



## Physical risk taking in elementary-school children: Measurement and emotion regulation issues

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### ABSTRACT

Children who engage in physical risk taking experience more injuries. In the present study children 7–12 years completed laboratory tasks and standardized questionnaires to explore inter-relations between measures of risk taking and to determine if the Balloon Analog Risk Task (BART) is a valid index of physical risk taking. Emotion regulation skills also were assessed to determine if poorer skills are associated with greater risk taking, and what measures of risk taking show these relations. Results revealed that general measures of risk taking propensity predicted both BART performance and physical risk taking. Similarly, poorer emotion regulation skills were associated with greater risk taking scores for both the BART and physical risk taking task. Measures of physical risk taking related to one another, however, none of these scores related to performance on the BART. Implications for measuring physical risk taking and exploring emotional links to risk taking in future research are discussed.

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### 1. Introduction

Injuries pose a significant health threat for children. In most developed countries they are the leading cause of death (World Health Organization, 2005). For elementary-school children, many injuries occur when they are away from home and making their own decisions about risk taking activities (National Center for Injury Prevention and Control [NCIPC], 2010; Shanon, Bashaw, Lewis, & Feldman, 1992). Past research has documented a number of temperament, cognitive, and emotional determinants that influence physical risk taking (i.e., engaging in a behavior that increases risk of physical injury when there are alternatives that pose less risk of injury, Morrongiello & Sedore, 2005) among children (Morrongiello, Lasenby-Lessard, & Matheis, 2007; Morrongiello & Rennie, 1998; Schwebel & Gaines, 2007). Such findings have paved the way for the development of effective programs to reduce these behaviors and children's risk of injury (Morrongiello & Marks, 2008; Morrongiello & Matheis, 2007).

Of course, physical risk taking is only one of several different types of risk taking (e.g., social, academic). There is long standing debate about whether individuals show uniformity in risk taking across decision domains (Baucells & Rata, 2006; Hanoch, Johnson, & Wilke, 2006; Soane & Chmiel, 2005) and if there are underlying personality attributes that give rise to consistency in risk taking across domains (Hanoch et al., 2006; Zuckerman & Kuhlman, 2000). Drawing on these issues, the current study examined in-

ter-relations between different measures of risk taking, with a focus on determining if children show similar patterns of risk taking on the Balloon Analog Risk Task (BART) as they do on a physical risk taking task. The expectation was that these risk taking scores would be highly positively correlated if the BART was a good proxy measure for physical risk taking in elementary-school age children. Relations between emotion regulation and risk taking also were examined to determine if emotion dysregulation is associated with greater risk taking, and what measures of risk taking show these relations.

#### 1.1. Measuring risk taking

Developing reliable and valid assessment approaches for measuring risk taking is challenging. For elementary-school children, because the focus is often on physical risk taking that can lead to injuries, the measurement challenge is substantial. Innovative approaches to measuring children's physical risk taking in ethically acceptable ways have included observations of children's behavior in naturally hazardous situations (Ginsburg & Miller, 1982) and creating contrived situations in which they indicate intentions to risk take when they are led to believe they will have to demonstrate the behaviors endorsed (e.g., Morrongiello et al., 2007; Morrongiello & Matheis, 2007; Morrongiello & Sedore, 2005). In contrast, for teenagers and adults, most risk taking measures involve self-reports about the health-related behaviors of interest (e.g., smoking, drinking). However, because self-reports about undesirable behaviors can be inaccurate (Ladouceur et al., 2000), there is increasing concern about their validity and interest in

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developing behavioral measures that index risk taking among teens and adults. Two such measures have gained in popularity, namely – the Iowa Gambling Task (Bechara, Damasio, Damasio, & Anderson, 1994) and the Balloon Analog Risk Task (BART, Lejuez et al., 2002).

Although performance on the Iowa Gambling Task has been shown to relate to some aspects of health risk behaviors in adolescents (Bechara et al., 2001), evidence from school-age children indicates that it is not a valid measure of physical risk taking (Morrongiello, Lasenby-Lessard, & Corbett, 2009). For the BART, several studies report moderate associations with real world risk behaviors (smoking, gambling, alcohol use) for teens (Lejuez, Aklin, Zvolensky, & Pedulla, 2003) and adults (Lejuez, Simmons, Aklin, Daughters, & Dvir, 2004). Further support for the construct validity of the BART comes also from findings that it relates to temperament attributes among adolescents in ways one would expect. It is positively associated with measures of disinhibition, including sensation seeking and impulsivity (Aklin, Lejuez, Zvolensky, Kahler, & Gwadz, 2005; Hunt, Hopko, Bare, Lejuez, & Robinson, 2005; Lejuez et al., 2003, 2002). Whether the BART can be used to index physical risk taking and whether it relates to temperament attributes associated with risk taking among elementary-school children, however, remains to be determined and was considered herein.

