EFFECTS OF PARENTS’ ATTITUDES, VALUES, AND BELIEFS ON THEIR RISK DECISION-MAKING ON BEHALF OF THEIR CHILDREN ENROLLED IN MINOR HOCKEY

by

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Abstract

Although there have been many studies examining the factors involved in children’s risk of injury, there has been a dearth of research that examines specific individual parental factors in children’s risk of injury. This thesis examined how the attitudes, values, and beliefs of 119 Canadian minor hockey parents of children (aged 9 to 12 years) with respect to their decision-making regarding their children’s safe participation in hockey. Two studies are reported. The first study describes: (a) the development of a questionnaire that quantifies the constructs of perceived control, probabilities, values, risk propensity, competitiveness, and assertiveness expectancies; and (b) a sample of hockey parents in terms of their demographic characteristics and their attitudes, values, and beliefs regarding their children’s participation in minor hockey. The second study examined the relationships between these attitudes, values, and beliefs and a measure of their risk decision-making. Overall, results showed that (a) this sample of hockey parents tended to be well educated, and did not see themselves as being generally over-competitive or aggressive; (b) hockey parents’ attitudes, values, and beliefs regarding their children’s risk of concussion had very little predictive value or reliable connection with respect to their risk decision-making on behalf of their children; and (c) the most significant factors in parents’ risk decision-making were the opinions of their children, and the opinions of the doctors. The implications of these findings for future research and practice are discussed.

Keywords: hockey, parents, proxy risk, concussion, health risk management
Co-Authorship

The manuscripts in chapters 2 and 3 are co-authored by John Robert Kirby and Lucie Pellan.
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# Table of Contents

Abstract .................................................................................................................................................. ii
Table of Contents ................................................................................................................................... iii
List of Figures ......................................................................................................................................... v
List of Tables .......................................................................................................................................... vi
Chapter 1 Introduction ........................................................................................................................... 1
Chapter 2 Attitudes, values, and beliefs of minor hockey parents ........................................................... 4
  Abstract .............................................................................................................................................. 4
  Introduction ....................................................................................................................................... 5
    Perceived Control .............................................................................................................................. 6
    Probabilities and Values ...................................................................................................................... 7
    Risk Propensity ................................................................................................................................. 8
    Competitiveness ................................................................................................................................. 9
    Assertiveness Expectancies ................................................................................................................ 10
  Demographic Characteristics ............................................................................................................. 11
Method .................................................................................................................................................. 11
  Participants and Procedure .................................................................................................................. 11
  Measures ......................................................................................................................................... 11
Results .................................................................................................................................................... 14
  Description of Participants .................................................................................................................. 14
  Scale Analyses .................................................................................................................................. 14
  Correlations ....................................................................................................................................... 20
  Group Differences on Scales ............................................................................................................... 22
Discussion ............................................................................................................................................. 24
  Development of Questionnaire ......................................................................................................... 24
  Describing Hockey Parents ............................................................................................................... 27
  Limitations, Implications, and Conclusions ....................................................................................... 28
Chapter 3 Predicting minor hockey parents’ risk decision-making on behalf of their children ... 29
  Abstract ............................................................................................................................................. 30
  Introduction ...................................................................................................................................... 31
    The Present Study ............................................................................................................................. 32
    Constructs Evaluated by the Questionnaire ..................................................................................... 33
  Method .............................................................................................................................................. 36
Participants .................................................................................................................. 36
Measures ....................................................................................................................... 36
Procedure ....................................................................................................................... 38
Results ......................................................................................................................... 38
Participant Characteristics .......................................................................................... 38
Regression Analyses ..................................................................................................... 39
Repeated Measures ANOVAs ....................................................................................... 40
Discussion ..................................................................................................................... 42
Chapter 4 General Discussion ...................................................................................... 50
Chapter 5 References .................................................................................................. 54
## List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Performance of Males and Females on Scales</td>
<td>23</td>
</tr>
<tr>
<td>2.2</td>
<td>Performance on Scales of Parents With and Without a History of Injury</td>
<td>23</td>
</tr>
<tr>
<td>2.3</td>
<td>Performance on Scales of Parents Whose Children Did or Did Not have a History of Injury</td>
<td>24</td>
</tr>
<tr>
<td>3.1</td>
<td>Proxy Risk Decision-Making Task</td>
<td>37</td>
</tr>
<tr>
<td>3.2</td>
<td>Doctor, Child, and Doctor x Child effects</td>
<td>41</td>
</tr>
<tr>
<td>3.3</td>
<td>Perceived Control x Doctor effects</td>
<td>42</td>
</tr>
</tbody>
</table>
### List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Descriptive Demographic Information About Participants</td>
<td>15</td>
</tr>
<tr>
<td>2.2</td>
<td>Means and Standard Deviations for the Perceived Control Scale</td>
<td>16</td>
</tr>
<tr>
<td>2.3</td>
<td>Means and Standard Deviations for the Probabilities and Values Scale; Results of Factor Analysis</td>
<td>17</td>
</tr>
<tr>
<td>2.4</td>
<td>Means and Standard Deviations for the Risk Propensity Scale</td>
<td>18</td>
</tr>
<tr>
<td>2.5</td>
<td>Means and Standard Deviations for the Competitiveness Scale; Results of Factor Analysis</td>
<td>19</td>
</tr>
<tr>
<td>2.6</td>
<td>Means and Standard Deviations for the Assertiveness Expectancies Scale</td>
<td>20</td>
</tr>
<tr>
<td>2.7</td>
<td>Correlations Between Scales</td>
<td>21</td>
</tr>
<tr>
<td>2.8</td>
<td>Correlations Between Scales and Demographic Variables</td>
<td>21</td>
</tr>
<tr>
<td>2.9</td>
<td>Correlations Between Demographic Variables</td>
<td>22</td>
</tr>
<tr>
<td>3.1</td>
<td>Scale Means and Standard Deviations; Per-Item Average Means and Standard Deviations</td>
<td>39</td>
</tr>
</tbody>
</table>
Chapter 1

Introduction

Parents must be responsible for managing risk for their children, because children are generally incapable of fully understanding the probabilities of success and failure or the consequences of risk. Parents play a vital role in managing the risks of their children in many different contexts. This management of risk can be done through such means as increased supervision, parenting styles, and controlling the amount of exposure their children have to various types of risk (Morrongiello, 2005; Kapungu, Holmbeck, & Paikoff, 2006; Roche, Ellen, & Astone, 2005; Georgiou, 1997). Parental belief about safety (Morrongiello, Ondejko, & Littlejohn, 2004), and parental knowledge about safety (Peterson, Farmer, & Kashani, 1990) have also been associated with a reduced risk of child injury.

In the context of minor hockey, pediatric head injuries are a specific and relevant example of such risk. In a review of literature of studies from the years 1966 to 1997, it was found that incidence of concussion was reported to be as high as 2.8 concussions per 1000 player hours for children ages 5 to 15 years old (Honey, 1998). Compounding this issue of pediatric concussion is the fact that evidence is only now starting to emerge regarding an association between concussive brain injury and lasting deficits in neurocognitive function (Hessen, Nestvold, & Anderson, 2007) and social-adaptive behaviour (McKinlay, Grace, Horwood, Fergusson, & MacFarlane, 2010). As the effects of concussive injuries on the developing brain are difficult to identify and to predict over the long term, prevention of concussions in pediatrics is of the utmost importance. The effective management of risk is one way to aid in prevention, as
fewer unnecessary risks should lead to lower injury rates, decreasing the number of pediatric concussions associated with participation in minor hockey.

The values, beliefs, and attitudes of hockey parents may provide researchers with valuable insight into how parents manage risks on behalf of their children, not just in the context of concussions in minor hockey, but general risk management as well. Prior research has suggested that parents’ attitudes, values, and beliefs can have significant effects on injury rates of their children (Morrongiello et al., 2004; Peterson et al., 1990; Peterson & Saldana, 1996). Thus, it should follow that parents of children ice hockey participants may be able to influence injury prevention through teaching and modeling competition and safe-play values, and making responsible decisions regarding when and how much to play, when to return to play after an injury, and the relative importance of competition and winning.

Understanding parents’ attitudes, values, and beliefs may be helpful in gaining insight into how parents make decisions about risk exposure on behalf of their children, which parents have a tendency to make high- or low-risk decisions on behalf of their children, and ultimately, how parents manage their children’s risk. This process will be referred to as proxy risk management, because while the children are the ones who assume the risk, the management of that risk is performed through parents via proxy. The first step in assessing these variables was to develop a questionnaire to measure the factors that are believed to affect risk perception, and to evaluate this questionnaire’s validity and reliability. The questionnaire was then used to explore relationships between parent-specific factors and their risk decision-making (via proxy) on behalf of their children, within the context of concussion in minor hockey.

Chapter two describes the design and validation of the questionnaire used in this study. Specifically, the questionnaire examines the reliability and validity of six measures developed
through the literature. These are quantifications of the following constructs: parents’ (1) perceived control over risk, (2) perceived probabilities for achieving successful outcomes, (3) subjective values placed on successful outcomes, (4) risk propensity, (5) competitiveness, and (6) assertiveness expectancies. Chapter two also examines the relationships between these variables to describe a sample of hockey parents, and attempts to draw conclusions about the sample and its representativeness. Chapter three adds two additional measures. The first is a measure of parents’ general concussion knowledge, and the second is a measure of parents’ management of their children’s risk. Chapter three examines the relationships between demographic variables, the predictor variables (including knowledge), and proxies’ risk management.

The thesis concludes with a final chapter providing an overview of the findings from chapters two and three, a description of how this study contributes to the research, and finally, what implications this study has for future research and practice.
Chapter 2

Attitudes, values, and beliefs of minor hockey parents

Abstract

One way for parents to foster the development of important social and kinesthetic skills is to encourage their children to participate in minor sports. The current study develops a questionnaire to examine the attitudes, values, and beliefs of 119 Canadian minor hockey parents with respect to their children’s safe participation in hockey. The questionnaire addresses parents’ (a) perceived control over their children’s risk of injury, (b) perceptions about their children’s probabilities of playing elite level hockey and how they value such an achievement, (c) risk propensities, (d) competitiveness, and (e) beliefs about the consequences of their assertive behaviors. Results from item and factor analyses supported the identification of the intended scales. Correlations and analyses of variance indicated significant relationships among: (a) sex, risk propensity, competitiveness, and parental history of injury; (b) competitiveness and parents’ perceptions of their children’s hockey ability; and (c) child history of injury and parents’ assertiveness expectancies. Implications for applications and future research are discussed.

