

Running head: REPRESENTATIONS OF HEAD INJURIES

Exploring the social representations of head injuries amongst 18-25 year olds who play sport

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Abstract

Research suggests that sport-related head injuries are amongst the leading causes of death in otherwise healthy individuals in the US (Bailes, Maroon, & Robinson, 2011). However, it seems that young athletes do not abide by safety guidelines regarding head injuries (Yard & Comstock, 2009). In order to explore the reasons for this, a social representations theory (Moscovici, 1961) approach was adopted to uncover young sportspeople's representations about head injury. Focus groups were conducted with four groups of students. All participants played sport with the other members of their group. Thematic analysis of the discussions showed that the participants do not always abide by research-based guidelines regarding appropriate responses to head injury. It also revealed that knowledge about head injury is gained from a variety of sources, and that the extent to which representations of head injury are shared depends on the individuals' identities as 'sportsperson' and 'team player'. Identity was found to be particularly significant in determining action taken by participants in response to head injury. These findings have important implications for how organisations concerned with head injury should transmit information to young sportspeople in order to elicit behaviour change.

Exploring the social representations of head injuries amongst 18-25 year olds who
play sport

Traumatic injuries to the head are one of the leading causes of death in otherwise healthy children and adults in the US, and many of these injuries are sustained during sports (Bailes, Maroon, & Robinson, 2011). However, relatively little is known about how sportspeople understand brain injuries and their risks, except that they do not necessarily abide by research-based safety guidelines (Yard & Comstock, 2009). Acknowledging the importance of understanding local knowledge for the reduction of risk-taking behaviours, this study adopts a social representations theory (Moscovici, 1961) approach. The literature review will provide an overview of the clinical literature on sports-related brain injuries, as well as work on public understandings of science, health, illness and risk. It will inform the current study on how brain injuries are understood by sports people, providing a framework for the exploration of this overlooked field.

Sports-Related Brain Injuries

Brain injuries that are caused by an external mechanical force are known as traumatic brain injuries (TBI). However, in the context of sports-related injuries, the terms ‘head injury’ and ‘brain injury’ are used interchangeably with ‘traumatic brain injury’, and will be throughout this study. Recent research suggests that TBI has a salient relationship with sport, particularly in young people: alongside motor vehicle accidents, contact sports were found to be the most common source of TBI in 15 to 25 year olds (McKinlay et al, 2008). The sports that were found to put players at a particularly high risk of sustaining a head injury included American Football, ice hockey, boxing, martial arts and rugby (Cantu, 1996; Kelly et al, 1991). Concern is emerging amongst sports scientists because brain injuries are the most frequent direct cause of death in sport (Mueller & Blyth, 1985), yet people continue to take risks (Yard & Comstock, 2009).

Concussion. The most common type of head injury found in sport is the concussion (Gerberich, Priest, Boen, Straub, & Maxwell, 1983). It is “a complex pathophysiological process affecting the brain” (McCrorry et al, 2005:i78), usually caused by a direct blow to the body. It causes short-lived impairment of neurological function and a possible loss of consciousness (McCrorry et al, 2005).

Sports-related injury research suggests that even mild concussion can have serious implications for cognitive functioning (e.g. Maddocks & Saling, 1996), and that deficits in cognitive performance could last up to 14 days subsequent to the concussion (McClincy, Lovell, Pardini, Collins, & Spore, 2006). Athletes with a history of concussion are more susceptible to later concussions (Mansell et al, 2010), and these later concussions appear more severe on-field (Collins et al, 2002). However, even infrequent concussions can have severe consequences: if a concussion is followed by a second impact to the head, second impact syndrome (Schneider, 1973) can occur, resulting in respiratory failure as a result of a loss of autoregulation of the brain’s blood supply (Cantu, 1996).

These findings have led researchers to believe that even brain injuries that do not appear particularly severe should be taken seriously. Hence it is important to prevent the occurrence of concussion in the first instance, as well as educating athletes about how best to respond to it.

Research-based advice. Recent research suggests that concussion is too often dismissed as trivial by the athletic community (Kelly et al, 1991; Dubourg & Messerer, 2011). Perhaps in response to this oversight, researchers have deemed sports-related injuries as a highly preventable cause of TBI, and propose a need for national-level prevention programmes (e.g. Bazarian et al, 2005). Consensus guidelines released in response to this need advice on protocol for the management and rehabilitation of concussion, with particular emphasis on return-to-play procedure (e.g. McCrorry et al, 2005). Some researchers believe

that teaching proper playing techniques and enforcing safety-promoting rules are the best method for reducing head injuries in athletes (Cantu, 1996), while others claim that these approaches cannot be relied on to reduce the incidence of concussion (McCrory, 1998, as cited in Finch, McIntosh & McCrory, 2001).

