Understanding risk compensation in children: Experience with the activity and level of sensation seeking play a role

Jennifer Lasenby-Lessard, Barbara A. Morrongiello

Department of Psychology, University of Guelph, MacKinnon Building, Guelph, Ontario, Canada N1G 2W1

ARTICLE INFO

Article history:
Received 9 August 2010
Received in revised form 30 November 2010
Accepted 5 February 2011

Keywords:
Risk taking
Risk compensation
Children
Sensation seeking
Sports activities

ABSTRACT

The aims of this study were to determine if children 7–12 years show risk compensation when engaging in ecologically valid recreational sports tasks, and to explore how experience with the activity and extent of sensation seeking influence this. Children were positioned up on a platform, on a bike or wearing rollerblades, and they were presented varying heights and inclines from which they selected the greatest one they go down when wearing and not wearing safety gear appropriate to the activity; when making their ratings they anticipated actually doing the task. Results revealed that children engaged in significantly more risk taking when wearing safety gear, thereby demonstrating risk compensation, and this was significantly greater for the activity with which they had greater experience. However, children high in sensation seeking demonstrated significantly more risk compensation in both the high and low experience activities, although the injury risk appraisals that predicted risk compensation varied with experience level. Implications for the design of injury prevention programs and directions for future research are discussed.

© 2011 Elsevier Ltd. All rights reserved.

1. Influences on children’s risk taking

Unintentional injury in childhood has been cited as one of the leading causes of death and disability for children in most developed nations (Canadian Institute of Child Health [CICH], 2000; National Center for Injury Prevention and Control [NCIPC], 2010; World Health Organization [WHO], 2005). For school-age children, many injuries occur when they are away from home and making their own decisions about injury-risk activities (Shanon et al., 1992). Research has shown that children engage in behaviors that put them at risk of injury when they have more experience with an activity (Lasenby-Lessard et al., in press; Morrongiello and Dawber, 2004); think there is little danger, that they are not vulnerable to injury, and that they would not be seriously injured (Morrongiello, 1997; Morrongiello and Rennie, 1998; Rosen and Peterson, 1990). A variety of personality and behavioral characteristics also influence risk taking decisions (see Schwebel and Gaines, 2007, for extensive review). In particular, sensation seeking (i.e., “the need for varied, novel and complex situations and experiences and the willingness to take physical and social risks for the sake of such experiences”, Zuckerman, 1979, p. 10) strongly relates to risk taking behaviors in adolescence and adulthood (Bouter et al., 1988; Brown et al., 1974; Heyman and Rose, 1980; Hymbaugh and Garrett, 1974; Rowland et al., 1986; Straub, 1982; Zuckerman, 1979, 2007), as well as in childhood (Morrongiello and Lasenby, 2006; Morrongiello et al., 2004a,b; Morrongiello and Sedoré, 2005). In a recent study examining the impact of accumulated experience with an activity on risk taking decisions, for example, children high in sensation seeking were especially likely to react with increased risk taking once they accumulated some experience with an activity (Lasenby-Lessard et al., in press). Thus, high sensation seekers emerged as a unique high risk group who needed very little prompting to increase their level of risk taking, presumably because doing so increases their level of arousal (Zuckerman, 1979) and satisfies a need for novel and intense stimulation (Zuckerman, 2007).

2. Risk compensation

One influence on risk taking that has recruited much attention and about which there is some controversy is the use of safety gear. Unquestionably safety gear reduces children’s risk of serious
injury. However, research has shown too that individuals sometimes react with increased risk taking when they wear safety gear, a phenomenon commonly known as risk compensation. While risk compensation theorists agree that safety initiatives (e.g., safety gear, environmental modifications to roads or products) produce positive effects by reducing injury risk, they argue that the full benefit of such effects will not be realized in individuals who show risk compensation. Although there is debate about the nature and scope of this phenomenon (Adams and Hillman, 2001; Hedlund, 2000; Thompson et al., 2001), and not all research has found support for this phenomenon (see Thompson et al., 2001, for review), risk compensation has been observed in athletes (Biasca et al., 2002; Braun and Fouts, 1998), adults when driving (Potvin et al., 1988; Simonet and Wilde, 1997; Stanton and Pinto, 2000), parents of young children (Morrongiello and Major, 2002; Viscusi, 1984, 1985; Viscusi and Cavallo, 1996), and even in school-age children (DiLillo and Tremblay, 2001; Morrongiello et al., 2007a,b).