Keywords: hockey, parents, risk propensity, competitiveness, history of injury
Introduction

Parents are involved in virtually every aspect of their children’s lives, and the participation in extracurricular sports and activities is no exception. Participation in minor sports is an excellent way for children to get exercise, have fun, and develop both social and kinesthetic skills. In Canada, one of the most popular forms of organized sport for children is minor hockey. Hockey Canada reported 572,411 children enrolled in minor hockey for the 2010-11 season (Hockey Canada, 2012a); in contrast, the United States, with a population almost ten times as large, reported 350,885 children enrolled in minor hockey for the same year (USA Hockey, 2011).

This study develops an instrument to provide a quantitative description of hockey parents, specifically with respect to constructs relevant to a competitive environment. Prior research has suggested a number of reasons why such a description would be valuable: for example, helping to define roles within the parent/athlete/coach triangle (Hellstedt, 1987; Smoll, Cumming, & Smith, 2011), explaining sideline behavior (Kidman, McKenzie, & McKenzie, 1999; Bowker et al., 2009), helping to understand the “professionalization” of youth sport by parents (i.e., the goals of winning vs. the development of skill) (Smoll et al., 2011), and maximizing the benefits from degrees of parental involvement (Brustad, 1988; Stein, Raedeke, & Glenn, 1999; Lauer et al., 2010).

Describing parents would also help researchers better understand how parents perceive safe participation and return-to-play issues. In a review of literature, Cusimano, Chipman, Volpe, and Donnelly (2009) found that opinions vary greatly with regards to the degree and rationale behind body contact, “playing injured”, and return-to-play guidelines in minor hockey. Gaining a better understanding of parents would ultimately help to explain these individual differences, and
provide a knowledge base for educating and informing parents so that they may make the most effective compromise between safe-play and competitive values.

There are two primary goals for this study. The first is to develop a questionnaire that quantifies the constructs of perceived control, probabilities and values, risk propensity, competitiveness, and assertiveness expectancies. The second goal is to use these scales to describe a sample of hockey parents. The following sections review the literature pertaining to each of the included constructs, and explain why each was selected.

**Perceived Control**

The risks involved in playing ice hockey suggest that it is important to understand parents’ ability to make risk decisions. The perceived control scale is intended to provide a measure relevant to hockey parents’ judgment and decision-making. Specifically, the scale measures two factors related to judgment: heuristics (Tversky & Kahneman, 1974; Stanovich & West, 2008) and control through ability (Klein & Kunda, 1994; Gaines & Schwebel, 2009). The questions focus on concussions because of current concerns about head injuries.

Perceived control can affect judgment through heuristics, which, depending on cognitive availability or associative distance, can positively or negatively alter perceptions regarding the frequency of an event (Tversky & Kahneman, 1973). That is, individuals may feel that, although something like an illness or injury is likely to happen, it is unlikely to happen to them specifically, or in the present case, to their child (for a full review, see Tversky and Kahneman, 1974). Perceived control can also affect decision-making through influencing individuals’ beliefs that they are able to control risk through ability. For example, DeJoy (1992) found significant effects for beliefs about risk behaviors on risk perception: male drivers rated themselves as significantly better drivers compared to both the average motorist and to their peers, and were
significantly more likely, compared to females, to rate risky driving behaviors as less serious. DeJoy concluded that an exaggerated sense of control while driving, combined with lower risk perception for risky driving behaviors, contributed to their judgments about their risk. Based on these findings, we would expect males to perceive a greater amount of control over risk than females.

**Probabilities and Values**

Because of the wide variety of possible benefits and outcomes, it is important for parents to consider their reasons for enrolling their children in minor hockey. Some children may be suited for a career in professional hockey, while others may receive a great deal of benefit by simply playing for the fun and enjoyment of the game. Weighing these possible outcomes in terms of personal values is an integral part of being a hockey parent.

The construct of probabilities and values combines the perceptions of the probabilities of success or failure with the values parents attach to these successes or failures. The importance of this construct lies in the subjective utility of outcomes (Slovic, 1987), and the subjective and objective probability of achieving those outcomes (Baird & Thomas, 1985; Bettman, 1973). Seminal work by Kahneman and Tversky (1979) suggests that they may manifest in our study as “overestimation” (of probability) and “overweighting” (of value). Overestimation refers to the assigning of a larger probability of success for events which realistically have a very small chance of success, and overweighting refers to the assigning of a greater weight to events with large payoffs and small probabilities of success versus events with small payoffs and large probabilities of success.

Subjective value may also manifest in the form of tangible benefits (Hellstedt, 1987; Coakley, 2006). In the context of children in sport, parents often invest a great deal of time,
money, and effort; some research suggests that parents may view material rewards, such as trophies, belts, places in starting line-ups, or non-material rewards such as more important roles on teams (e.g., being named team captain), as a return on these investments that they have put into their children (Coakley, 2006). Probabilities and values may also manifest as intuition or emotion. Denes-Raj, Epstein, and Cole (1995) showed that, when presented with accurate statistical information, participants often ignore that information, and choose options intuitively. Hockey parents often do not have access to detailed statistical information, so intuition becomes a major factor in the hockey parent decision-making process, and it is important that it be addressed.

The probabilities and values scale is a subjective measure of how hockey parents’ estimate their children’s chances of playing elite level hockey, and about the value they place on achieving that goal. Because the investment of time, money, and energy increases with increasing competitive levels (due to increased travel, practices, and tournaments), the measure of probabilities and values is expected to vary with children’s levels of competition (Hellstedt, 1987; Coakley, 2006). Furthermore, prior research has demonstrated a link between competitiveness and beliefs about abilities (for a full review, see Niederle & Vesterlund, 2011). This indicates that probabilities and values should also vary with the competitiveness of the parents. Because the two aspects of probabilities and value may be separate, we will investigate whether this scale is better seen as one or two scales.

**Risk Propensity**

Due to the nature of hockey (e.g., quick pace, players playing with sticks and a hardened puck, body contact, etc.), injuries can be a concern. For this reason, willingness to accept risk is an important characteristic of hockey parents. Risk propensity has been defined as the reported
frequency with which people take different kinds of risks, that is, the measured summation of the reported risk-taking behavior of an individual across situations and time (Nicholson et al., 2005). Studies have linked risk propensity with such constructs as sensation seeking (Zuckerman, Eysenck, & Eysenck, 1978), impulsivity (Eysenck & Eysenck, 1977), fear of or aversion to uncertain outcomes (Morgenstern & Zechmeister, 2001), and Sitkin and Weingart (1995) found that risk propensity plays a significant role in individual risk decision-making.

Risk propensity is measured in this study using the Risk Propensity Scale (Meertens & Lion, 2008). Age should be negatively related to risk-taking behavior (de Rome et al., 2011) and males should demonstrate greater risk-taking behavior than females (DeJoy, 1992). Risk propensity should also correlate with parental history of injury, because those individuals who are inclined to take more risks will tend to injure themselves more often.

**Competitiveness**

Competitiveness is an important trait when participating in sport at any level, both for participants and spectators; this may be especially true when the spectators are the parents of the players. Competitiveness is also an important personality variable; it has been suggested to play a significant role in interpersonal success (Gough, 1987), it has been associated with the advocating one’s needs, interests, and positions (Ma & Jaeger, 2010), it is predictive of career choice (Houston, Farese, & La Du, 1992), and it has been associated with the “big five” personality traits of conscientiousness, agreeableness, neuroticism, openness, and extraversion (Fletcher & Nusbaum, 2008). It is a complex construct, and can be seen to have two aspects. The first aspect is “positive”, and has been referred to as interpersonal competitiveness characterized by the desire to use competition as a vehicle for personal growth and social development. The second aspect is “negative”, and has been referred to as goal oriented competitiveness or hyper-competitive.
attitude (HCA); it is characterized by the desire to use competition as a vehicle for social dominance, and to promote one’s own superiority (Griffin-Pierson, 1990; Houston, McIntire, Kinnie, & Terry, 2002). These two aspects of competitiveness are not presented in the literature as opposites, or as mutually exclusive. We will assess both positive and negative aspects and determine if they form a single dimension.

Competitiveness should be negatively correlated with age (Martin, Eklund, & Smith, 1994); individuals who are high in competitiveness should exhibit greater confidence in their abilities (represented here as perceived control, probabilities, values, and risk propensity), and males should be more competitive than females (for a full review, see Niederle & Vesterlund, 2011).

**Assertiveness Expectancies**

Assertiveness expectancies are the expectancies individuals have about the consequences of their assertive behaviors (Ames, 2008). Ames has shown that, whereas some individuals believe that a moderate level of assertiveness, aggressiveness, or pressure is most likely to result in success, others believe that high levels will bring greater success (i.e., individuals who continue to “push” will eventually get what they want).

Parents’ assertiveness expectancies in this study measure a component of parental involvement, the degree to which parents are emotionally, physically, and financially involved with their children in sport (Hellstedt, 1987; Gould, Tuffey, Udry, & Loehr, 1996; Stein et al., 1999). This should allow for some degree of quantification of the enthusiastic and aggressive nature of over-involved parents. High levels of assertiveness are associated with competitive conflict styles, while low levels of assertiveness are associated with cooperative conflict styles (for a full review, see Ames, 2008). In the present study, this suggests that assertiveness
expectancies should be correlated with competitiveness and with variables related to competitiveness (age, perceived control, probabilities and values, and possibly risk propensity).

**Demographic Characteristics**

Demographic factors about parents (e.g., the gender, education, and age of the parent) and their children’s hockey participation (e.g., level of competition, league rules regarding body checking) will not only provide important descriptive information, but will also aid in assessing whether the scales described previously correlate as expected with various characteristics. Demographic information should also provide important reference information for future studies.