Another ongoing debate regarding the prevention of sports-related brain injuries concerns the effectiveness of safety equipment such as helmets and mouth guards. Sport-specific helmets have been shown to be effective in reducing injuries in sports where there is a risk of high-speed collisions or falls onto hard surfaces (Johnston, McCrory, Mohtadi & Meeuwisse, 2001). However for other sports, such as rugby or football, laboratory test results suggest that head protectors do not reduce the likelihood of head injury (McIntosh & McCrory, 2000). In fact, there is concern that some players who wear headgear may change their playing behaviour in a way that increases risk of head injury (Finch et al., 2001) due to a “misguided faith in an ineffective device” (McIntosh & McCrory, 2000:340). The effectiveness of mouth guards has also been questioned. Despite being advertised as having the potential to reduce the chances of concussion, their beneficial effect is yet to be demonstrated clinically (McCrory, 2001).

Public response to research-based advice. Although debates on how best to prevent brain injury in sport continue, consensus guidelines do exist (Cantu, 2006). However it seems that published findings and advice are not necessarily acknowledged by the sports community, particularly at school and college-level. A recent retrospective study suggests that the low level of severity associated with brain injury observed by some researchers translates to a failure to comply with consensus guidelines on concussion: 40% of concussed high school athletes in the US returned to play too early during 2005-2008 according to the American Academy of Neurology guidelines, and 15% did so according to the Prague statement guidelines (Yard & Comstock, 2009). There have been some suggestions as to why

sportspeople do not always behave as advised by researchers. For instance, Gerberich and colleagues (1983; as cited in Malgorzata, Kolodziej, Koblitz, Nimsky, & Hellwig, 2011) suggest that soccer players are afraid to mention head injury symptoms to a trainer for fear of being prevented from returning to play. However, this suggestion is specific to football, and a more general explanation is yet to be found.

Public Understanding of Science

The significance of local knowledge. In order to explore why sports people do or do not act according to research-based evidence regarding brain injuries, an understanding of the relationship between ‘expert’ knowledge and ‘common’ or ‘lay’ knowledge is first required. There are two main conceptions of the transmission of scientific knowledge from experts to the public. The dominant conception, the ‘deficit model’, views scientific knowledge as being distorted and misunderstood by the public (Whitley, 1985). The second conception, that scientific knowledge undergoes ‘creative reconstruction’ during its transmission to the public (Irwin & Wynne, 1996), takes a more positive view of public understanding, recognising that there are differences between the motives of science and lay people. In recognising this, promoters of the second conception emphasise the importance of respecting local knowledge as an object of study. Indeed some even go as far as to claim that experts and policy-makers ignore local knowledge at their own peril (Jodelet, 1991; as cited in Jovchelovitch, 2007). Social representations theory (Moscovici, 1961) embraces this perspective and hence forms the framework for this study. It will be discussed more fully below.

Public understanding of brain injuries. There has been some effort to explore how scientific knowledge about brain injuries is transmitted to the public, but without any particular focus on members of the public that are involved in sport. For instance, Weber and Edwards (2010) compared university students’ understandings of the terms ‘concussion’,

‘mild traumatic brain injury’, and ‘minor head injury’. They found that a more negative outcome was expected for ‘mild traumatic brain injury’ than for the other terms, suggesting that the public’s conception of this type of brain injury does not directly mirror the findings presented in the clinical literature. Further research on the extent and nature of local knowledge of brain injuries amongst the sporting community would be highly beneficial to sports scientists and others concerned about the safety of young sportspeople.

Social representations theory. A focus on the sporting community is not the only aspect of the current literature that is lacking. There is also not enough exploration of how the meanings attached to brain injuries are constructed. This is partly due to the unfortunate dominance of the deficit model – many studies (e.g. Weber & Edwards, 2010) view public knowledge as being misinformed, and hence fail to acknowledge that the construction of the new meanings deserve investigation. Moscovici’s social representations theory (SRT, 1961) provides the ideal framework for exploring how meaning is constructed, and how these meanings are transmitted between groups.

SRT attempts to uncover the understandings that everyday knowledge expresses (Jovchelovitch, 2007) by drawing on the traditions of both psychology and sociology. It has its basis in the Meadian view that ideas are grounded in and emerge from human bodies engaged in human interaction (Smith, 1997). In other words, it sees everyday knowledge as being constructed socially (Willig & Stainton-Rogers, 2008). To elaborate, SRT describes how meanings (or representations) of objects and/or ideas are shared by members of the same social milieu (Jovchelovitch, 1996), and are formed via the interaction that occurs between individuals in that social group (Duveen & Lloyd, 1990). They form a link between the represented object or idea, the carriers of the representation, and the activity of the social group within which the representations makes sense (Bauer & Gaskell, 1999).