In organized sports, for example, wearing safety gear has been associated with increased aggressive and injurious behavior by hockey players, as well as resistance to calling penalties by coaches and referees (Biasca et al., 2002). Adult drivers have been shown to behave more recklessly (e.g., speeding) when wearing seat belts (Stanton and Pinto, 2000). Product safety interventions directed towards children also have been found to lead to risk compensation. For example, with the invention of childhood caps on medication there was an increase of 3500 cases of poisoning in children under the age of five, presumably because parents were less vigilant about the handling and storage of these ‘safer’ bottles (Viscusi, 1984). The introduction of safety mechanisms on cigarette lighters also has been linked to reduced parental caution about these products (Viscusi and Cavallo, 1996). Similarly, parents have been shown to react with increased tolerance for risk taking when their children are wearing safety gear during recreational sports and play activities (Morrongiello and Major, 2002). Even during childhood wearing safety gear has been shown to result in more reckless risk taking behavior (DiLillo and Tremblay, 2001; Morrongiello et al., 2007). Thus, despite debate about how robust and generalized risk compensation is, research demonstrates unequivocally that this phenomenon occurs across a broad age range and across numerous activities.

3. Current study

Building on past research, the current study examined if the extent of risk compensation shown by school-age children varies as a function of the extent of experience with an activity, and what role individual-difference factors (sensation seeking, injury-related appraisals, emotional reactions) play in this process. Children participated in both high experience (bicycling) and low experience (rollerblading) activities, and to assess for risk compensation a within-participant design was used (cf. Streff and Geller, 1988) in which each child’s risk taking when not wearing safety gear was compared to their risk taking when wearing gear. Bicycling and rollerblading were used in this study because both carry a potential for serious injury risk; children are aware of this risk (Adams et al., 1996; Pudpud and Linares, 1997), children in this region are more likely to bike (high experience) than rollerblade (low experience), and both activities have designated safety gear that is encouraged or mandated for use during these activities. To assess sensation seeking, children completed a standardized questionnaire (Morrongiello and Lasenby, 2006). Appraisals of injury-risk cognitions (danger, vulnerability, potential injury severity) and emotions (excitement, fear) in response to risk taking also were measured to explore if these provide insight into the mechanisms by which risk compensation operates.

4. Methods

4.1. Participants

A sample of 99 children 7–12 years of age was divided into four groups: young girls (N = 27, range: 7–9 years, M = 8.76, SD = 0.93), young boys (N = 23, range: 7–9 years, M = 8.97, SD = 0.64), older girls (N = 25, range: 10–12 years, M = 11.47, SD = 0.85), and older boys (N = 24, range: 10–12 years, M = 11.67, SD = 0.81). Participants were randomly selected from the Child Development Research Unit Database at the University of Guelph; a database comprised of over 13,000 families who have previously indicated an interest in participating in research on child development. Mothers were predominantly Caucasian (98%) and generally well educated, with 79% having completed a university or college degree, 16% having completed some university or college courses, and 4% having completed high school. Family income fell within the mid- to high-socioeconomic status range, with 63% earning $80,000 and above, 25% earning between $60,000 and $80,000, 12% earning between $40,000 and $60,000, and 1% earning under $40,000 per year. Children were English speaking, normally developing, and no child had experienced an injury resulting in hospitalization. Children were pre-screened over the phone and were asked to rate their level of experience bicycling and rollerblading on a scale of 1–5. Only children with high experience bicycling (ratings of 4 = do it regularly and often when it is nice weather or 5 = do it very often when it is nice weather) and low experience with rollerblading (ratings of 1 = have never done it or 2 = have done it a little but not more than 3x) were selected for participation in the current study; participation rate = 74%. The Institutional Review Board at the University of Guelph provided approval for this research and parents and children granted consent prior to participating.

4.2. Measures

Risk taking tasks: Each child participated in a task that was designed to allow for risk compensation to occur. Specifically, children were randomly assigned to participate in either an incline (speed) or a height task, with the constraint that the groups be balanced by age and sex; two different types of tasks (judgements based on speed and height) were used to ensure variation in risk taking and because pilot tests revealed both were interesting for children at these ages. For both of these tasks an apparatus was custom built that would allow the children to choose varying heights and inclines according to the level of risk they were willing to take with and without safety gear on.