**Method**

**Participants and Procedure**

Participants were 51 male and 68 female hockey parents (n = 119) who were recruited from the Kingston, Greater Toronto Area, Simcoe, and Sudbury regions of Ontario, and from Temiscaming, Quebec. Offline participants (n = 67) were recruited by direct contact at hockey tournaments and games, and online participants (n = 52) were recruited using poster advertisement within the hockey community, and hockey associations’ websites. No incentives were offered for participation.

**Measures**

The questionnaire took approximately 20 minutes to complete. The following sections describe each of the scales. Except for the demographic items, all questions were answered on 5-point Likert scales, with 1 being described as *strongly disagree* and 5 as *strongly agree*; when appropriate and as noted, items were reverse-coded.

**Demographic information.** Parents were asked to supply the following information: (a) parent age, (b) child age, (c) parent sex (males coded as 1, female as 2), (d) highest level of
education attained by parent, (e) parent history of injury (no = 1, yes = 2), (f) child history of injury (no = 1, yes = 2), (g) child age cohort, (h) child level of competition, and (i) whether or not the child’s league allows body checking (no = 1, yes = 2).

Level of education was measured on a 5-point scale with lowest to highest education achieved ranked 1 through 5; the five available choices were “did not complete high school”, “high school or high school equivalent”, “college” (known as community college in the United States), “bachelor’s degree”, and “post graduate degree”. History of injury was measured as a binary response (i.e., “yes” or “no”) with an option to record specific information about the injury.

Child age cohort refers to four age groupings: 9 to 10 year olds (both termed Atom), and 11 to 12 year olds (both termed Peewee). Level of competition was measured on a 5-point scale with lowest to highest levels of competitive play ranked 1 through 5. “House league” and “house league select” are two levels of non-competitive minor hockey, with “house league select” having the greater emphasis on skill development and preparation for play in competitive leagues. These two levels are followed by three competitive play levels: A, AA, and AAA, with AAA being the highest level of competitive play in Canadian minor hockey. Each of these levels exists in the Atom and Peewee groups, so the two variables are independent.

Finally, there is an important note regarding body checking and age cohorts. Non-body checking leagues often exist as an alternative for those parents who have children enrolled at the Peewee level, thus, parents with children at the Peewee level have the option of enrolling their children in body checking or non-body checking leagues. However, for parents who have children enrolled at the Atom level, all leagues in Ontario are non-body checking leagues.
**Perceived control.** This seven item scale measures the degree to which parents believe they are in control of their children’s risk of injury, whether it be through incidence (i.e., my child is not likely to receive a concussion) or skill and ability. Examples of items are, “Concussions can be avoided by being careful (for example, by keeping your head up)” and, “I believe that my child has the ability to avoid or escape injuries while playing Atom or Peewee hockey”.

**Probabilities and values.** This scale assesses the subjective utility of possible outcomes (Slovic, 1987), and the subjective and objective (perceived) probabilities of achieving those outcomes (Baird & Thomas, 1985; Bettman, 1973). Of the seven items, four items address parents’ perceptions of child ability and three address parents’ subjective value or importance of playing elite level hockey. Examples of items from this section are, “My child has the potential to play hockey at an elite level (either professionally or in Major Junior)” and, “It is not important to me for my child to play hockey at an elite level”.

**Risk propensity.** Risk propensity measures parents’ general risk-taking tendencies. The measure of risk propensity used is a modified version of the Risk Propensity Scale developed by Meertens and Lion (2008). This scale is composed of six items, as opposed to the seven item original, and to maintain consistency with the rest of rest of the questionnaire, uses a 5-point Likert scale, as opposed to the original 9-point scale. The modified risk propensity scale addresses general tendencies and personal philosophies regarding risk (four items), fear of the unknown (one item) (Slovic, 1987; Morgenstern & Zechmeister, 2001), and sensation seeking (one item) (Zuckerman et al., 1978). Examples of items from this section are, “I really dislike not knowing what is going to happen” and “I prefer to avoid risks”.

**Competitiveness.** The competitiveness scale contains ten items, five addressing HCA, and five addressing interpersonal success. Examples of items are, “Competing is the best way to
identify my strengths and weaknesses” and, “Win or lose, it is most important for me to keep improving.”

**Assertiveness expectancies.** Assertiveness expectancies assess the degree to which individuals believe they can push before incurring negative consequences (Ames, 2008). Examples of items are, “Extremely aggressive people gain more than they lose” and, “I believe there are limits to what being assertive in life can achieve.”

**Results**

Results are presented in five sections: (a) a description of the participants, (b) analyses of the individual scales, (c) the relationships between scales, (d) the relationships between scales and demographic variables, and finally (e) a summary description of hockey parents’ responses by demographic category.

**Description of Participants**

Descriptive demographic information about the participants is shown in Table 2.1. A small number of participants did not answer all questions. Twelve missing values for age were replaced by the sample mean. One individual did not indicate history of child injury, age cohort, level of competition, or body-checking, and another did not indicate parental history of injury, so the N for these variables is 118.

**Scale Analyses**

There was a small amount of missing data for the items of the scales (19 out of 4165 potential data points). Missing data were replaced with item means.

**Perceived control.** Means and standard deviations for each Perceived Control item are shown in Table 2.2. This scale had an alpha reliability of .54, and item analysis did not suggest any particular items to delete to improve reliability. However, because of the relevance of this
Table 2.1
Descriptive Demographic Information about Participants (N = 119)

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<td>Parent history of injury (yes)</td>
<td>42</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child history of injury (yes)</td>
<td>38</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age cohort a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor Atom (age 8)</td>
<td>42</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major Atom (age 9)</td>
<td>20</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor Pee wee (age 10)</td>
<td>21</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major Pee wee (age 11)</td>
<td>34</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of competition a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House league</td>
<td>25</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>House league select</td>
<td>18</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>34</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>22</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AAA</td>
<td>19</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body checking b</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>70</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>45</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Know</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. a N = 118, b N = 117

construct to risk decision-making that is suggested by the literature (Tversky & Kahneman, 1974; Peterson, Farmer, & Kashani, 1990; DeJoy, 1992; Klein & Kunda, 1994; Morrongiello, Ondejko, & Littlejohn, 2004; Gaines & Schwebel, 2009), we decided to use the entire scale, in spite of its poor internal consistency, with the hopes that future research will retain the construct, but modify the scale to improve its reliability.

**Probabilities and values.** The probabilities and values item statistics are shown in Table
Table 2.2  
*Means and Standard Deviations for Perceived Control Scale Items (N = 119)*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC1. I think that concussions in minor hockey are over-reported.</td>
<td>1.76</td>
<td>0.92</td>
</tr>
<tr>
<td>PC2. Concussions can be avoided by being careful (for example, by keeping your head up)</td>
<td>2.75</td>
<td>1.04</td>
</tr>
<tr>
<td>PC3. Considering ALL possible injuries in hockey, concussions are the most common injuries. (R)</td>
<td>3.01</td>
<td>1.11</td>
</tr>
<tr>
<td>PC4. How likely do you feel it is that your child will get a concussion while playing Atom or Peewee hockey? (R)</td>
<td>2.94</td>
<td>1.05</td>
</tr>
<tr>
<td>PC5. How likely do you believe it will be that a child who plays on your child's team will receive a concussion while playing Atom or Peewee hockey? (R)</td>
<td>2.43</td>
<td>1.14</td>
</tr>
<tr>
<td>PC6. I believe that my child has the ability to avoid or escape injuries while playing Atom or Peewee hockey.</td>
<td>2.63</td>
<td>0.96</td>
</tr>
<tr>
<td>PC7. Regardless of any 'statistics' about the incidence of concussion in hockey, I don't believe my child will experience a concussion while playing Atom or Peewee hockey.</td>
<td>2.82</td>
<td>1.15</td>
</tr>
<tr>
<td>Average per item for Perceived Control scale</td>
<td>2.62</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Note. R indicates the item was reverse-coded.

Table 2.3  
*Means and Standard Deviations for the Probabilities and Values Scale; Results of Factor Analysis (Principal Axis Factoring, Varimax Rotation) (N = 119)*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV1. My child should be on the top line or first defensive pair, or the starting goaltender on his team.</td>
<td>2.79</td>
<td>1.13</td>
<td>0.60</td>
<td>-0.08</td>
</tr>
<tr>
<td>PV2. My child has the potential to play hockey at an elite level (either professionally, or in Major Junior).</td>
<td>2.46</td>
<td>1.01</td>
<td>0.67</td>
<td>-0.01</td>
</tr>
<tr>
<td>PV3. It is not important to me for my child to play hockey at an elite level. (R)</td>
<td>2.53</td>
<td>1.31</td>
<td>-0.03</td>
<td>0.59</td>
</tr>
<tr>
<td>PV4. My child is considerably farther along in his hockey skill development than his peers.</td>
<td>2.82</td>
<td>1.00</td>
<td>0.73</td>
<td>-0.09</td>
</tr>
<tr>
<td>PV5. I wish to be the proud parent of an NHL player.</td>
<td>2.41</td>
<td>1.10</td>
<td>0.49</td>
<td>0.06</td>
</tr>
<tr>
<td>PV6. I would be perfectly happy if my child never played Major Junior or professional hockey. (R)</td>
<td>2.62</td>
<td>1.47</td>
<td>-0.00</td>
<td>0.84</td>
</tr>
<tr>
<td>PV7. My child has essentially reached his potential in terms of overall skill.</td>
<td>2.25</td>
<td>1.03</td>
<td>-0.24</td>
<td>0.19</td>
</tr>
<tr>
<td>Average per item for 4-item Probability scale</td>
<td>2.62</td>
<td>0.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average per item for 2-item Value scale</td>
<td>2.58</td>
<td>1.20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. R indicates the item was reverse-coded. Factor loadings > .25 are in bold.
Table 2.4

*Means and Standard Deviations for the Risk Propensity Scale Items (N = 119)*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP1. I really dislike not knowing what is going to happen in life. (R)</td>
<td>2.94</td>
<td>1.07</td>
</tr>
<tr>
<td>RP2. I do not take risks with my health. (R)</td>
<td>2.72</td>
<td>0.89</td>
</tr>
<tr>
<td>RP3. I prefer to avoid risks. (R)</td>
<td>2.65</td>
<td>0.93</td>
</tr>
<tr>
<td>RP4. I believe in safety first. (R)</td>
<td>2.03</td>
<td>1.01</td>
</tr>
<tr>
<td>RP5. I usually view risks as a challenge.</td>
<td>2.77</td>
<td>0.91</td>
</tr>
<tr>
<td>RP6. I take risks regularly.</td>
<td>2.54</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>Average per item for Risk Propensity scale</strong></td>
<td>2.61</td>
<td>0.55</td>
</tr>
</tbody>
</table>

2.3. The scale had an initial alpha reliability of .44, which was increased to .52 with the omission of item PV7. Principal axis factor analysis with Varimax rotation resulted in a 2-factor solution, with items PV1, PV2, PV4, and PV5 loading on a factor representing probability (Factor 1), and items PV3 and PV6 loading on a factor representing value (Factor 2); item PV7 did not load strongly on either factor (see Table 2.3). We decided to form two separate scales; the alpha reliability of the four-item Probability scale was .71 and that of the two-item Value scale .65.

