	Cool
feels good	Doing stupid things	Not hurt
stupid	Break rules	Thrill
not smart	Not fearful	Scary
attention	Get experience	Not scary
inattention	Don't care	
fun	Not careful	
angry	Didn't know	
scared	Don't think	
lucky	Nothing going on	
fear	Something went wrong	
confident	Not supposed to	
not cool		
thrill		