According to SRT, representations link knowledge to societal processes (Wagner & Hayes, 2005). This is evident in the three types of transformations Duveen and Lloyd (1990) identify as being involved in social representations: 1) sociogenesis is the transformation of social representations of social groups about specific objects over time; 2) ontogenesis is the transformation of the extent to which social representations are relevant for individuals' social identities; 3) microgenesis is the construction of social representations as a result of social interaction while communicating. Social representations could be seen to constitute knowledge. Assuming that this is the case, there are several angles from which the social construction of knowledge could be explored. Furthermore, the three mentioned here could be studied simultaneously as they are interlinked (Duveen & Lloyd, 1990), or independently.

Regardless of what aspect of social representations one decides to focus on, there is ample opportunity for the investigation of the social construction of knowledge of head injuries amongst the sporting community. There is the potential for a deeper understanding of many aspects of the knowledge of brain injury, including how relevant individuals' identities as sportspeople are to how they understand head injuries, and the importance of clinical research in comparison to social interaction. SRT's dual focus on group-based and internal rationality (Joffe, 2002) makes it well-suited to framing the study of public knowledge within particular social contexts, and the transmission of this knowledge from the scientific to the common-sense.

The Application of Social Representations Theory

Although Moscovici's early work provided little guidance on the methodology for conducting empirical research using social representations (Duveen & Lloyd, 1990), there has since been significant application of the theory to the investigation of a wide range of issues. Although there has not yet been a study that employs the SRT approach to examine knowledge of brain injuries in the sporting community, there are two important and related

issues that have been explored in this way. One is the social representations of risk (Joffe, 1999), and the other the social representations of health and illness (Herzlich, 1973). Both are important facets of the knowledge of brain injuries amongst sports people, but are too general to give a comprehensive description.

Social representations of risk. Recent research into risks and hazards has moved away from focusing on the internal information-processing of individuals when evaluating risk, and toward the processes of communication about risk and their relation to individual and society-wide beliefs. For instance, the mental models approach (Morgan, Fischhoff, Bostrom, & Atman, 2002) argues that people can be helped to make more informed decisions if they are given new information in a format that is in keeping with their initial belief system (Breakwell, 2001). The model is compatible with SRT, which emphasises communication, rather than individual cognition, when explaining how representations are formed (Joffe, 1999).

One of the important findings from Joffe's study on risk (1999) is that aside from logic, there are also social and emotional factors involved in behavioural responses to risk. The suggestion that individual cognitions do not accurately predict behavioural responses to risk is supported by Offir, Fisher, Williams, and Fisher's study (1993). They found that gay men who reported that they had modified their sexual behaviour enough to reduce or eliminate their risk of contracting AIDS did not actually carry out safer sex as a result of learning about the disease. This is important, as it suggests that the prevention of any risk-taking behaviour does not depend exclusively on the accuracy of people's individual knowledge of the risks, but also on the processes of communication about the risks and the importance of the social group for the individual (Breakwell, 2001).

SRT has also facilitated work that reveals that people feel invulnerable to and less anxious of a risk because they externalise the threat by forming social representations which

portray 'others', rather than the self and the in-group, as being more deserving targets of the hazard (Joffe, 1999). When taking this into account alongside evidence that people believe that negative events are less likely to happen to them than others (Weinstein, 1980), it is clear that we need to acknowledge that individuals are likely to take risks, even if they are cognitively aware of them. Furthermore, it seems that people may be more likely to engage in risk-taking behaviours if they identify with a well-defined group (Breakwell, 2001). Therefore, the study of particular risks within a particular social context is important if hoping to encourage a reduction of risk-taking behaviours, and SRT is particularly suited to this task (Joffe, 1999; 2002).

Social representations of health and illness. Although there is very little literature on the social representations of injury, and none on the social representations of sports-related brain injuries in particular, the social representations of health and illness have some relevance to brain injuries. Herzlich's famous work emphasises society's role in teaching individuals to be ill (Herzlich, 1973). It also suggests that the invalid is perceived by others to be a deviant, and that illness in general is seen as a form of 'unproductivity' (Herzlich, 1973). This notion could be extended to account for injury, although it also appears that there are differences between illness and accident – accidents are “much more violent”, but “less serious” (Herzlich, 1973:66).

Framing the Current Study

There is a lack of research on the social representations of brain injuries held by sportspeople in the current literature. Considering the abundance of clinical evidence for the dangers of brain injuries, it is worrying that many young athletes do not abide by the consensus guidelines set out by sporting associations. According to SRT, we must accept that knowledge is transformed socially and over time, as a result of interaction between members of a social group, and in line with individuals' shifting self-identities. If we do so we may

begin to understand why there is a discrepancy between the experts' knowledge and young sportspeople's behaviour. Therefore this study attempts to uncover some of the understandings of brain injuries held by young sports teams, with a particular emphasis on the social construction of meaning.

Due to the nature of social representations studies in general, it is not possible to predict exactly what aspects of the participants' understanding will arise. However there are a number of broad research questions that the study will attempt to explore. These include:

- the meanings associated with head injuries in the context of being a member of a sports team;
- how knowledge about head injuries is transmitted to the sports group from the scientific community;
- how knowledge about head injuries is shared amongst sports groups; and
- the extent to which this information-sharing may elicit change in behaviour.