**Risk Propensity.** The means and standard deviations for the items of the risk propensity scale are shown in Table 2.4; this scale had an alpha reliability of .70.

**Competitiveness.** Item means and standard deviations for the original competitiveness scale are shown in Table 2.5. This scale had an alpha reliability of .52. Principal axis factor analyses were carried out to explore the dimensions underlying the scale. A one-factor solution (see Table 5) showed 6 items loading on the factor. A two-factor solution (with Varimax rotation) was attempted, but the first factor was similar to that shown in Table 2.5 and the second factor was not interpretable. We decided to retain a single competitiveness factor, defined by items C2, C3, C4, C6, C7, and C9 (the last negatively; see Table 5). These items represent both
Table 2.5
*Means and Standard Deviations for the Competitiveness Scale; Results of Principal Axis Factor Analysis (N = 119)*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
<th>Factor 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1. I hate competing with others. (R)</td>
<td>3.72</td>
<td>0.96</td>
<td>.22</td>
</tr>
<tr>
<td>C2. One of the best reasons to compete is to make friends.</td>
<td>2.90</td>
<td>1.11</td>
<td>.55</td>
</tr>
<tr>
<td>C3. Competing is the best way to identify my strengths and weaknesses.</td>
<td>3.18</td>
<td>0.97</td>
<td>.72</td>
</tr>
<tr>
<td>C4. I enjoy the feeling of being better than others.</td>
<td>2.84</td>
<td>1.08</td>
<td>.66</td>
</tr>
<tr>
<td>C5. Win or lose, it is most important for me to keep improving.</td>
<td>4.21</td>
<td>0.85</td>
<td>.13</td>
</tr>
<tr>
<td>C6. My friends think that I am too competitive.</td>
<td>2.35</td>
<td>1.00</td>
<td>.36</td>
</tr>
<tr>
<td>C7. I tend to put people down when they don’t meet my standards.</td>
<td>1.71</td>
<td>0.70</td>
<td>.28</td>
</tr>
<tr>
<td>C8. Losing is sometimes more important than winning, because it teaches you what you need to work on in order to improve.</td>
<td>3.82</td>
<td>0.86</td>
<td>.13</td>
</tr>
<tr>
<td>C9. It’s not whether you win or lose, it’s how you play the game.</td>
<td>4.15</td>
<td>0.71</td>
<td>-.29</td>
</tr>
<tr>
<td>C10. One of the best reasons to compete is to learn the value of teamwork.</td>
<td>1.71</td>
<td>0.70</td>
<td>-.06</td>
</tr>
<tr>
<td>Average per item for 6-item Competitiveness scale (with C9 reversed)</td>
<td>2.47</td>
<td>0.57</td>
<td></td>
</tr>
</tbody>
</table>

R indicates the item was reverse-coded. Factor loadings > .25 are in bold.

positive and negative aspects of competitiveness. This new 6-item scale, with C9 reverse-coded, had an alpha reliability of .65.

*Assertiveness Expectancies.* Means and standard deviations for each item can be seen in Table 2.6. This scale had an alpha reliability of .43, which increased to .59 with the omission of item AX1.

*Correlations*

Correlations between scales are presented in Table 2.7, those between scales and
Table 2.6
*Means and Standard Deviations for the Assertiveness Expectancies Items (N = 119)*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>AX1. Assertive behavior always leads to poor outcomes. (R)</td>
<td>3.70</td>
<td>0.89</td>
</tr>
<tr>
<td>AX2. Extremely aggressive people gain more than they lose.</td>
<td>2.27</td>
<td>0.93</td>
</tr>
<tr>
<td>AX3. I believe that there are limits to what being assertive can achieve. (R)</td>
<td>2.66</td>
<td>0.99</td>
</tr>
<tr>
<td>AX4. In the end, aggressive people will generally achieve less than those who limit their aggression. (R)</td>
<td>3.05</td>
<td>0.98</td>
</tr>
<tr>
<td>AX5. Being extremely assertive in life will lead to good things.</td>
<td>2.94</td>
<td>0.91</td>
</tr>
<tr>
<td>Average per item for 4-item Assertiveness Expectations scale</td>
<td>2.73</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Table 2.7
*Correlations between Scales (N = 119)*

<table>
<thead>
<tr>
<th></th>
<th>PC</th>
<th>P</th>
<th>V</th>
<th>RP</th>
<th>C</th>
<th>AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived control scale (PC)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Probability scale (P)</td>
<td>.10</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Value scale (V)</td>
<td>-.01</td>
<td>-.04</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Risk propensity scale (RP)</td>
<td>.02</td>
<td>.03</td>
<td>.10</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Competitiveness scale (C)</td>
<td>.17</td>
<td>.22*</td>
<td>-.05</td>
<td>.23*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Assertiveness expectancies scale (AX)</td>
<td>.17</td>
<td>.21*</td>
<td>.13</td>
<td>.02</td>
<td>.09</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. * indicates p < .05; ** indicates p < .01

Table 2.8
*Correlations between Scales and Demographic Variables (N = 119)*

<table>
<thead>
<tr>
<th></th>
<th>PC</th>
<th>P</th>
<th>V</th>
<th>RP</th>
<th>C</th>
<th>AX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.06</td>
<td>-.03</td>
<td>-.04</td>
<td>-.09</td>
<td>.15</td>
<td>-.06</td>
</tr>
<tr>
<td>Sex (M= 1, F = 2)</td>
<td>-.03</td>
<td>-.14</td>
<td>.02</td>
<td>-.25*</td>
<td>-.42**</td>
<td>.09</td>
</tr>
<tr>
<td>Level of education</td>
<td>-.17</td>
<td>-.15</td>
<td>-.02</td>
<td>-.06</td>
<td>.02</td>
<td>-.41**</td>
</tr>
<tr>
<td>Parent history of injury (no = 1, yes = 2)</td>
<td>.01</td>
<td>-.05</td>
<td>.05</td>
<td>.19*</td>
<td>-.21*</td>
<td>-.07</td>
</tr>
<tr>
<td>Child history of injury (no = 1, yes = 2)</td>
<td>-.17</td>
<td>-.04</td>
<td>.04</td>
<td>-.11</td>
<td>.01</td>
<td>-.20*</td>
</tr>
<tr>
<td>Age cohort</td>
<td>-.07</td>
<td>-.16</td>
<td>-.16</td>
<td>.09</td>
<td>.01</td>
<td>-.16</td>
</tr>
<tr>
<td>Level of competitive play</td>
<td>-.02</td>
<td>.27**</td>
<td>.23*</td>
<td>.07</td>
<td>.00</td>
<td>.14</td>
</tr>
<tr>
<td>Body checking (no = 1, yes = 2)</td>
<td>-.12</td>
<td>.03</td>
<td>-.04</td>
<td>.14</td>
<td>-.12</td>
<td>-.09</td>
</tr>
</tbody>
</table>

Note. See Table 10 for scale abbreviations. * indicates p < .05; ** indicates p < .01
Table 2.9  
Correlations between Demographic Variables (N = 119)  

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Sex (M=1, F=2)</td>
<td>-.14</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Level of education</td>
<td>.05</td>
<td>.08</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Parent history of injury (no = 1, yes = 2)</td>
<td>.07</td>
<td>-.32**</td>
<td>.05</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Child history of injury (no = 1, yes = 2)</td>
<td>.17*</td>
<td>-.07</td>
<td>.10</td>
<td>.18</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Age cohort</td>
<td>.42**</td>
<td>-.08</td>
<td>.04</td>
<td>-.01</td>
<td>.25**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Level of competitive play</td>
<td>-.08</td>
<td>-.06</td>
<td>-.01</td>
<td>-.09</td>
<td>-.15</td>
<td>-.15</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>8. Body checking (no = 1, yes = 2)</td>
<td>.30**</td>
<td>-.03</td>
<td>-.01</td>
<td>-.01</td>
<td>.09</td>
<td>.58**</td>
<td>.13</td>
<td>-</td>
</tr>
</tbody>
</table>

demographic variables in Table 2.8, and those between demographic variables in Table 2.9. 

Interpretation of these correlations is in the Discussion. 

**Group Differences on Scales**

The participants’ performance on the various scales was next considered in terms of their sex, and parent and child histories of injury, and body checking. When males and females were
Figure 2.1. Performance of males and females on scales.

Figure 2.2. Performance on scales of parents with and without a history of injury.
compared (see Figure 2.1), they differed on risk propensity, $F(1, 117) = 7.73$, $p < .01$, partial $\eta^2 = .06$, and competitiveness, $F(1, 117) = 24.61$, $p < .001$, partial $\eta^2 = .17$. Parents with a history of injury differed from those without such a history on risk propensity, $F(1, 116) = 4.11$, $p < .05$, partial $\eta^2 = .03$, and competitiveness, $F(1, 116) = 5.45$, $p < .05$, partial $\eta^2 = .04$ (see Figure 2.2). Parents of children with a history of injury differed from those whose children did not have such a history on assertiveness expectancies, $F(1, 116) = 6.40$, $p < .05$, partial $\eta^2 = .04$ (see Figure 2.3). No significant differences on scale scores were found between parents who had children enrolled in body checking leagues and parents who had children enrolled in non-contact leagues.