The platform on which the child stood was on the top of the apparatus and was three feet wide and six feet long; this size accommodated a bicycle on the platform. Wood boxes were built to go under the platform and to act as steps for the child to go up and down so s/he could survey the different height conditions (i.e., 6, 12, 18, 24, 30, 36, and 42 in.) or incline conditions before making his/her risk taking selection (i.e., what is the greatest height or steepest incline condition the child would bike or rollerblade down). For the incline condition, three ramps were designed for each of the seven step heights (6–42 in.) and these were constructed such that at each height there was a ramp that would lay at a 20 degree angle, a 32.5 degree angle and a 45 degree angle; these angles correspond to those that are rated as novice, intermediate, and advanced angles, respectively, for slope (speed) based recreational activities such as rollerblading and skiing (Beaudry, 1994). The selection of higher step heights and greater incline angles, therefore, indicated greater risk taking.

Ratings: Once children made their risk taking decision (height or incline), they positioned themselves at that location, sitting on the bike or standing and wearing rollerblades, and were asked to...
use a 5 point Likert scale (1 = not at all, 2 = slightly, 3 = somewhat, 4 = fairly, 5 = very) to rate their cognitions and emotions; children completed separate ratings for each of the four test conditions (bike, rollerblade × gear on, off), with ratings randomized each time. Specifically, children were asked to rate their perceptions of: danger (e.g., How dangerous do you think it is for you to go down the ramp?), vulnerability (e.g., How likely do you think it is that you could fall doing this?), and injury severity (e.g., How hurt do you think you could get if you were to fall?), excitement (e.g., How excited do you feel now that you are getting ready to go down the ramp?) and fear (e.g., How scared or nervous do you feel now that you are getting ready to go down the ramp?).

Questionnaires: Each child completed the Sensation Seeking Scale for Children-Child version (SSSC-C, Morroniello and Lasenby, 2006), a measure that assesses sensation seeking in children. The scale consists of 27 items in which children are presented opposing statements and asked to choose the one from each pair that best describes them (i.e., I would like to jump or dive off a diving board versus I would not like the feeling you get when standing on a diving board). Items are scored such that higher numbers indicate greater sensation-seeking (range: 0–27); internal reliability was .86 for this sample. The parent also completed a Demographic Information Sheet that provided information about parental education and family income.

4.3. Procedure

Regardless of whether the child was assigned to the height or incline task, the length of the session was 45 min.

Height risk taking task: Children performed the height task four times (bike, rollerblade × gear off, gear on), with task order randomized with the four groups of participants (2 ages × 2 sexes). Children walked up each of the seven steps and looked down at a 20 degree angle ramp attached to the front. Children were told they were going to ride a bike (or rollerblade) down the ramp and to choose the highest step height at which they would feel comfortable doing so. The children were then allowed to walk up and down the steps in order to choose the height at which they felt comfortable biking (or rollerblading) down on the 20 degree ramp. For the safety gear condition, they were wearing the necessary safety gear for either biking (helmet) or rollerblading (helmet, wrist guards, elbow and knee pads). In order to elicit a more valid response, children were told that they would actually be performing these activities after they had made their decisions about how high they wanted the platform. After the children had chosen the height at which they felt comfortable biking (or rollerblading), the 20 degree ramp was set to that height and the children were seated on an actual bike or wore rollerblades up on the platform, and they then rated their cognitions and emotions (as outlined above under Ratings), either with or without safety gear on, depending on condition. Thus, when children made their risk selection for height they expected they would perform the activity (rollerblade or bike down the ramp) at that height, and when they gave their ratings, they were fully equipped depending on condition (rollerblades on, seated on bike × safety gear on, off) and positioned at the height they selected.

Incline risk taking task: Before beginning the incline task each child’s height was measured and 50% of their overall height was calculated and recorded; this ensured that each child’s experience of height was the same when making their risk taking decisions about the steepest incline they would go down. Each child performed the incline task (i.e., selecting the steepest ramp they would go down) at this height several times (bike, rollerblade × gear off, on), with order randomized. Once children had chosen the ramp they wanted, they would get on top of the bike (or stand with rollerblades on) and rated their cognitions and emotions (see above), either with or without safety gear on, depending on condition.