It is hoped that this study will elicit information about the understandings of brain injury amongst young sportspeople, and how the information is transmitted to and between them. This information may then be used by organisations dedicated to preventing the incidence of brain injury to develop services that take into account young sportspeople's knowledge of brain injuries and their risks.

Method

Research Design

In qualitative studies, the methodological approach one decides to take is related to both theoretical issues and epistemological conceptions (Jovchelovitch, 2007). Therefore it is important to consider how social representations theory may influence the methodology used in this study. The literature on social representations makes it evident that any given social representations study can focus on one of many aspects of social representations. The object

of study could be the social group's habitual behaviour, the content of formal communication, individual cognitions, or the process of informal communication. This study aimed to explore the latter two. However it also remained open to exploring other aspects, as it was not possible to predict exactly what points of interest would emerge from the analysis.

Ethical approval. This study was approved by the SDP Ethics Committee.

Participants were required to read and sign a consent form (Appendix A) before participating, and were given a debriefing information sheet at the end (Appendix B).

Focus groups. This study's aim was best met by carrying out focus group discussions. A focus group is a research technique that collects data through group interaction on a topic determined by the researcher, where the researcher has an active role in creating the group discussion (Morgan, 1996). It allows observation of naturally-occurring social groups; both the individual's cognitions and the effects of interaction on his or her understanding can be uncovered. The focus group is not only a platform for discussion that reveals the meanings surrounding an issue, but can also be seen as a social occasion in itself. The interactions between individuals can be studied as the everyday process of generating social representations (Livingstone & Lunt, 1996), making the focus group the ideal context in which to explore microgenesis (Duveen & Lloyd, 1990). The group context also serves to remind participants of their social identity (Morley, 1980), enabling the study of knowledge and understanding in relation to identification with the social group.

Participants. 17 participants took part in the study. They were university students who volunteered by responding to emails sent to sports teams in a university in the South East of England. Four focus groups were conducted in total. Each consisted of four or five participants, all of whom played the same sport with the other participants in the focus group. Focus groups were conducted with groups from two female teams (rowing and lacrosse), and two male teams (rugby and football). Attempts were also made to include members of the

boxing club, but this was not possible for reasons examined in the discussion section. The participants were aged between 18 and 25.

Materials. Prior to conducting the focus groups, four vignettes were written to be used in the discussions (Appendix C). These vignettes were written using a mixture of stories told during informal interviews with university sportspeople, stories in the media, and case studies used in clinical journals. Their purpose was to elicit discussion during the focus groups by helping the participants to contextualise the topics being discussed. Focus groups are a good environment for the discussion of abstract situations and ideas, as the participants are able to explain themselves to and query each other (Morgan, 1996).

Procedure

Focus groups. The focus groups lasted around 1 hour, and took place in locations familiar to the participants. All participants gave informed consent before participating. The researcher, who was present throughout the focus group, introduced the discussion by giving a brief verbal description of what the discussion would entail. The discussion was audio recorded.

There were two main parts to the focus group: general discussion about head injuries, and discussion of one or more vignettes. The discussion was opened with the general question, ‘What do you think of when someone talks about a head injury?’ As the aim of the focus group was to elicit interaction amongst the participants, the researcher merely acted as moderator. Occasionally she interjected to ask open-ended semi-structured format questions (Appendix D). These were used flexibly, varying according to the context of the on-going discussion.

Transcription. The recorded focus groups were then transcribed word-for-word. For the purposes of anonymity, the participants' names were disguised for the transcription¹, as were names of other people, identifying locations and institutions.

Coding. Thematic analysis, 'an accessible and theoretically flexible approach to analysing qualitative data' (Braun & Clarke, 2006) was adopted to analyse the resulting focus group data. Thematic analysis is a widely used method for identifying, analysing and reporting patterns within data, helping to organise and describe it in detail (Braun & Clarke, 2006). The approach does not obligate the researcher to commit to a fully-developed theory that is grounded in the data, but allows for more flexible analysis to be conducted. Considering the explorative nature of this study, thematic analysis seemed to be a highly suitable analytic approach. However, the study also adopts a social representations perspective. Therefore it requires an analytic method that allows the researcher to focus on the interactions between individuals, socially-constructed meanings and transmission of information between groups in society. As thematic analysis requires the researcher to actively construct themes from the data, this approach was considered appropriate for the analysis of the data in this study.