Figure 2.3. Performance on scales of parents whose children did or did not have a history of injury.
Discussion

Development of Questionnaire

One of the purposes of this study was to develop an instrument that could reliably measure the constructs of perceived control, probabilities and values, risk propensity, competitiveness, and assertiveness expectancies. Overall, the questionnaire that was developed performed adequately, although some constructs and scales may require refinement. In several cases the internal consistencies of the scales were low. Although this may indicate poor questions or inappropriate constructs, we suggest that neither of these interpretations is entirely true. All of the constructs have been studied extensively in prior research (see the literature review), and the items used here are similar to those used in previous studies.

We propose alternative explanations for the low scale reliabilities seen in this study. All of the constructs used in the current study were developed using post-secondary student populations (i.e., students enrolled in either undergraduate or graduate programs). The sample in the current study represented a population that was considerably older and more diverse than these populations. These differences in samples alone could account for the low internal consistencies seen here. Alternatively, the context of the questionnaire may have been responsible for low scale reliabilities. The context of the current study is quite different from the context of the previous studies in which risk constructs were developed and validated. Some of these studies contextualized risk as financial gains and losses, which are a different risk domain than injuries to one’s children. We propose that the low internal consistencies reported here are a result of these reasons, and not poor measures.

The perceived control scale, while exhibiting low reliability, is an important construct, particularly with respect to risk management (DeJoy, 1992; Klein & Kunda, 1994; Gaines &
Schwebel, 2009). This suggests that, while the construct is conceptually sound, further refinement of the scale may be required in future research. It may be that perceived control is more complex or multidimensional when parents are thinking about their children playing a risky sport.

Based on previous studies (Kahneman & Tversky, 1979; Kahneman & Tversky, 1984), we expected that probabilities and values would form a single dimension, but this was not the case. Furthermore, results showing good reliabilities for separate probabilities and values scales, and low inter-scale correlation (-.04; see Table 7) did not support the findings of Kahneman and Tversky (1984). One possible reason for this may have been that Kahneman and Tversky examined risk decision-making in a primarily monetary or economical context, whereas we asked parents to consider risks to their children. The relationship between probabilities and values may depend on context.

Finally, competitiveness did not form two separate aspects, but rather one single aspect representing both the positive and negative dimensions of competitiveness. These results do not support a two-dimensional approach to competitiveness, but they do attest to the complexity of the construct (Fletcher & Nusbaum, 2008). The present results may be due to the nature of the participants or the context; further study of the dimensionality of competitiveness is warranted.

Several effects that previous studies would have suggested should be found were not. For example, competitiveness is often negatively correlated with age (Martin, Eklund, & Smith, 1994), but it was not here. Similarly, age and risk propensity have been found to be negatively correlated (de Rome et al., 2011) but were not in the present study. However, we do not see these as challenging the validity of the scales, but rather as demonstrating how different samples and contexts can affect results. In contrast to the usual sample of 18 to 22 year old undergraduates,
the present age range was 29 to 57 years, and instead of being students, participants were parents with careers, families, and dependents. It is likely that competitiveness and risk propensity decline with age (e.g., into early adulthood), and context (e.g., having dependents), but remain constant after this time (see de Rome et al., 2011).

The nature of the sample and the context of the study may also have affected scale reliabilities. The constructs in this study were developed using primarily undergraduate populations. It is possible that some of the constructs are not as clearly defined in hockey parents as they are in undergraduate students, or those that appear to be one-dimensional traits in university students are more multi-dimensional in older individuals who must consider their children’s safety. Future research should consider the effects of samples and context upon scale performance, relationships, and reliability.

Overall, the results suggest that the scales developed in this study can be used in future research to describe hockey parents, however, further refinement and expansion of scales would be required to study particular aspects, such as competitiveness, in greater detail.

Describing Hockey Parents

The second purpose of this study was to describe a sample of hockey parents using the questionnaire. Demographically, the sample was of middle age and well-educated; about 40% reported having been injured themselves, and about the same percentage reported their children having been injured. Their children were evenly spread across age and competition levels, and 60% played in leagues allowing body-checking. Consistent with prior research, males scored higher on competitiveness and risk propensity compared to females (DeJoy, 1992; Meertens & Lion, 2008; Niederle & Vesterlund, 2011). These factors must be taken into consideration when generalizing results to other samples.
Without a comparison group of non-hockey parents, it is not possible to know how hockey parents differ from other parents, but it is possible to examine how they responded to the questionnaire items in relation to the scale’s neutral mid-points, and to see how the dimensions of the questionnaire are related. With regard to the scale mid-points, it is interesting to note that all averages were below the mid-points, suggesting that the parents do not see themselves as generally risky or competitive and so on. This conflicts with the stereotypical views seen in the media, which often portray hockey parents as, for instance, very competitive (“13-year-old referee”, 2012), and supports two possible opinions. First, it may be that hockey parents are not overly competitive, and that it is the vocal minority that skews public opinion. A second possibility is that this result is due to social desirability, or to the education level of this sample. Future research should determine how hockey parents differ from others, and how their attitudes, values and beliefs develop over time.

The results also gave us information about the associations between the variables we measured. Competitiveness was correlated with risk propensity and perceived probability of their children’s success, as were perceived probability and assertiveness expectancies. Furthermore, parents who reported having been injured had higher scores than those who did not on risk propensity and competitiveness, and if their children had been injured, the parents were higher on assertiveness expectancies. Thus, although the effects are modest in magnitude, there is evidence for a cluster of parent attitudes, values, and beliefs being associated with both parent and child injuries. Future research should attempt to uncover the causal paths underlying these associations.

**Limitations, Implications, and Conclusions**

26
Although we see the instrument developed here as being useful in a number of contexts, it is important to acknowledge a number of limitations. The parents who agreed to complete the questionnaire are unlikely to be representative of all parents whose children play hockey, and it is further likely that those parents whose behavior is the most concerning are the least likely to have completed the questionnaire. The results obtained here are also likely to be sample-dependent; for instance, some relationships may be stronger and others weaker for less educated parents. The scales we constructed showed lower internal consistency in several cases than would typically be preferred (perceived control, values, competitiveness, and assertiveness expectancies); as we discussed earlier, some of the constructs involved may be more complex for hockey parents. Finally, hockey parents themselves are a limitation: it is not clear how similar they are to parents of children playing other sports or engaging in other activities. Further studies in more varied contexts are warranted.

The questionnaire developed in this study, perhaps with some refinement and modification, could provide a valuable tool for those working with minor hockey parents, as well as for parents of children playing other sports in general. For example, in the context of educational programs for parents (such as concussion awareness and prevention programs), this tool might be useful in helping to derive important information about parents, the family unit, and parents’ roles regarding their children’s participation in minor sport. This information could then be used to help educators design risk information programs to help parents exercise good judgment regarding the participation of their dependents. Once further normative data are collected, it might be possible to use the tool to screen parents for possible dangerous behavior, or as part of a family assessment associated with a child’s sports injury.
In conclusion, it is evident that hockey parents are an important under-studied population for research. Their degree of influence over their children’s behavior suggests that it is important that hockey associations, coaches, and researchers develop a deeper understanding of what drives parents to behave in different ways. Although much more research needs to be done, the current research has provided a satisfactory start to creating a valid and reliable quantification of a number of important variables, and has provided an objective description of an interesting and under-studied population.
Chapter 3

Predicting minor hockey parents’ risk decision-making on behalf of their children

Abstract

Although minor hockey is an excellent opportunity for children to develop critical social and kinesthetic skills, it also presents recognizable health risks, such as the risk of concussion. This study examines the effects of 119 Canadian hockey parents’ attitudes, values, and beliefs on their risk decision-making on behalf of their children; an effect referred to as proxy risk decision-making. Results showed that risk constructs of: (a) general concussion knowledge, (b) perceived control over their children’s risk of injury, (c) perceptions about their children’s probabilities of playing elite level hockey, (d) how they value such an achievement, (e) risk propensities, (f) competitiveness, and (g) beliefs about the consequences of their assertive behavior had relatively few effects on proxies’ risk decision-making. Opinions of the primaries (children) and expert advisers (doctors) were found to have large effects on proxies’ risk decision-making processes. Results and implications for future research are discussed.

*Keywords*: hockey, parents, proxy risk, concussion, health risk management
Introduction

The uncertainty of the long term outcomes of concussive injuries to the developing brain (Goldman, 1974; Levin et al., 1988; Dennis et al., 2001; Holsinger et al., 2002; McKinlay et al., 2002; Hessen et al., 2007) has prompted increased awareness of safe participation in minor hockey (Committee on Sports Medicine and Fitness, 2000; Cusimano et al., 2009). This awareness has focused specifically on the education and prevention of concussions in minor hockey. To address these issues, hockey associations, such as Hockey Canada, have initiated risk management strategies for concussion that have focused on concussion awareness, player education, rule enforcement, and protective equipment (Hockey Canada, 2012b). Examples include instruction in delivering and receiving a body check and increasing players’ awareness of on-ice activity and dangerous areas on the ice (Hockey Canada, 2012c), enforcing regulation on direct contact to the head (Hockey Canada, 2012d), and the use of mouth guards and appropriately fitted certified helmets (Hockey Canada, 2012e).

More recently, focus has shifted to parents as risk management agents. It is widely believed that parents’ teaching and modeling of proper competition and safe-play values, as well as exercising good judgment and decision-making on behalf of their child, can have an impact on children’s risk of injury in minor hockey. Although there is no literature to directly support this claim in the context of minor sport, research has shown that parents can indeed help prevent unintentional pediatric injuries (Schwebel & Bounds, 2003; Morrongiello, Ondejko, & Littlejohn, 2004). Furthermore, research has also shown that parents can have a strong influence over their children’s injury incidence through teaching and modeling safety rules and guidelines (Peterson, Farmer, & Kashani, 1991; Peterson & Saldana, 1996). Thus, parents, although not being able to take a direct role in preventing these kinds of injuries must be aware of their role in the process
(Peterson, Farmer, & Kashani, 1991; Peterson & Saldana, 1996; Morrongiello, 2005). That is, much in the same way that teaching, modeling, and knowing about safety rules and values can lead to fewer pediatric injuries (Morrongiello et al., 2004), knowing about concussions, teaching and modeling competition and safe-play values, and exercising good judgment (in such things as when and how much to play, when to return to play after an injury, and the relative importance of competition and winning) may be able to reduce concussion incidence.