Debriefing: Designing real-life activities that are safe and ethically in order to measure risk taking and risk compensation is very difficult. Because these tasks are potentially dangerous, particularly when not wearing safety gear, children were not required to actually perform these activities. After the children had made their decisions about height or incline for all conditions they were debriefed as to why they were told they would have to do the activities but were not required to do so.

5. Results

Although participants were randomly assigned to the height and incline condition, preliminary analyses were conducted to assess for age and sex differences in risk taking across conditions. Results revealed comparability in risk taking scores across conditions for gear and no-gear scores (p > .05 for all effects). Because results revealed no significant differences for test condition, the effects of primary interest were based on within-participant and within-condition comparisons, and there was no interest in examining results as a function of risk taking condition per se, we collapsed across incline and height conditions in all analyses reported herein. For risk taking, scores could range between 1 and 7, with higher scores indicating greater risk taking.

Did children show risk compensation and did it vary as a function of extent of experience with the activity?

An Age group (2) × Sex (2) × Experience (2: high, low) × Safety Gear (2: on, off): Analysis of Variance (ANOVA) was conducted to assess for risk compensation (i.e., higher risk taking scores for gear on than gear off trials), with experience and safety gear as within-participants factors and age and sex as between-participants factors. Results revealed main effects of sex, experience, and safety gear, along with an experience × safety gear interaction. Specifically, boys engaged in more risk taking than girls overall (M = 3.90 and 3.21, SD = 1.49 and 1.26, respectively), F(1,95) = 8.83, p < .01, η² = .29. Children engaged in significantly more risk taking for the high than the low experience activity overall (M = 4.03 and 3.05, SD = 1.59 and 1.25, respectively), F(1,95) = 68.33, p < .01, η² = .42. Children engaged in more risk taking when wearing safety gear (M = 3.84, SD = 1.50) than when not wearing safety gear (M = 3.11, SD = 1.34), confirming that they showed risk compensation, F(1,95) = 56.73, p < .01, η² = .37. An interaction between experience and gear also emerged, F(1,95) = 4.86, p < .05, η² = .25, which reflected the fact that the extent of risk compensation (i.e., difference in risk taking scores across gear conditions) was greater for the high (bicycling) than low (rollerblading) experience conditions (see Table 1).

What individual-difference factors relate to risk compensation and do these vary for high and low experience activities?

To address this question we computed a single index of risk compensation for each participant for the high and low experience activities separately (cf. Morroniello and Major, 2002) and these scores were then related to other variables of interest. Specifically, each ‘risk compensation’ score was determined by subtracting each participant’s risk taking ‘gear off’ score from their risk taking ‘gear
on' score so that higher scores reflected greater risk compensation (i.e., increased risk taking when wearing gear). Similar difference scores were computed for ratings of danger, vulnerability, severity, and fear; for the excitement ratings the reverse was done. This mathematical approach ensured that all ratings resulted in a positive score and reflected the extent of change in rating that corresponded to the extent of risk compensation (i.e., extent of increase in risk taking when wearing safety gear). The risk compensation scores for high and low experience activities were then each correlated with sensation seeking, age, sex, and the change in ratings for danger, perceived vulnerability for injury, perceived injury severity, excitement, and fear.

As can be seen in Table 2, sensation seeking correlated with risk compensation for both high and low experience activities. Regardless of their level of experience with the activity, children who scored higher in sensation seeking showed greater risk compensation. For the high experience activity, extent of decrease in rating of danger also was associated with risk compensation. In contrast, for the low experience activity, risk compensation related to decreases in ratings of injury vulnerability and potential injury severity in reaction to wearing safety gear. Specifically, children who showed greater decreases in ratings of vulnerability and injury severity in reaction to wearing safety gear, showed greater risk compensation for the low experience activity. Interestingly, there was only a modest relation found between risk compensation scores for the high and low experience activities, [r(96) = .49, p < .05], which suggests that it is not necessarily the same children across high and low experience activities who showed risk compensation. Examining the correspondence in these risk compensation scores as a function of extent of sensation seeking, however, revealed an interesting difference: for children high in sensation seeking (i.e., top 1/3 of sensation seeking scores) there was a much higher degree of correspondence [r(32) = .69, p < .01] compared with those low in sensation seeking (bottom 1/3 of sensation seeking scores; r(32) = .49, p < .01). Thus, high sensation seekers represented a much more ‘high risk group’ in that they were more likely to show risk compensation across high and low experience activities than were children scoring lower in sensation seeking.