The transcription of the audio-taped data constituted the initial coding process, although no formal record of codes was made. The transcribed data was then open-coded (Strauss & Corbin, 1998) manually. This coding process resulted in a list of over 500 codes. These codes were then grouped into categories, and in the process some codes were deleted, added and changed. The different categories of codes were then further organised into themes and sub-themes, resulting in a hierarchy consisting of themes, sub-themes, categories of codes, and codes. This process of coding, organising and re-organising was conducted by

¹ Pseudonyms of participants according to group:
Rowing (Roseanne, Rosie, Sarah, and Nicola); Rugby (Harry, John, Chris, and Theo);
Football (Adrian, Joseph, Sam, and Robert); Lacrosse (Charlotte, Emily, Annie, and Erica)

frequently referring back to the original transcribed data until the researcher judged the thematic map to depict the data as accurately as possible (Appendix E). Once coding was complete, the data were examined for differences and similarities between focus groups within themes, and across code categories. In this way, the systems of meaning underlying the different data sets, as well as the data as a whole, could be revealed. The results are presented in narrative form, using examples from the data.

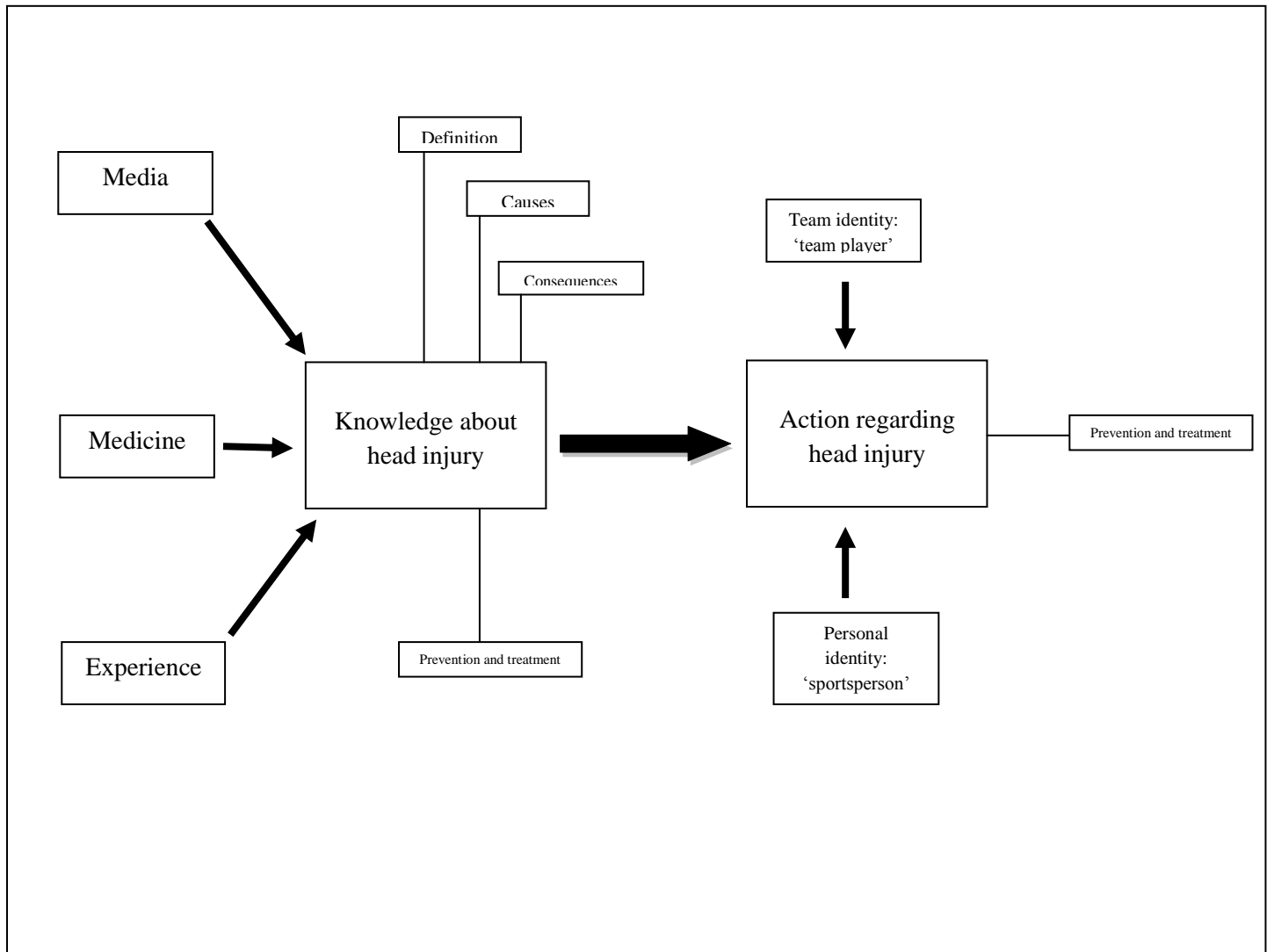
Results

The dominant themes that arose out of the analysis have been organised into an overarching framework through which the data can be understood (Figure 1). The themes are written in rectangle boxes of varying sizes. Bigger boxes indicate broader themes. Arrows between themes indicate that one affects another, whilst lines between themes indicate that the smaller box is a sub-theme of the bigger box.

