# Understanding perceptions of injury risk associated with playing junior cricket

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**Abstract**

Preventing sports injuries in children is important, but there is limited information about children's perceptions of injury risk or their injury beliefs and attitudes. This study investigated injury risk perceptions in a sample of junior sports participants across different age levels of play. Junior cricket players (n=284, aged 8-16) completed a survey about their injury risk perceptions. Survey questions asked about players' perceived injury risk to themselves compared to cricketers in general, as well as their perceived injury risk across different playing position, ground condition, and protective equipment use scenarios.

Chi square analysis found that risk perceptions were significantly higher in U12 and U14 players for both batting and fielding compared to U16 players and that U16 players had a higher risk perception associated with bowling. Players tended to see themselves as less likely to be injured than cricketers in general and perceived there to be a high risk of injury when fielding close to the batter and a comparatively low risk of injury when fielding in the outfield. Junior players also perceived there to be a high injury risk associated with playing on hard and bumpy grounds. Despite their relatively accurate perceptions of risk and appreciation for the importance of protective equipment, junior players need continual reminding of the importance of safety strategies by coaches and others. Coaches need to inform players that fielding injuries can occur anywhere on the ground, and include skills practice accordingly.

Keywords: safety, attitudes, juniors, cricket, community

Child sports injuries are a priority focus for preventive efforts and understanding the magnitude, aetiology and mechanisms of these injuries is crucial to the development of effective injury interventions.[1] Despite this, very few studies investigating children's perceptions of injury risk in sport exist. Kontos[2] investigated the perceived risk, risk taking, estimation of ability, and injury among adolescent soccer players and found that low perceived risk was a significant risk factor for injury. In a study of junior Australian football players,[3] inconsistencies were found between players' risk perceptions and the actual risks they were prepared to take. Under particular circumstances (e.g., when senior team selection depended on it), these players were prepared to play with injuries despite recognising the risks of doing so.

Cognitive-behavioural theories such as the Health Belief Model (HBM)[4] and the Theory of Planned Behavior (TPB)[5] explain health behaviours in terms of a cost-benefit analysis whereby people make behavioural practice decisions based on their assessment of the probability of outcomes and severity of consequences of engaging (or not) in specific behaviours.[6] These theories have also been shown to be relevant to understanding children's risk taking.[7] For example, children who rate risk as low and do not perceive themselves to be personally vulnerable to injury are more likely to take risks.[8,9] In this way, children's assessments of their own risk of sustaining a sports-related injury are likely to impact on their sports safety decisions, including those in relation to the adoption of preventive behaviour.

Variability in perceived risk can be explained largely by cognitive and motivational factors that bias individuals' risk judgements.[6] For example, the *availability heuristic* suggests that individuals perceive injuries as being more likely to occur if they can imagine them easily.[6,10] Similarly, the *representativeness heuristic*[6] explains how players may be more likely to perceive a particular injury risk as being applicable to them if the injury fits

their mental representation of the types of injuries that occur to players like themselves, playing their particular sport. A related cognition is the *optimistic bias* or "the tendency for people to report that they are less likely than others to experience negative events and more likely than others to experience positive events".[11]

This paper reports a baseline survey of junior players recruited into an injury cohort study in community club cricket. Cricket was chosen because of its international popularity as a summer team sport and its known potential for injury risk in children.[12-14] Australian[14,15] studies have indicated that the overall risk of injury in this sport increases with age and more specifically, the risk of fielding injuries and the risk of bowling-related overuse injuries increases with age. It is currently not known if children's injury risk perceptions also change accordingly. This paper specifically describes the injury risk perceptions of junior cricketers across different age levels of play. In doing so, it is the first peer-reviewed study of injury risk perceptions of cricketers at any level.

## Methods

Junior cricket players registered with clubs from the Ballarat (Junior) Cricket Association were recruited into a larger cohort study of injuries in junior cricket players. More than 50% of the club nominated teams were recruited and player response for the cohort study was 75%. Of the 411 players who consented for the cohort study, 284 (69%) completed a baseline survey about their injury risk perceptions and attitudes. This response rate was due to the low numbers attending training on the day of survey administration. Players were aged between 8 and 16 years, with 58 players in the Under 12 years competition (U12), 141 in the Under 14 years competition (U14), and 85 in the Under 16 years competition (U16), reflecting the total number of players available in each age group. All but two participants were male, which is consistent with the number of males and females in this

particular competition. The sampling plan for the cohort study and the full cohort methodology are explained in more detail elsewhere.[15] All study procedures were approved by the University of Ballarat Human Research Ethics Committee and written consent was obtained from both the child and their parent.