### 1.2. Emotion regulation and risk taking

Historically, the field of decision making has neglected the influence of emotions on risk taking, preferring instead to focus on rational-based decision making. More recently, however, there is increasing evidence that emotions can undermine rational decision making and motivate risk taking or lead to impulsive decision making (Lerner & Tiedens, 2006; Loewenstein, Weber, Hsee, & Welch, 2001). Emotion dysregulation has been conceptualized in many ways (e.g., impulsivity, lack of emotional awareness, emotional reactivity) and measured using a variety of questionnaires (e.g., Difficulties in Emotion Regulation Scale: Gratz & Roemer, 2004; Emotion Reactivity Scale: Nock, Wedig, Holmberg, & Hooley, 2008), but the general pattern of results is the same: individuals who are poor at regulating their emotions tend to engage in more risk taking (Cyders et al., 2007; Yuen & Lee, 2003). In virtually all of this research, however, the focus has been on adolescents and adults (e.g., Cooper, Wood, Orcutt, & Albino, 2003; Hessler & Katz, 2010; Raffaelli & Crockett, 2003), leaving open the question of whether elementary-school children who are poor at emotion regulation show similar dysfunctional risky behavioral patterns.

### 1.3. Present study

The present study had several aims. The first was to assess if the BART could be used as a proxy indicator of physical risk taking for elementary-school children. A computer-based behavioral measure of risk taking could be very useful because it would eliminate both under-reporting biases that can occur in physical risk taking questionnaire measures and data gathering limitations related to climate issues that occur when actual playground tasks are used. To address this aim, inter-relations of BART performance with other measures that tap physical risk taking were examined. Risk taking scores also were related to two temperament characteristics that have been linked to physical risk taking, namely – *high intensity behavior* (i.e., associated with increased frequency of physical risk taking and injury; Bijur, Stewart-Brown, & Butler, 1986; Nyman, 1987; Vollrath, Landolt, & Ribi, 2003), and *inhibitory control* (i.e., child's ability to inhibit impulses when instructed to do so, which has been associated with reduced frequency of physical risk taking and injury; Morrongiello, Corbett, McCourt, & Johnston,

2006; Schwebel, 2004; Schwebel & Plumert, 1999). A general index of risk taking propensity also was included to ascertain if this related in a similar way to performance on the BART and physical risk taking task.

The second aim was to explore relations between emotion dysregulation and risk taking in order to determine if poor emotion regulation is associated with greater risk taking among school-age children, and if this pattern is evident for both the BART and physical risk taking task. Past research has shown that children attend to the emotions communicated by other children during risky play activities on playgrounds and they utilize this information in estimating injury risk (Morrongiello & Rennie, 1998). However, we are not aware of any research examining whether emotional dysregulation is associated with increased risk taking in children.

## 2. Method

### 2.1. Participants

Children in grades two to four were recruited from four elementary schools and included 32 boys ( $M = 8.81$  years,  $SD = 0.83$ ) and 38 girls ( $M = 8.79$  years,  $SD = 0.82$ ); participation rate was 66%. Procedures were approved by the Research Ethics Boards at the schools and university and all children and their parent gave consent before participating. No other demographic information about the sample was available.

### 2.2. Materials

#### 2.2.1. Questionnaire measures

**2.2.1.1. Emotion Dysregulation Scale for Children (EDS-C).** The scale was modeled after one developed to assess difficulties in various dimensions of emotion regulation in adults (Gratz & Roemer, 2004) and children 11–17 years old (Neumann, Van Lier, Gratz, & Koot, 2010). We selected three subscales that 8–10 year olds identified as highly relevant to their lives and understandable in pilot interviews. These included: Difficulties Engaging in Goal-Directed Behavior (e.g., *When I'm upset, I have a hard time getting school work done*), Impulse Control Difficulties (e.g., *When I get upset, it's hard for me to control what I do and say*), and Limited Access to Emotion Regulation Strategies (e.g., *When I get upset, I can't think of anything to do to make myself feel better*). We edited the wording of individual items and pilot tested with other children to ensure their interpretation of each item matched what was intended. The final version consisted of 19 items that children rated on a 5-point scale according to how often each was true for them (1 = *almost never*, 5 = *almost always*), with higher scores representing greater emotion dysregulation. Because the three scores were highly inter-correlated (ranging from .66 to .72) herein, they were combined to create one emotion dysregulation score (Cronbach's  $\alpha = .89$ ).

**2.2.1.2. Injury Behavior Checklist (IBC).** The IBC indexes children's typical level of risk taking (Potts, Martinez, & Dedmon, 1995; Speltz, Gonzales, Sulzbacher, & Quan, 1990). Children rate, on a 5-point scale (1 = *never*, 5 = *very often*), how often they engage in each of 24 risky behaviors. Cronbach's  $\alpha$  was .90.

**2.2.1.3. Early Adolescent Temperament Questionnaire-Revised (EATQ-R, Capaldi & Rothbart, 1992).** High Intensity Pleasure (11 items, e.g., *I wouldn't be afraid to skateboard or ride a bike really fast down a steep hill*), and inhibitory control (11 items, e.g., *It's easy for me to keep a secret*) were measured using a 5-point rating scale (1 = *almost always untrue of me*, 5 = *almost always true of me*). Cronbach's  $\alpha$  was .76 and .70, respectively.

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