As the diagram shows, the two most dominant themes are ‘knowledge about head injury’ and ‘action regarding head injury’. The results of the analysis will be divided into two main sections accordingly. The results will be presented and interpreted simultaneously, a common practice in qualitative studies. This is particularly necessary for this study, as thematic analysis is an interpretive process (Braun & Clarke, 2006).

Figure 1

Overarching framework of themes



Knowledge about Head Injury

This section will describe the subthemes that make up ‘knowledge about head injury’: ‘definition’, ‘causes’, ‘consequences’, and ‘prevention and treatment’. The sources of knowledge are also included in the theme: ‘media’, ‘medicine’ and ‘experience’. There were similarities and differences between groups in the knowledge held about head injury, which indicate the existence of both a broad and more narrow social milieu, within which meaning is shared: ‘sportspeople’ and ‘teams’ (i.e. the groups in this study). The sources of knowledge also influenced the extent to which knowledge was shared between groups – ‘experience’ was particularly significant. The findings will be discussed in relation to the SRT view that meaning is constructed socially.

Definition. Three of the groups understood brain and head injuries as ambiguous terms, whereas one was certain about their differences. The rugby, lacrosse and rowing groups could not come to a conclusion on the definition of brain and head injuries:

Harry:	“I wouldn’t distinguish between head and brain injuries”
Chris:	“Brain is a subset of head injury”
Theo:	“No, they’re definitely different I think.” (Rugby) ²

However, the football participants perceived head and brain injury as distinct. They strongly felt that the term ‘head injury’ is used more frequently than ‘brain injury’, and is hence more important. Joseph even described the former as a “catch-phrase”, meaning that it is used frequently and without much consideration about its underlying meaning.

The significance of football for the football participants implies that the notion of head injury is anchored (Moscovici, 1984) in the group’s existing understanding of their own sport. This could indicate that the groups in the study possessed knowledge that was shaped by their shared interest and experience in the same sport. Further evidence that each group is a social milieu within which knowledge is shared (Bauer & Gaskell, 1999) is presented below.

² Extract from the transcription of the rugby focus group.

Causes. However, findings of consistency across groups must first be addressed, as it indicates that ‘sportspeople’ also exists as a broader social milieu. For instance, all groups associated the causes of head injury with sport in general. This not only supports recent research linking head injury with sport (e.g. McKinlay et al, 2008), but also suggests that all groups share the general conception that head injury is caused by sports:

Emily: “[I think of it as being] generally through sports”
Erica: “Yeah definitely, actually through sports more so than a car accident, or anything else” (Lacrosse)

Another ‘cause’ that was understood by all groups was ‘bad technique’. This usually related to headers in the football group: “If you do mess up headers like that, you are wary of the next one, because you are aware that you have actually hurt yourself” (Robert; football). For the rugby players, tackling badly was seen as a cause of injury to the self or others: “in rugby I’m relatively confident that most of the time I won’t hurt myself doing a tackle because I know I’m doing it right” (Theo), and “I think it was literally his first game of rugby and he just had no idea how to tackle somebody. And I don’t know what part of his body it was but one part of his body just impacted my head so badly” (Harry). Similarly, Roseanne claimed that a head injury in rowing could only be caused by doing something wrong: “It’s likely that I would have been doing something stupid if I managed to smack myself in the head”. The shared understanding that injury is caused by incorrect technique supports researchers’ claims that teaching proper technique may reduce the incidence of concussion (Cantu, 1996).

The groups were also similar in understanding ‘impact’ as a significant cause of head injury. Participants described being “hit on the head” (Nicola; rowing), “hitting your head” (Emily; lacrosse), “any kind of blow to the head” (Robert; football), and “I always kind of think of impact” (Harry; rugby).

However, there were differences between groups regarding the type of impact that concerned participants. For football and rugby participants, impact to the head was understood as a result of collisions with other players, for instance “tackles”:

- John: “What have you guys hit with head injuries? Have you hit like knees and stuff?”
 Harry: “Um, knee, boot (in America), my own player [laughter], one time.”
 (Rugby)

The football group spoke about “headers” - for instance, “He got like proper cracked skull, brain damage. Um and that was just literally jumping for a header” (Joseph). The lacrosse group, in contrast, did not view collisions with other players as the cause of impact: “you don’t get slide tackled or anything, it’s more like a contact with the stick, not your body, so that avoids people trying to push people over” (Erica). This difference is likely to be due to the different levels of physical contact involved: rugby and football are contact sports, while women’s lacrosse only allows limited contact. Therefore although the general causes of head injury were understood similarly by all groups, knowledge of specific causes was anchored in the perceived nature of the sport played. This is evidence for the parallel function of ‘teams’ and ‘sportspeople’ as social milieu.