According to the TPB,[5] junior cricketers are more likely to willingly engage in safety behaviours in playing situations that they perceive to be of high risk. Therefore, the survey was designed to determine the perceived risk that junior cricketers associate with different playing positions (e.g., a bowler; a fielder in the outfield, etc.); various ground conditions (e.g., playing on a hard ground); and various wicket keeping situations (e.g., not wearing a helmet while wicket keeping facing a spin bowler, etc.). The different scenarios posed in these questions were all chosen to reflect the real-world playing settings in which injuries to players occur.[12,14]

The HBM[4] suggests that safety behaviours are likely to be determined in part by perceived personal vulnerability to injury. Therefore, the survey also asked a question to elicit players' perception of injury risk to themselves, as well as to cricket players in general.

All questions required participants to respond on a 3-point Likert scale ('no chance', 'a small chance', 'a high chance'), which were then coded to scores of 1, 2 or 3, respectively for subsequent analysis or give an 'I don't know' response. Table 1 shows the specific survey questions.

As part of the survey construction and validation process, question justification was undertaken through an investigation of the literature. To the extent possible, questions were extracted or slightly modified from previously reported surveys from other sports injury studies, especially those of the authors.[3,16,17] Face and content validity, as well as the age appropriateness of the questions, were established through feedback from the peak sports

bodies (Cricket Victoria and Cricket Australia) and from secondary and primary school teachers.

A member of the research team administered the survey at specific training sessions during the first few weeks of the 2007/08 cricket season. The self-report survey took approximately 25 minutes to complete. Fifty-nine participants from 15 purposely selected teams completed the survey again at a second training session, three to four weeks later, as a measure of test-retest reliability.

All survey data were pre-coded, double-entered, edited and then transferred to SPSS (version 14) for analysis. All data is presented as the percent (%) of players giving each response to the questions, both overall and by age level of play. 'Don't know' and 'missing' responses were removed prior to conducting chi square analysis and test-retest reliability analysis. Chi square analyses were conducted to determine age group differences in participants' risk perceptions associated with different scenarios relating to playing position, ground conditions, and protective equipment use. Test-retest reliability was assessed by Kappa statistics, which were then categorised.[18]

## Results

The overall test-retest reliability of the risk perception questions was fair to substantial ($\kappa$ =0.22–0.60) (Table 1), with $\geq$69% of players giving the same responses at the two survey administrations. Table 1 shows the sum of responses from the first and second survey administration for participants who provided different responses over the two administrations, with higher scores indicating a heightened perceived risk. For the majority of questions, the changes in responses did not affect the overall level of perceived risk of the test-retest group as a whole.

**Table 1** Test-retest Agreement (% and Kappa) for Each Cricket Injury Risk Perception Question and Comparison of Responses in Players Who Did Not Agree

| Question<br>How much chance do you think… | % Agreement | Kappa statistic | Rating of test-retest reliability* | Players with non-agreeing responses<br>Sum of responses administration 1 | <br>Sum of responses administration 2 |
|---|---|---|---|---|---|
| a player fielding in the outfield has of being injured? | 83 | .60 | Substantial | 17 | 16 |
| a player fielding in close to a batter has of being injured? | 81 | .60 | Substantial | 23 | 27 |
| you have when playing cricket? | 85 | .51 | Moderate | 15 | 16 |
| a wicket keeper has of being injured? | 81 | .50 | Moderate | 25 | 26 |
| a batter against a fast bowler has of being injured? | 73 | .50 | Moderate | 35 | 40 |
| there is of getting injured not wearing a helmet while wicket keeping facing a fast bowler? | 71 | .50 | Moderate | 35 | 39 |
| a batter against a spin bowler has of being injured? | 74 | .44 | Moderate | 28 | 20 |
| a person has of getting injured when playing cricket? | 82 | .42 | Moderate | 21 | 19 |
| there is of getting injured fielding in slips? | 80 | .41 | Moderate | 20 | 24 |
| there is of getting injured playing on grass? | 79 | .40 | Moderate | 15 | 15 |
| there is of getting injured playing on hard ground? | 72 | .40 | Moderate | 38 | 40 |
| there is of getting injured on bumpy ground? | 70 | .40 | Moderate | 42 | 42 |
| a bowler has of being injured? | 70 | .35 | Fair | 38 | 36 |
| there is of getting injured not wearing a helmet while wicket keeping facing a spin bowler | 70 | .32 | Fair | 46 | 45 |
| there is of getting injured wearing a helmet while wicket keeping facing a spin bowler? | 69 | .31 | Fair | 30 | 26 |
| there is of getting injured wearing a helmet while wicket keeping facing a fast bowler? | 73 | .22 | Fair | 29 | 22 |

Note: Sum of responses indicate the sum of scores on that item for players with non-agreeing responses. Higher sum of response totals for players with non-agreeing responses indicate higher levels of perceived risk.