To explore the mechanisms by which sensation seeking influences risk compensation and determine if this attribute moderates the impact of other variables on risk compensation, a regression was conducted to predict risk compensation, separately for the low and high experience activities, from interaction terms based on crossing sensation seeking with changes in risk appraisals (danger, vulnerability, severity) and rating of emotions (excitement, fear) in response to putting on safety gear when risk taking; main effect variables were centered prior to computing interaction terms and an examination of inter-correlations revealed no evidence of multi-collinearity concerns (Tabachnick and Fidell, 1989). Results revealed that although sensation seeking was positively associated with risk compensation for both activities, it impacted risk compensation via different mechanisms for the high and low experience activities.

For the high experience activity, risk compensation was predicted by an interaction of sensation seeking × change in danger rating [F(5, 95) = 2.10, p < .05; t = 2.51, p < .05; B = .19, SE = .07], and this accounted for 22% of the variance in risk compensation. Follow-up simple slopes analyses (cf. Aiken and West, 1991) were conducted to test for sensation seeking as a moderator and to determine if change in danger rating was a significant predictor of risk compensation at each of three levels of sensation seeking (low = 1 SD below mean; mid = mean; high = 1 SD above mean). Results indicated that sensation seeking moderated the relation between change in danger rating and risk compensation. Specifically, sensation seeking had a differential impact on risk compensation when children reacted with large decreases in danger ratings in reaction to wearing safety gear: then high levels of sensation seeking predicted significantly greater risk compensation, F(3, 95) = 3.38, p < .05; t = 2.50, p < .01; B = .54, SE = .21. As the data in Fig. 1 illustrates, when engaged in an activity with which they have a high level of experience, children react to wearing safety gear by decreasing their rating of danger, and for those who react with a large decrease in this rating, being high in sensation seeking further exaggerates injury risk and predicts significantly greater levels of risk compensation than that shown by those not high in sensation seeking.

For the low experience activity, the model also significantly predicted risk compensation [F(5, 95) = 2.65, p < .01], accounting for 26% of the variance. Significant predictors included changes in rating of severity (t = 3.02, p < .01; B = .29, SE = .10), sensation seeking (t = 2.38, p < .05; B = 10, SE = .04) and a marginally significant interaction of sensation seeking × severity (t = 1.94, p = .055; B = .09, SE = .02). Follow-up simple slopes analyses (cf. Aiken and West, 1991) were conducted to test for sensation seeking as a moderator and to determine if change in severity rating was a significant predictor of risk compensation at each of three levels of sensation seeking (low = 1 SD below mean; mid = mean; high = 1 SD above mean). Results revealed, as shown in Fig. 2, that sensation seeking had no differential impact on extent of risk compensation when children made small decreases in severity ratings in response to wearing safety gear. However, those high in sensation seeking engaged in significantly greater risk compensation when medium and large decreases in severity ratings were made in reaction to wearing safety gear, F(3, 95) = 7.21, p < .01; t = 3.77 and 3.18, p < .01; B = .44 and .26, SE = .12 and .08, respectively. Thus, when children were engaged in an activity with which they had limited experience, risk compensation was linked to judgements

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experience</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td>.07</td>
<td>−.09</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td>−.02</td>
<td>−.14</td>
</tr>
<tr>
<td>Change in danger</td>
<td></td>
<td>−.19**</td>
<td>0.5</td>
</tr>
<tr>
<td>Change in vulnerability</td>
<td></td>
<td>−.06</td>
<td>−.19*</td>
</tr>
<tr>
<td>Change in severity</td>
<td></td>
<td>−.04</td>
<td>−.29*</td>
</tr>
<tr>
<td>Change in excitement</td>
<td></td>
<td>.10</td>
<td>.07</td>
</tr>
<tr>
<td>Change in fear</td>
<td></td>
<td>.09</td>
<td>−.16</td>
</tr>
<tr>
<td>SS</td>
<td></td>
<td>.28*</td>
<td>.27</td>
</tr>
</tbody>
</table>

*p < .05,
**p < .01.
about potential injury severity. Children high in sensation seeking were easily prompted to show risk compensation when they judged there were moderate and high declines in potential injury severity due to wearing safety gear.