Consequences. Participants’ knowledge of ‘consequences’ was more consistent across groups than of ‘definition’ and ‘causes’. They conceived of two types of consequences – internal and external. The main internal effect was ‘concussion’, usually involving unconsciousness, memory loss, dizziness, and vomiting as the main symptoms. ‘Brain damage’ was also referred to across groups. Joseph (football) was explicit in his understanding: “If you think about boxers getting brain damage from being smacked”, whereas Rosie (rowing) referred to it implicitly: “in terms of head injuries, I think one of the big fears is that it messes your brain up”. One of the main external consequences was the sight of blood: “When I think of head injury, I think more of like actual external bleeding” (John; rugby). ‘Blood’ was also significant for the perceived severity of head injuries, being

associated with more serious consequences: “I’ve only had to go off [the pitch] for blood, and er, people are very readily, they’re fine with you going off for blood. As soon as they see blood they’re like he’s gotta go, he’s gotta go” (John; rugby).

The shared knowledge about ‘consequences’ across groups provides further evidence for the existence of ‘sportspeople’ as a broad social milieu.

Prevention and treatment. The theme ‘prevention and treatment’ reveals that ‘sportspeople’ have a common trust in ‘rules and procedure’ about head injury. All groups expressed a desire to do what they are supposed to do (e.g. “like if you get concussion you’re meant to have 3 weeks off, aren’t you?” (Harry; rugby)), and trusted that if head injury in their sport were a major issue, there would be rules and procedure in place to deal with it: “Surely these days with all the health and safety stuff, if there were massive concerns about it, they’d just make people wear like scrum caps” (Robert; football).

However, even the common trust in rules and procedure was anchored in individual groups’ understanding of their own sport. Rugby and lacrosse, for example, were aware of the possibility of being penalised during matches for putting others at risk of head injury: e.g. “if any player gets tackled and they get turned upside down and it looks like their head’s gonna go into the floor then they’re off” (John; rugby). However, other groups possessed less knowledge about head-injury related rules. Roseanne, the captain of the boat-club said, “Well there’s a British Rowing safety thing that everyone has to do – and if there are any odd issues they come up in Captains’ meetings. I don’t think there’s anything explicitly head injury related”. This is probably due to the perceived low risk of head injury in rowing.

Other knowledge about ‘prevention and treatment’ also differed across groups. For instance, although all groups were aware that equipment to protect the head existed, different items were relevant to different groups. Scrum caps were highly significant for the rugby and football groups, while mouth-guards were relevant for the lacrosse group.

Analysis has so far shown that although some knowledge was shared amongst all groups, indicating a broad ‘sportspeople’ social milieu, other knowledge was specific to particular groups, indicating smaller social milieus of individuals playing the same sport, i.e. the groups taking part in this study. The differences in knowledge between groups are explained by participants anchoring the idea of head injury to their perceptions of their own sport. The following section will explain this mechanism in more detail.

Sources of knowledge. As shown in Figure 1, participants gained knowledge about head injury from three sources: ‘media’, ‘medicine’, and ‘experience’.

Experiences. This theme explains why different knowledge was shared within groups: participants tended to share experiences with other members of their group through their sport, which led to each group sharing a distinct collection of experiences. Consequently, different groups anchored the idea of head injury to ideas of different sports, causing some of the differences in knowledge between groups.

The following example illustrates how Harry’s experience in rugby informed his knowledge of the cause, consequence and ideal response to head injury:

“When we played [H] last year, I got tackled in the head from behind at one point, and kind of, it was like a proper sort of, I didn’t really know where I was, I was a bit kind of dazed. I went off the pitch for a few minutes, and then felt fine, and came back on. Which is really, really stupid and then, later on, I got hit in the head again, and then I had absolutely no idea what was going on, and I was quite worried.” (Rugby)

Physiological experiences of head injury were remarkably similar across groups. They involved pain, dizziness, a ‘weird’ sensation, not knowing where one is, and feeling fine after a period of time. These experiences were shared amongst ‘sportspeople’, and were not specific to any particular sports group.

However, there were many differences in experiences between groups, explaining the segmentation of ‘sportspeople’ into ‘teams’. For instance, none of the rowing participants had experienced or knew of others experiencing head injury in rowing, causing them to believe it “never happens” (Rosie). In contrast, rugby players knew of several others who had

experienced head injuries through rugby, and so “you’re never surprised when there’s an injury [...] you’re not that surprised because you know it’s gonna happen to you at some point or another” (Harry).

‘Experiences’ were clearly a significant source of knowledge because they were so readily available – even if they were others’ experiences. For instance, Charlotte (lacrosse) said that “I’ve never had any formal learning about head injuries, it’s always just been what you pick up from other people”, and Nicola (rowing) learnt about memory loss caused by head injury through her mother: “my mum one time was jumping her horse [...] she fell off, and then got back on, re-jumped the fence, but she can’t remember falling off or re-jumping the fence”.

However, ‘experiences’ were not the only source of knowledge for the participants. Knowledge was gained from several external sources, a finding that is in keeping with SRT, which views knowledge as being social in origin rather than a product of individual cognition (Wagner & Hayes, 2005).