*According to the scale of Landis and Koch[18]

**Perceived risk to self and cricket players in general**

There was a statistically significant difference between players' perception of their own risk of cricket injury and that of cricketers in general ($\chi_4^2$=143.30, p<0.01). Overall, 64% of players believed themselves to have a small chance of being injured playing cricket compared to 74% believing that cricketers, in general, have a small chance of being injured. Further, 12% of players said that they had a high chance of being injured playing cricket, compared to 13% for all cricketers. These views were not significantly different across age levels. A figure illustrating the participants' perceptions of their own and others' risk of being injured while playing cricket can be found in Supplement File 1.

**Perceived risk associated with different playing positions**

In terms of playing positions, all players considered injury risk to be greatest when fielding close to a batter and when batting facing a fast bowler. The U16 players were less likely to perceive a high risk of injury when batting facing a fast bowler than both the U12 and U14 players (significant only for U16 versus U14 players: $\chi_2^2$=7.64, p<0.05). The U16 players were also less likely to perceive a high risk of injury when fielding close to a batter than the two younger age groups (significant only for U16 versus U14 players: $\chi_2^2$=8.60, p=0.01). A figure illustrating the participants' perceptions of injury risk according to playing positions can be found in Supplement File 2.

**Perceived risk associated with different wicket keeping situations**

Across all age groups, players considered there to be a higher chance of injury when wicket keepers faced a fast bowler than a spin bowler. However, even wicket keepers facing a spin bowler were considered to be at a high risk of injury if they did not wear a helmet. The conditions under which a player was perceived to be at

greatest risk across all age groups was when a wicket keeper faced a fast bowler without wearing a helmet. This risk perception was significantly more pronounced in U12 players compared to U16 players ($\chi_2^2$=35.82, p<0.01) and in U14 players compared to U16 players ($\chi_2^2$=31.61, p<0.01). A figure illustrating the participants' perceptions of injury risk in relation to wicket keeping under various playing situations (helmet use and type of bowler faced) can be found in Supplement File 3.

**Perceived risk associated with different ground conditions**

Given recent media and other public concern about the impact of ongoing drought conditions on the quality and safety of sports grounds in Australia at the time of the survey,[25] the players were asked about their perceptions about this. Using a four point scale, 159 (56%) players reported 'a high chance' of injury when playing on a hard ground; 164 (57%) reported 'a high chance' of sustaining an injury when playing on a bumpy ground; while only 7 (2%) reported 'a high chance' of injury when playing on grass. There were no significant differences across age levels. A figure illustrating the participants' perceptions of injury risk in relation to ground conditions can be found in Supplement File 4.

## Discussion

Understanding behavioural determinants and the context in which injury interventions are intended to be implemented, including individuals' perceptions of injury risk, is likely to improve their uptake.[19-21] This study is the first to report injury risk perceptions in junior cricket players (or indeed cricketers at any level of play), and one of only a limited number that has considered this in any type of junior sports club participant.[3,21,22]

Overall, the survey had acceptable test-retest reliability. The differences in the two test administrations did not alter the overall picture of risk perceptions held by the whole group. Further, three of the four items with low reliability were related to wicket keeping situations. This may be reflect the relatively low exposure players have to playing in this position and the impact this may have on their ability to make injury risk assessments. Nevertheless, it is recommended that the last four items with Kappa values ranging from .22 to .35 be excluded in future use of the survey.

There was an overall trend for players to perceive themselves as less likely to be injured than cricketers in general indicating an optimistic bias[11] in the players' judgements of their own injury risk. This bias has previously been demonstrated in the context of childhood play,[9] however, to our knowledge, it has not previously been considered explicitly in the context of junior sports injury. According to the Health Belief Model,[4] this perceived lack of personal vulnerability may make junior cricketers unlikely to take unprompted injury prevention measures, instead requiring explicit direction from coaches or officials.

Overall, players' perception of risk was higher for game situations relating to fielding and batting compared to bowling. This finding reflects injury surveillance data[14] that shows batting and fielding to be the contexts in which most junior cricket injuries occur. More specifically, the players perceived the highest risk of injury when batting facing a fast bowler (as opposed to a spin bowler) and fielding close to the batter (as opposed to in the outfield). A fast bowler bowls the ball as fast as possible, with the aim of defeating the batter with pace. A spin bowler uses a shorter run-up and applies wrist or finger motion to impart spin to the ball which can difficult for the batter to anticipate and play.[23] Current injury literature provides tenuous support for the distinction that players made in relation to batting injuries,

with contact with a ball being the primary mechanism of batting injuries in juniors.[14,15] The distinction that the players made in relation to fielding injuries is not supported by injury data as ball misfieldings are the primary mechanism of fielding injuries[14,15] and these can occur anywhere on the ground. According to the TPB[5] and HBM,[4] these players are unlikely to see the benefit of engaging in safety practices to prevent injuries that occur to fielders in the outfield because their perception of injury risk in this position is low.