In recognition of this plausible link, hockey associations have begun integrating parent education programs into their risk management strategies. Educational documents and parent contracts, which draw parents’ attention to their role in injury risk management in minor hockey (Hockey Canada & General Motors of Canada Limited, 2009), are increasingly being used. However, although this type of educational approach is popular, the effects of parental beliefs about degree of body contact, players playing injured, or the professionalization of youth sport (Smoll et al., 2011) on parents’ risk decision-making on behalf of their children is not known. Evidence that these factors significantly affect parents’ risk decision-making would first need to be shown in order to prove the effectiveness of this educational approach.

The Present Study

The current study examined the degree to which parents’ attitudes, values, and beliefs regarding their children’s safe participation in minor hockey, are associated with their risk decision-making on behalf of their children in a return-to-play scenario following a concussion. It is also important to note that the current research paradigm diverges from the standard risk paradigm, because parents are not making decisions regarding their own risk, but rather regarding their children’s risk. For this reason, we refer to the process as proxy risk decision-making, to differentiate the process from individual risk decision-making.
The specific aspects of parents’ attitudes, values, and beliefs examined in this study were:

(a) general concussion knowledge, (b) perceived control over risk, (c) parents’ perceptions regarding their children’s probabilities of playing elite level hockey, (d) how parents value their children playing elite level hockey, and (e) parents’ risk propensity, (f) competitiveness, and (g) assertiveness expectancies. These scales were taken from a study by Koo, Kirby, and Pelland (see Chapter 2 of this thesis). Parents were also asked to complete a short assessment of their general knowledge about concussions.

Parents’ risk decision-making was assessed through hypothetical scenarios in which they were asked how likely they would be to encourage their children to return to play following a concussion. The scenarios were structured to differ in whether or not the children and the children’s doctors supported a return to play. Scenarios were selected to measure risk decision-making because they obviated the need for finding genuine concussion cases, and widened the subject pool by being applicable to many potential participants, as opposed to only those with children who had received a medically diagnosed concussion. Examples of the successful use of hypothetical scenarios include Klein and Kunda’s (1992) research on participants’ preference for control in risky situations and Kahneman and Tversky’s (1979) work examining individual differences in decision-making under circumstances with varying degrees of risk.

Constructs Evaluated by the Questionnaire

Knowledge was measured using a brief test of general knowledge of concussions; for example, signs and symptoms (of concussion), and whether or not parents understand that there is a difference between adult and pediatric concussions. Research has shown that, as individuals become more knowledgeable about probabilities and consequences of outcomes, they will
become less willing to take risks (Slovic, 1987; de Rome et al., 2011). Thus, we expect concussion knowledge to have a negative effect on proxies’ risk behavior.

Perceived control is a measure of how much control parents believe they have over their children’s risk of concussion. We expected risk behaviour to vary with (a) the ease of which individuals could bring to mind examples of how concussions had negatively affected them or the people around them, and (b) how closely these examples have personally affected them (Tversky & Kahneman, 1974). Examples of these effects in the literature have been found by Gaines and Schwebel (2009), who determined that parents perceived less risk for their own children than for other children under similar circumstances, because they felt that certain injury risks did not apply to their children (i.e., parents felt that their children were “smarter, safer, or developmentally more advanced than the average child” [p. 1073]).

The probabilities construct was measured with questions about parents’ beliefs about the likelihood of their children playing elite level hockey (Major Junior or professional level hockey). This construct was designed to quantify parents’ perceived probabilities of achieving desired outcomes (Bettman, 1973; Baird & Thomas, 1985). Also related to the construct of probabilities is the construct of values, which quantifies the weight parents place on their children playing elite level hockey (Slovic, 1987).

Finally, risk propensity is defined as the reported frequency with which individuals take different kinds of risks, or the measured summation of the reported risk-taking behavior of an individual across situations and time (Nicholson et al., 2005). Risk propensity is a broad personality trait which has been linked to such risk constructs as sensation seeking (Zuckerman, Eysenck, & Eysenck, 1978), impulsivity (Eysenck & Eysenck, 1977), and aversion to uncertain
outcomes (Morgenstern & Zechmeister, 2001). Sitkin and Weingart (1995) found that risk propensity was positively associated with risk behavior.

The remaining variables of competitiveness and assertiveness expectancies address the competitive nature of sports. Competitiveness is an important personality variable, and has been associated with a number of interpersonal success correlates (Gough, 1987). Furthermore, there is research that suggests that individuals’ judgment can be heavily influenced by both intuition and emotion (e.g., competitive or assertive/aggressive levels), and that this effect remains present even when individuals are presented with accurate probability data (Ubel & Loewenstein, 1997; Ubel, 2010). The constructs of competitiveness and assertiveness expectancies quantified how competitive hockey parents perceive themselves to be, as well as provided some measure of the enthusiastic and aggressive nature of over-involved parents.

The lack of research examining how proxies makes risk decisions means that there is no research to guide hypotheses in this matter. For this reason, we must initially assume that the variables significant in individual risk decision-making are also significant in proxies’ risk decision-making. Specifically, we hypothesize that the constructs of knowledge, perceived control, probabilities, values, and risk propensity will predict parents’ risk decision-making significantly. Our second hypothesis, based on the competitive nature of minor sport, posits that competitiveness and assertiveness will also exert direct predictive effects on parents’ risk decision-making. We also hypothesize that effects of perceived control, probabilities, values, risk propensity, competitiveness, and assertiveness expectancies on risk behavior will be positive in direction, while the effects of knowledge will be negative. Our fourth and final hypothesis posits that the views of the child and doctor, about whether the child should return to play following a concussion, will have effects on proxies’ decision-making.
Method

This study received clearance according to the recommended principles of Canadian ethics guidelines and Queen’s University policies.

Participants

Participants were 119 parents of male hockey players who were between the ages of 8 and 13 years of age. Participants were recruited from hockey regions around southern and eastern Ontario, Canada: Greater Kingston and Napanee, Greater Toronto, York-Simcoe, and Sudbury areas; and the Temiscaming, Quebec areas. No incentives were offered to participants.

Measures

The constructs of perceived control, probabilities, values, risk propensity, competitiveness, and assertiveness expectancies were measured using 5-point Likert scale items (see Chapter 2 for more details about these scales). Scales and their reliabilities were as follows: (a) the perceived control scale contained seven items and had a reliability of .54; (b) the probabilities scale contained four items and had a reliability of .71; (c) the values scale contained two items and had a reliability of .65; (d) the risk propensity scale, which was a modified version of the Risk Propensity Scale developed by Meertens and Lion (2008), contained six items and had a reliability of .70; (e) the competitiveness scale contained six items and had a reliability of .65; and (f) the assertiveness expectancies scale contained four items and had a reliability of .59. The questionnaire also had items addressing the demographic variables of age, sex, level of education, parent history of injury, child history of injury, child age cohort, child level of competitive play, and whether or not body-checking was permitted in the child’s league.

The knowledge measure contained nine items: three multiple choice, five true or false items, and one selection item. For the selection item, participants were asked to correctly identify
Read the following scenario, then answer the questions.

Imagine that two weeks ago, your child was hit while playing hockey. At the time of the injury, he was complaining of headaches and dizziness. Your doctor diagnosed your child with a mild concussion and prescribed rest. The doctor also suggested that your child not return to play at the time, and to return for a re-evaluation in two weeks. Now, it has been two weeks, your child seems fit and healthy, and is no longer suffering any signs or symptoms of concussion…

1. Your child wants to go back on the ice, but your doctor still suggests that he does not return to play. How likely would you be to encourage your child to return to play hockey?
2. Your child does not want to go back on the ice, but your doctor says that it is okay for him to return to play. How likely would you be to encourage your child to return to play hockey?
3. Your child wants to go back on the ice, and your doctor agrees that it is okay for him to return to play. How likely would you be to encourage your child to return to play hockey?
4. Your child does not want to go back on the ice, and your doctor still suggests that he does not return to play. How likely would you be to encourage your child to return to play hockey?

Figure 3.1. The text of the scenarios used in the proxy decision-making task. The Likert response scale displayed was shown after each of the four items.

signs and symptoms associated with concussion; one point was given for each correct selection, one point was subtracted for each incorrect selection, and no points were assigned for missed signs or symptoms. For all other items, one point was given for each correct response, and no points were given for incorrect responses.

The proxy decision-making task required participants to rate, on 11-point Likert scales, how likely they would be to encourage their child to return to play under four conditions: (1)
neither the child nor the doctor endorse a return to play (referred to as the C-, D- condition); (2) the child wishes to return, but the doctor suggests he does not return to play (the C+, D- condition); (3) the child does not wish to return, but the doctor endorses a return to play (the C-, D+ condition); and (4) both child and doctor endorse a return to play (the C+, D+ condition). The text of the outcome scenarios can be found in Figure 3.1.

**Procedure**

Participants were recruited both online and offline. Online participants were recruited through the Mississauga Hockey League website and through flyers which were distributed by researchers. Offline participants were recruited by direct contact at minor hockey practices, games, and tournaments, as well as poster advertisements within the hockey community.

**Results**

This section first presents a brief description of the characteristics of the sample used in this study, followed by regression analyses to determine the predictors of the four measures of risk decision-making, and then a series of repeated measures analyses of variance to examine Child, Doctor, and Child x Doctor effects in the context of the other predictors.