6. Discussion

Using an ecologically valid task that tapped normative recreational activities (bicycling, rollerblading) the present findings add to the accumulating literature that children show risk compensation when wearing safety gear. The extent of risk compensation, however, was found to vary based on children’s level of experience with the task and their level of sensation seeking. Previous research has demonstrated that children engage in greater risk taking in tasks with which they have more experience (Lasenby-Lessard et al., in press; Morrongiello et al., 2004a,b; Morrongiello and Sedore, 2005). However, the findings that children engage in greater risk compensation when engaged in high than low experience activities, and that sensation seeking moderates this relation, are unique to this study; each of these findings will be discussed in turn.

Past research has demonstrated that individuals engage in greater risk taking for activities with which they have greater experience. Presumably, as individuals accumulate non-injurious experience with an activity they perceive this activity as more familiar and risk appraisals change to reflect a belief that the activity is less risky than thought initially (Zuckerman, 2007). The fact that risk compensation is greater for high than low experience activities, however, suggests that not only do children show greater risk taking for high vs low experience activities but they also respond with significantly greater levels of risk taking when wearing safety gear during high than low experience activities. Hence, wearing safety gear has much more deleterious impact on risk taking as children become increasingly familiar with an activity. At the same time, therefore, that parents are likely to be becoming more lax in monitoring because they assume children’s familiarity with the activity indicates expertise (Morrongiello and Major, 2002), children’s behavior is likely to be becoming increasingly risky, particularly if they are wearing safety gear. Furthermore, the child’s level of sensation seeking, moderates the extent of impact of wearing safety gear on risk compensation, with the most significant impact of injury risk being evident for children high in sensation seeking.

Lasenby-Lessard et al. (in press) found that high sensation seekers are particularly likely to engage in risk taking when the contextual demands or their experiences support them doing so. The current findings support this notion: independent of their level of experience with the activity, when high sensation seekers were wearing safety gear they engaged in significantly greater risk taking than when not wearing safety gear. Zuckerman (2007) has noted similar findings among high sensation seeking adults, namely – that they assume risks are lower, and respond accordingly, even for activities with which they have limited experience. Thus, individuals high in sensation seeking appear to form a unique ‘high risk’ group who will take risks and engage in risk compensation even for activities with which they have limited experience. Zuckerman (1979, 2007) argues that individuals who are high in sensation seeking seek out intense activities in order to increase their level of arousal. It may be, therefore, that repeated experience with an activity (Lasenby-Lessard et al., in press) or wearing safety gear (as in the current study) results in a reduced level of arousal to which sensation seekers then react by increasing their level of risk taking and, consequently, level of arousal.

Past research has shown that children often consider personal vulnerability for injury, potential injury severity and extent of danger when making decisions about risk activities (Morrongiello, 1997; Morrongiello and Rennie, 1998). The present findings demonstrate, however, that children actually considered different injury appraisals when deciding on activities with which they have high vs low experience. For high experience activities, it appears that children considered how well they could do the activity based on their past experiences, and focused on how dangerous they thought it was for them. In contrast, for the activity with which they had limited experience, they focused on if they could get injured (vulnerability) and how hurt they could be if they were injured (severity); having limited experiences by which to judge how dangerous the activity was for them, they instead focused on the potential for injury to occur and the severity of injury that could occur if they were not successful in doing the activity. Interestingly, sensation seeking moderated relations between risk appraisals and level of risk compensation. Specifically, for high experience activities children in the low and middle sensation seeking groups showed lower levels of risk compensation regardless of how much they decreased their danger rating in response to wearing safety gear, whereas children high in sensation seeking showed increasing levels of risk compensation the greater their decline in danger ratings. Thus, children high in sensation seeking were more easily provoked to respond with greater risk compensation for high experience activities as their danger ratings declined in reaction to wearing safety gear. Similarly, for the low experience activity, low sensation seekers showed reduced risk compensation regardless of how much they decreased their appraisal of injury severity when wearing safety gear. However, children who fell in the mid and high sensation seeking groups showed increasing risk compensation as their appraisal of injury severity systematically decreased. Overall, then, the findings indicate that for both high and low experience activities, scoring higher in sensation seeking predicts greater risk compensation corresponding to increasing changes in extent of risk appraisal (i.e., danger appraisal for high experience activity; injury severity for low experience activity).