The representativeness heuristic[6] can assist in explaining the distinction players make in relation to batting and fielding injuries. Players are more likely to perceive a high injury risk if they are able to picture the injury risk situation easily. If the mental picture that players have is of cricketers typically being injured whilst 'being hit by a ball while batting facing a fast bowler', or 'being hit by a ball while fielding close to the batter', then they are more likely to perceive the risk of injury in these situations as high. The fact that most junior cricketers bat, bowl and field suggests that these views are not being governed by their experiences of and preferences for specific playing positions. Risk perceptions were higher in U12 and U14 players for both batting and fielding compared to U16 players and the U16 players had a higher risk perception associated with bowling. This is consistent with published data reporting higher frequencies of lower back injuries in U16 players, an injury type most commonly associated with bowling.[14,15,24] According to the TPB[5] and HBM,[4] U16 players are likely to be receptive to safety practices related to the prevention of bowling injuries because they perceive the risk of injury in this position as relatively high.

The majority of surveyed players perceived there to be a higher chance of injury when playing on a hard or bumpy ground compared to playing on grass.

Whether or not this perception is borne out by injury statistics is yet to be shown, as no injury study has formally assessed this.[25] Nonetheless, this high perception of risk can be attributed to the availability heuristic.[6] The media coverage and likely discussion around clubs about the issue of sports ground hardness in areas currently experiencing drought conditions[25,26] may have made a supposed connection between injury and ground conditions easy for the junior players, resulting in their high perception of risk. A limitation of the study, however, was that it was not specifically defined what was meant by 'hard', 'bumpy', and 'on grass' in questions relating to ground conditions.

Across various wicket keeping situations, the players indicated an understanding of the increased risk of injury associated with not wearing a helmet.[12] They also believed there to be a higher risk of injury for wicket keepers when facing fast bowlers than spin bowlers, consistent with injury data.[12]

There were some significant differences across age levels of play. This may reflect an awareness of the modified game and emphasis on safety in the U12 players, and the introduction of the hard ball only in the U14 competition.[27]

There are a number of biases that may have influenced players' responses. Because the survey was administered during the first few weeks of the cricket season, it is possible that a player may have witnessed a cricket injury, either while playing or while watching cricket on television, just prior to completing the survey. This could have temporarily impacted on their injury risk perceptions, and as such, could have impacted on the test-retest results. Similarly, the injury histories of these players are unknown. Since previous injury experiences could influence injury risk perceptions, injury history is an important factor to consider in future studies.

There was only a moderate response rate to the survey, with 69% of the players recruited in the larger cohort study completing the survey. This was due to the low numbers attending training on the day of survey administration. Although no consenting player attending training refused to complete the survey, it is possible that surveying only players at one training session may have introduced a bias associated with players who train more often and, as such, have more exposure to cricket. Also, any players who were absent from training due to injury, and therefore likely to have a biased perception of risk, were also not represented in the sample.

This survey was only conducted with players from one large community junior cricket association. Whilst we have no reason to believe that the risk perceptions reported in this group of players would differ greatly from those of junior cricketers elsewhere, there would be value in undertaking additional surveys with broader samples of junior cricketers.

The over-representation of males is a further limitation of the study. Although cricket is a sport that has traditionally been played by boys, female participation is growing in many junior cricket associations in Austraila. Further research is required to determine whether the injury risk perceptions held by girls are the same as those demonstrated by the boys in this study.

## Conclusions

While they recognise the injury risks associated with playing cricket, junior players are likely to underestimate their personal risk of injury and, as such, need continual reminding of the importance of safety strategies (e.g. use of protective equipment) by coaches and others. Careful monitoring of the standard to which these safety measures are being adopted is also required.

Players perceive the highest risk of fielding injuries to be when a player is fielding in close to the batter (as opposed to in the outfield). This perception is not supported by the literature as fielding injuries most commonly result from misfielding a ball, which can occur anywhere on the field. Since players are unlikely to see the benefit of safety-related outfield fielding practice, coaches should include outfield fielding practice with a focus on performance, with the aim of increasing skills while at the same time decreasing injury risk.

Junior circket players have a perception that there is a higher risk of injury when batting facing a fast bowler compared to a spin bowler. Although this appears logical, it is currently unknown whether this perception is accurate or not. Nevertheless, coaches should guard against player complacency by ensuring that protective equipment is worn correctly by batters at all times, regardless of the bowler they are facing.

The U16 players have accurate perceptions about the risk of injuries associated with bowling. Therefore, players in this age group are more likely to be receptive to measures to prevent bowling injuries. This presents an opportune time for coaches to focus on improving bowling technique while monitoring bowling exposure.

Children’s perceptions of injury risk are likely to be influenced by information presented in the media. Therefore, coaches and relevant cricket bodies need to ensure that the information junior players are receiving is based on real evidence and not just media hype.

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