**Participant Characteristics**

Participants in this study had a mean age of 43.3 years of age (SD = 4.9) with a range between 29 and 57 years. For comparison, Statistics Canada reports mean ages at first, second, and third births at 28.1, 30.7, and 31.7 years of age (Statistics Canada, 2008). 88% (N = 105) of parents also reported having completed some form of post-secondary education (i.e., community college or higher). 35% of parents (N = 42) reported having had an injury serious enough to force them to miss school or work, while 32% (N = 38) reported that their children had experienced an injury of similar degree. Also, 36% (N = 43) of parents had their children
Table 3.1
Overall scale means and standard deviations; per-item average means and standard deviations

<table>
<thead>
<tr>
<th>Variable</th>
<th># of Items</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge¹</td>
<td>9</td>
<td>10.97</td>
<td>1.95</td>
</tr>
<tr>
<td>2. Perceived control²</td>
<td>7</td>
<td>2.62</td>
<td>0.54</td>
</tr>
<tr>
<td>3. Probabilities²</td>
<td>4</td>
<td>2.62</td>
<td>0.77</td>
</tr>
<tr>
<td>4. Values²</td>
<td>2</td>
<td>2.47</td>
<td>0.92</td>
</tr>
<tr>
<td>5. Risk propensity²</td>
<td>6</td>
<td>2.61</td>
<td>0.55</td>
</tr>
<tr>
<td>6. Competitiveness²</td>
<td>6</td>
<td>2.47</td>
<td>0.57</td>
</tr>
<tr>
<td>7. Assertiveness expectancies²</td>
<td>4</td>
<td>2.92</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Note. ¹ indicates scale means and standard deviations, ² indicates per-item means and standard deviations.

enrolled in non-competitive house leagues, compared to 64% (N = 75) in competitive leagues.

One participant failed to complete one page of the questionnaire, and so did not provide information for child history of injury, child age cohort, level of competition, and body-checking; one other participant failed to report parent history of injury. N for these variables is 118. 12 missing values for age were replaced with the sample mean. Means and standard deviations for all scale scores are shown in Table 3.1.

Regression Analyses

Stepwise hierarchical regression analyses were conducted to determine the predictors of the four measures of risk decision-making. The demographic variables of sex, level of education, parent and child history of injury, and child age cohort were entered in the first step, level of competition and body checking were entered in the second step, and knowledge, perceived control, probabilities, values, risk propensity, competitiveness, and assertiveness expectancies were entered in the final step. The variables in the first step represented characteristics of the children and parents, those in the second step represented hockey league characteristics, and those in the final step represented psychological variables which may be subject to educational
intervention. In each step, stepwise analysis was used to retain significant \((p < .05)\) predictors and delete non-significant \((p > .10)\) predictors. Results showed significant effects only for D-outcomes (C-, D- and C+, D-). The only significant predictor in the C+, D- condition was perceived control, \(\beta = .272, t(118) = -1.86, p < .01\), for an \(R^2\) of .072. The significant predictors in the C-, D- condition were level of competition, \(\beta = .193, t(118) = 2.17, p < .05\), and perceived control, \(\beta = .267, t(118) = 3.00, p < .01\), for a total \(R^2\) of .11.

**Repeated Measures ANOVAs**

A series of 2 x 2 x 2 mixed model analyses of variance were conducted with repeated measures on the Child (yes/no) and Doctor (yes/no) factors. We decided to consider between-subjects variables one-by-one, because we did not have higher order hypotheses. Levels of the between-subjects factors, either a demographic variable or scale score for each analysis, were determined by median splits into “high” and “low” groups with the following exceptions: Level of competition was split into competitive (A, AA, and AAA, \(N = 75\)) and non-competitive (house league and house league select, \(N = 43\)) groups, child age cohort was split into Atom (minor and major Atom, \(N = 62\)) and Peewee (minor and major Peewee, \(N = 55\)) groups, and level of education was split into undergraduate or higher (\(N = 71\)), or less than undergraduate (\(N = 48\)) groups.

Results showed powerful Child, \(F(1,118) = 158.23, p < .001\), partial \(\eta^2 = .57\), Doctor, \(F(1,118) = 507.82, p < .001\), partial \(\eta^2 = .81\), and Child x Doctor, \(F(1,118) = 110.18, p < .001\), partial \(\eta^2 = .48\), effects. These effects can be seen in Figure 3.2. As indicated by the 95% confidence intervals, every point was significantly different from every other point, \(p < .05\).

The results for the between-subjects effects and their interactions with Child, Doctor, and Child x Doctor effects showed only one significant effect: Perceived control interacted
Figure 3.2. Parents’ likelihood of encouraging their children to return to play two weeks after being diagnosed with a mild concussion. For both doctor and child conditions, “yes” represents an endorsement to return to play, and “no” represents a non-endorsement to return to play. Whiskers represent 95% confidence intervals.

...significantly with Doctor, $F(1,117) = 4.81, p < .05$, partial $\eta^2 = .04$. This effect is illustrated in Figure 3.3. The main effect of perceived control approached significance, $F(1,117) = 3.84, p = .052$, partial $\eta^2 = .03$. As may be seen in the figure, high and low perceived control parents only differed when the doctor endorsed the child’s return to play.

**Discussion**

This study set out to test four hypotheses: (1) that the variables of knowledge, perceived control, probabilities, values, risk propensity would have significant predictive effects on risk...
Figure 3.3. Parents’ likelihood of encouraging their children to return to play two weeks after being diagnosed with a mild concussion. For the doctor conditions, “yes” represents an endorsement to return to play, and “no” represents a non-endorsement to return to play. Whiskers represent 95% confidence intervals.

decision-making; (2) that the variables of competitiveness, and assertiveness expectancies would also have significant predictive effects on risk decision-making; (3) that perceived control, probabilities, values, and risk propensity would be positively related to proxies’ risk behaviour, and that knowledge would be negatively related; and (4) that Child, Doctor, and Child x Doctor effects would be found. Overall, while Child, Doctor, and Child x Doctor effects were found to be powerful, there was little evidence for predictive effects of the other variables mentioned on risk behavior.
The strongest effect found in this study was the Doctor effect, which highlighted the importance and weight that parents placed on the advice of their doctors. This effect should reassure medical professionals that, even though they may encounter difficult patients who reject their advice, by and large, individuals actually consider this advice quite carefully. Furthermore, it shows that, even for a competitive population like hockey parents, professional medical advice, especially advice regarding concussions, does not fall on deaf ears. However we should note that our sample of parents was well-educated; further research is required to determine if this effect generalizes to other parents, and other populations. It is also important to remember that the responses were made to a hypothetical scenario, not in a real context.

We also hypothesized that the views of the children would have a significant effect on parents’ decision-making. This hypothesis was supported by the strong Child effect. The Child effect and its magnitude suggest that, while parents do not weigh their children’s opinions as heavily as they weigh those of their doctors, their children’s opinions still significantly influence their decision-making processes. Furthermore, the Child x Doctor interaction indicates that the Doctor effect is larger when the child says he wishes to return to play (i.e., the effect of the agreement between child and doctor is greater than the sum of these two effects individually). This suggests that having all parties in agreement is extremely important in the processes of proxies’ risk decision-making.

The remaining hypotheses in this study were based on the assumption that risk decision-making by proxies would occur in the same fashion as risk decision-making by individuals. Specifically, we hypothesized that perceived control (Gaines & Schwebel, 2009), probabilities and values (Bettman, 1973; Kahneman & Tversky, 1979; Baird & Thomas, 1985), and risk propensity (Nicholson et al., 2005; Sitkin & Weingart, 1995; Meertens & Lion, 2008) would all
be positively related to increased proxy risk behaviour. Results did not fully support this hypothesis. Regression analyses showed that perceived control, level of competition, and level of education were the only predictors of risk decision-making significantly, and that they were only significant when doctors advised against return to play. Perceived control had a positive relationship with risk behavior suggesting that the more control parents believe they have over their children’s risk of injury, the more likely they are to make high-risk decisions.

We also hypothesized that knowledge would share a negative relationship with proxy risk behaviour (Slovic, 1987; de Rome, et al., 2011). Results failed to support this hypothesis, as both regression analyses and analyses of variance showed that knowledge was not a significant factor in proxies’ risk decision-making. One possible explanation for this finding is that parents’ concussion knowledge must be above or below a certain threshold level before it can affect their risk behavior. Alternatively, it is also possible that the measure of general concussion knowledge used in this study, which utilized multiple choice and true or false item formats was not an accurate measure. Future research will be needed to address this issue.

Analyses of variance also failed to provide strong support for the importance of questionnaire variables in proxy risk behavior. Questionnaire variables did not interact with any of the Child, Doctor, or Child x Doctor effects, with the exception of perceived control with Doctor effects. In this interaction, when doctors advised that children were ready to return to play, parents with high levels of perceived control were significantly more likely to encourage their children to return to play, compared to parents with low levels of perceived control. In contrast, when doctors advised that children were not ready to return to play, levels of perceived control did not influence parents’ decision-making.
The fact that perceived control was the only significant questionnaire variable in both regression analyses as well as analyses of variance suggests that it may be a factor in proxies’ risk decision-making. However, an important caveat to this finding is that, even though these significant results were found, due to the number of analyses conducted, they may have occurred as a result of chance, and may not be replicable. Further investigation into the variable of perceived control is warranted.

The constructs assessed in the questionnaire were selected because they had a strong foundation in prior research, and although it is possible that there were errors in measurement or methodology, and that more extensive measures would have yielded more reliable measures, it seems unlikely that this would have changed the general pattern of results here. We propose a number of possible explanations as to why this study was unable to find a significant relationship between questionnaire constructs and proxies’ risk decision-making.

One possible explanation for these overall findings may lie in the domain differences. For example, some of the risk constructs used in this study were developed in the domain of finance, where the standard quantification of risk is gains and losses in monetary value. However, risk in the current study lies in the domain of health, where risk is quantified in terms of long-lasting gains and losses in health. Parents may respond differently to risks scenarios in the domain of health compared to the domain of finance (Weber, Blais, & Betz, 2002; Blais & Weber, 2006), and thus, these types of constructs may not apply to this study.

It is also important to remember that the scenarios used in this study only involved situations in which doctors had already diagnosed a concussion and given professional medical advice. Thus, a second possible explanation emerges which suggests that proxies’ concussion knowledge, as well as their attitudes, values, and beliefs are not significant factors in their risk
decision-making only once a medical professional has diagnosed their child and given their medical opinion. However, these variables may still play a significant role in proxies’ risk decision-making under the circumstances where parents must decide whether or not to have their children diagnosed by a medical professional.

A third explanation may be that parents did not respond honestly about how they would act under the provided conditions. Responding to questions about their actions regarding the health and safety of their children may have made parents socially conscious. Parents in this state of mind may have wished to appear socially responsible, and may have responded in a way that would make them appear so, rather than how they would normally react in those given situations.