6.1. Implications

The current findings are important for both theoretical and practical reasons. On a theoretical level this study confirms that risk compensation operates in children when engaged in sports and recreation activities. Moreover, the results highlight that the level of sensation seeking should be taken into account when conducting research on risk compensation. Previous research has indicated that individuals who have greater experience with an activity take greater risks (Horvath and Zuckerman, 1993; Lasenby-Lessard et al., in press; Morrongiello and Dawber, 2004; Zuckerman, 2007), individuals wearing safety gear engage in greater risk tak-
ing than if they were not wearing gear (Biasca et al., 2002; DiLillo and Tremblay, 2001; Morrongiello et al., 2007a,b), and that various injury appraisals have a significant impact on risk decisions (Morrongiello, 1997; Morrongiello and Rennie, 1998). However, the current study is the first to examine these three factors together, and the findings illustrate important ways these factors interrelate, and highlight that children scoring high in sensation seeking constitute a particular ‘high risk’ group. Overall, in comparison to other children, those who are high in sensation seeking generally engage in greater risk taking, show greater risk compensation in reaction to wearing safety gear, and they show elevated risk compensation in response to decreases in perceived danger and injury severity when wearing safety gear.

The current results also have important implications for intervention. The findings highlight the need for parents, coaches, and other supervisors to be particularly vigilant when children are engaged in sports and recreation tasks for which they have a base of experience. It is essential that supervisors not assume children can accurately appraise injury risk in these activities or that they need less supervision because they are familiar with the activity or are wearing safety gear (Morrongiello and Major, 2002). Raising awareness among supervisors that children are likely to show high levels of risk taking and risk compensation during activities with which they have experience may help motivate them to remain vigilant. These issues are particularly relevant to the domain of organized sports, where questions about who should be responsible for children’s safety and how they behave (e.g., parents, coaches, children themselves) continue to be debated (Emery et al., 2007).

Tailoring of interventions based on unique individual and or contextual factors has gained in popularity (Gienel et al., 2006; Rosenbloom, 2003; Zuckerman, 2007) and the current results are relevant to this approach. Previous research has indicated the need for intervention programs to target high sensation seekers (Lasenby-Lessard et al., in press; Zuckerman, 2007) and the current research not only confirms this but highlights the importance of also considering extent of experience with the risk activity. In fact, the findings indicate that the content of intervention programs targeted at high sensation seekers needs to differ for high and low experience activities. If a safety program seeking to reduce risk compensation is targeting high sensation seekers, then the content needs to focus on perceived reduction in danger for individuals with high experience with the activity, and on perceived reduction in injury severity for individuals with low experience with the activity. Given that tailoring of interventions has been shown to maximize effectiveness (Gentiello et al., 2005; Gienel et al., 2006; Ebel et al., 2003; McDonald et al., 2005; Nansel et al., 2002; Zuckerman, 2007), considering sensation seeking and extent of experience with the activity may produce the best strategies for counteracting excessive risk taking and risk compensation among children in sports activities.

6.2. Limitations and future research

Although the present study provides important insights regarding the impact of safety gear on children’s risk taking a few limitations should be noted. Children were preselected for participation based on their level of experience with bicycling and rollerblading. Future research on risk compensation may want to examine risk compensation in a task such as the one utilized by Lasenby-Lessard et al. (in press) in which experience was accumulated on site and carefully measured to ensure uniformity across participants. Second, the present study examined individual sports and recreation tasks. Different results may be found for team sports or when peers are present. Research indicates that children engage in greater risk taking when peers are present (Christensen and Morrongiello, 1997; Horvath and Zuckerman, 1999; Morrongiello and Dawber, 2004; Sandels, 1977; Wilson et al., 1991). Future research should examine whether or not children engage in greater risk compensation when peers are present during individual sports and recreation tasks (bicycling, rollerblading, etc.) or during team sports activities; children may show off and demonstrate even greater risk compensation when peers are present. Finally, in future research it would be informative to explore ways to counteract children showing risk compensation in response to wearing safety gear. Morrongiello and her colleagues have developed a number of behavioral strategies that effectively reduce risk taking in children (Morrongiello and Mathies, 2007; Morrongiello and Marks, 2008), but whether these can be extended to address risk compensation remains to be determined and is an important consideration for future research on child injury prevention.

References