Finally, it is also possible that parents were not able to accurately predict how they would act under the provided conditions. This differs from the previous possibility in that it is not about intentionally responding in such a way as to appear more socially responsible. Rather, it is about parents believing that they will act in one way, but actually acting in a different way under similar circumstances in real life.

The findings of this study have important implications for future research in proxy risk management, and for the parties involved in safe participation in minor hockey. First, they suggest that proxy risk decision-making may not operate on similar processes as individual risk decision-making, and that much more research in this area is needed. Second, findings that the opinions of medical professionals are very highly regarded by parents, even in competitive circles, suggest that doctors’ contributions to safe competition and concussion awareness campaigns are, and will continue to be, very valuable. This further suggests that, in addition to the roles they already play in concussion education and information, doctors and other medical
professionals may wish to consider a more proactive, community role in the prevention of concussions that encourages parents to seek professional medical opinions.

Third, these findings are important for the development of concussion education programs in the future. Results can be used to inform the development of education programs for doctors, parents, hockey associations, and players in three ways. These are: (1) content – what is the most important message to communicate, (2) target audience – who is this message best communicated to, and (3) delivery – who is most effective at delivering this message. Findings suggest that, while concussion information may still be important, educational content may wish to focus on the importance of encouraging parents to have their children diagnosed by a doctor. Significant child effects suggest the importance of including children as a target audience. Educational programs, in addition to concussion awareness and education programs aimed at parents, may wish to develop child appropriate content aimed at educating children about (a) the signs and symptoms of concussions and (b) the importance of communicating these symptoms to adults. Findings also suggest that doctors are the most effective in delivering these messages. Their expertise and status allow them to be seen as credible, reliable, and dependable sources of information within the community.

Finally, these findings have implications for proxy risk management in general. The evidence presented in this study may be the first to show that variables considered important for individual risk decision-making may not apply to proxies who are making these decisions on behalf of someone else. The evidence from this study suggests that the only opinions that truly matter are those of the primary, and those of the expert adviser. These findings may be important for proxy risk in any context, including proxies managing the risk of those who are unable to
make decisions due to factors such as illness, injury, mental disability, or age, and may possibly even extend to financial risk models when other beneficiaries are involved.

Future research should focus on obtaining a broader, more representative sample of the hockey parent population. Generalizability of the findings should also be tested by examining effects in other minor sports populations, testing the validity of the findings in more general contexts outside of minor sports altogether, and replicating the study with parents of children who have actually suffered concussions. Future research should also attempt to replicate results by comparing findings with injured and non-injured populations, such as orthopedic vs. concussive injury, injured vs. non-injured groups, broadening age ranges to include younger and older participants, and more closely examining the effects of knowledge on proxy risk management. Finally, future research may wish to focus on the role of parents’ attitudes, values, beliefs, and concussion knowledge, not in deciding whether or not to return a child to play following a concussion, but in deciding whether or not to have their child diagnosed by a medical professional.

The limitations to the findings of this study are clear. The sample used in this study may only represent a particular (e.g., educated) faction of hockey parents, so the representativeness of the sample must be taken into account when generalizing the findings of this study. Also, while this study has shown that a number of important factors involved in individual risk may not be significant contributors in proxies’ risk decision-making, there are many other individual differences to be considered in future research. The use of scenario-based measures also present limitations to the study, because, in order to appear more socially conscious, parents might not respond in an honest fashion. Scenario-based measures also present the possibility that participants may not truly know how they will react in real life under the given circumstances.
Finally, scenario-based measures are limited to the given circumstances of the study, while in real life, concussion management and prognoses vary from patient to patient (Kutcher, Giza, & Alessi, 2010).

It is clear that much more directed research in the area of proxy risk management is required. Our study, which has shown that the variables and parties involved in proxy risk behavior are different from individual risk behavior, is only the beginning. While many more questions exist for future research to answer, the current study has provided evidence for further investigation into how these processes differ, and has provided a strong framework with which this research can move forward.
Chapter 4

General Discussion

This general discussion begins by reviewing the purpose of the research, followed by a general summary of findings, a general discussion of findings, including implications for parties involved in the proxy risk management process, implications for education programs, study limitations, and closes with some concluding remarks.

My overall purpose in this research was to examine the effects of risk constructs, established in an individual risk context, on parents’ risk decision-making on behalf of their children, to investigate differences between individual risk behavior and proxy risk behavior, and ultimately, to examine how these findings could be used to improve current concussion education programs. Findings from the studies reported here suggest that parents’ knowledge about concussions and their attitudes, values, and beliefs regarding their children’s safe participation in minor hockey are not significant factors in their risk management on behalf of their children. This further raises the possibility that the risk management processes used by proxies may be different from risk management processes used by individuals when managing their own personal risk. Finally, the findings showed that the strongest predictors of parents’ risk decision-making were the opinions of their children and of their doctors.

These findings have implications, not just for parents and medical professionals, but for all parties involved in making participation in minor hockey a safer activity. For parents specifically, the interpretation of the results is not entirely clear. The fact that parents generally scored well on our test of general concussion knowledge, combined with the lack of effect for knowledge on their decision-making, may suggest that there is a certain knowledge threshold at
which this variable ceases to have an effect. Findings also show that, regardless of their attitudes, values, or beliefs, parents’ are unlikely to make high risk decisions once a doctor has diagnosed a concussion and provided medical advice. These mixed findings suggest that, while future research will need to further elucidate these relationships, the message to parents in the meantime is clear – have your child diagnosed by a medical professional.

Findings from these studies also have implications for clinicians and medical professionals. Because it is unknown what effects parents’ attitudes, values, beliefs, and knowledge would have on their risk decision-making in the event that doctors are not consulted, and until future research addresses these questions, it is important to communicate to parents the importance of seeking professional medical advice. Findings showed that the opinions of doctors carried great weight for parents in making health risk decisions, confirming their status as credible and reliable sources of health advice within the community. Thus, it may be important for doctors and other medical professionals to incorporate a more proactive, community approach to their practice. Findings from this study suggest that working together with their communities and local minor hockey associations will be an effective means of encouraging as many proxies (e.g., parents, trainers, and coaches) as possible to seek professional medical opinions for suspected concussions.

Important implications exist for hockey associations as well. Significant Child effects showed that children’s opinions, for better or for worse, influenced parents’ risk decision-making regarding whether or not they would encourage their children to return to play. Also, questionnaire variables were not significant in predicting parents’ risk behavior. This evidence suggests that minor hockey associations may wish to (a) develop child appropriate content that focuses on concussion awareness, concussion symptoms, and the importance of recognizing and
communicating these symptoms to adults; and (b) have educational material focus on encouraging parents to have their children diagnosed by a doctor in the event that a concussion is suspected by any party, including coaches, trainers, parents, or children.

The knowledge threshold effect also may be important for hockey associations to consider. If future research finds that knowledge can affect parents’ risk decision-making by proxy, hockey associations will be given one more option in effectively addressing the risk of concussion in minor hockey. That is, hockey associations will be able to address concussion risk management, not only by encouraging some parents to seek the opinions of a medical professional, but also by helping those parents, who choose not to seek medical advice, to reduce their likelihood of making a high-risk decision through education.

Finally, the evidence presented in this study provides a framework for future research. The lack of knowledge effects, and a possible threshold effect pattern, suggests that future research focus on determining if the variable of knowledge can affect parents’ risk behavior by proxy under different circumstances. Specifically, future research may wish to examine differences between high and low knowledge groups, expert and informed knowledge levels, high and low confidence groups, combinations of these groups, and the use of more sensitive knowledge measures.

Future research should also carefully investigate the effects of parents’ knowledge of concussions, attitudes, values, and beliefs under varying circumstances. This study has established that these factors do not seem to be significant once doctors have diagnosed a concussion, and are giving medical advice on a return to play. However, much research still needs to be done regarding whether or not these factors will be significant in parents’ decisions to
bring their child to be observed by a medical professional, acknowledging the symptoms of a concussion, or returning their children to play if they (or their children) suspect a concussion.

Finally, future research should focus on replicating the findings of these studies presented here using broader samples to establish representativeness. Comparisons of hockey parent samples to control group samples to see if hockey parent are significantly different in their attitudes, values, beliefs, or demographic characteristics is one possibility. Alternatively, future research may also wish to compare hockey parents to a number of different populations: parents with children enrolled in other minor team sports, such as soccer, football, or baseball; parents with children enrolled in other highly competitive individual sports, such as track and field, swimming, or tennis; or against a representative sample of the general, demographically age-matched parent population. Finally, future research may wish to attempt to replicate findings with other proxies of children in hockey, such as coaches, trainers, and referees, proxies of children in other sports, and proxies’ risk behavior in other domains, such as academic and behavioral risk in education, general medical risk, and financial risk.

Important limitations to the study are those imposed by the scenario, which indicated that doctors had already diagnosed children and given medical recommendations to parents. Thus, it is not possible to judge the effects of variables in the absence of doctors opinions. These effects could include how sensitive parents become to recognizing or acknowledging that their children have had concussions, how readily parents bring their children to see a doctor in the event of a suspected concussion, and how eager parents are to return their children to play.

Coaches present another limitation to the study. It is important to remember that, in many cases, coaches can play a significant role in parents’ risk decision-making by proxy. Coaches either control, or have great influence, over how much ice-time players receive, players’
roles and positions on teams, and their opinions can have a great influence over parents’ decision-
making, not just in terms of risk, but in terms of many hockey-related decisions that parents must
make, such as training schedules, and levels of competition. It may be important for future
research to include some consideration for the influence of coaches on parents’ decision-making
on behalf of their children.

The research presented here suggests that proxy risk management warrants further
investigation. Future research will need to focus on the replication and validation of the findings
presented here; however, the steps taken in this study have expanded upon the current risk
research by presenting evidence of previously unstudied risk decision-making processes.
Whether or not future research confirms these findings or shows that they extend to other risk
contexts remains to be seen, but for the present, this research justifies far more research in the
future on proxy decision-making.
References


Hockey Canada. (2012e). *Does your equipment fit?* Retrieved from
http://www.hockeycanada.ca/multimedia/minor_hockey/equipment/EquipmentFitting_e.mp


57