Media. One aspect of the social origin of knowledge is the process of communication, of which ‘media’ is important (Moscovici, 1961). However, analysis showed that only the rugby and football groups accessed knowledge about head injury in this way. Footballers often referred to head injuries sustained by professional players on television: “Well I’ve seen them do it on professionals, I remember seeing Michael Owen get a boot to the head” (Joseph). Rugby players gained knowledge about technique that prevents head injury: “When I watch on TV, you kind of watch other people tackling and you watch other people taking collisions, that sort of stuff, I don’t know whether your brain naturally thinks, he did that, I’ve gotta do the same sort of thing” (Chris). Therefore some of what these groups knew about head injury is closely linked to what they are presented with in the media.

However the other groups did not use media as a source of knowledge, due to a lack of relevant media content available.

Medicine. In contrast to ‘media’, ‘medicine’ was a source of knowledge for all groups. All participants expressed trust in ‘physios’ [physiotherapists], doctors, the hospital, and the ‘medically-trained’, and medical action was seen as the ‘proper’ response to a head injury: “it depends if there’s someone medical there, like, you need some proper action” (Roseanne). Medical knowledge was also valued above all other forms of knowledge, including that of experienced members of the team. Erica insisted that “if there’s a coach there, they may think oh, it’s fine, I’m the coach I’m in charge, but they’re not a medical expert”. Overall, a high level of respect for medical knowledge was identified, which resulted in all the groups gaining some knowledge from medicine. This explains some of the consistency across the data. However, SRT theorists generally agree that “the public uptake of science depends primarily upon the trust and credibility public groups are prepared to invest in scientific institutions and representations” (Wynne, 1992:281). Therefore this source of knowledge may not be unique to ‘sportspeople’, but utilised by the majority of western society.

However, despite the widespread trust in medical knowledge, the participants did not absorb every aspect of it. For instance, John did not read the leaflet that he received after going to hospital for concussion, and Chris said “I never read the leaflet”. This suggests that other sources of knowledge, such as ‘experiences’, are more dominant.

Knowledge about head injury: conclusion. Analysis of the data showed that knowledge was shared either within the group, or throughout all groups. Instances of the former indicate each group as a social milieu, while instances of the latter indicate a broader milieu of ‘sportspeople’. The shared understanding within ‘sportspeople’ stemmed from a common trust in medical knowledge, and experiences that were common to all participants.

Differences in knowledge between groups were largely a result of different experiences for different groups, and specific communication via the media – and the sharing of the resulting knowledge amongst members of the same group. These findings fit the ‘toblerone model’ of common sense (Bauer & Gaskell, 1999), which views meaning as a product of the relationships between the carriers of the representation (i.e. sportspeople), the represented object or idea (i.e. head injury), and the project of the social group within which the representation makes sense (i.e. sports team). They also support SRT’s view that knowledge is not a product of individual rationality, but social processes (Willig & Stainton-Rogers, 2008).

Action Regarding Head Injury

The second part of the results section concerns the factors that influenced the participants’ actions regarding head injury. As shown in Figure 1, the actions regarding head injury are influenced by the knowledge they have about head injury, as well as their ‘personal identity as ‘sportsperson’’ and their ‘team identity as ‘team player’’. The data suggests that although the participants held some medical knowledge about how to prevent and treat head injury, their experiences and identities often overrode this knowledge. This could explain findings that sportspeople continue to take risks with head injury (Yard & Comstock, 2009). However at times, these same factors complemented the knowledge they held, and encouraged them to act as they knew they should. Organisations wanting to encourage preventive behaviour in sports people should take note of the latter factors.

Knowledge about head injury. The data shows that knowledge about the prevention and treatment of head injury has the potential to influence the action that the participants take if they are faced with a head injury. All groups possessed and sometimes utilised medical knowledge, and many participants had experienced head injuries that made them want to behave more cautiously than before. However, during the actual head injury

episode, participants tended to act according to how they felt at the time of injury, rather than according to what they knew they should do.

Medicine. The consistent trust in medical knowledge often led to medically-informed action regarding head injury. For instance, Robert explained that he would only wear a scrum-cap for football if a doctor told him to: “If it was like a big game and this one was slightly touch and go, and a proper doctor gave me advice and said oh you can play but I’d like you to wear this kind of protective stuff, then I probably would maybe at that point”. Throughout the data there was also evidence that participants readily accepted medical professionals’ advice to take time off from sport after sustaining a head injury.

However, this was not always the case, especially in the lacrosse group. Annie reported: “I’ve been told by the physio at the moment that I shouldn’t be playing, but I am playing because at the end of the day like I’ve got 3 weeks left of our season and I’ve done whatever damage that I’m doing, and I’m not going to stop now”. This example shows that there were other factors determining the extent to which action was influenced by medical knowledge, and that in some cases these other factors were more dominant.

Experience. The participants’ own experiences were one of the strongest determinants of their actions regarding head injury. Throughout the data, there was evidence that personal experiences affected how head injuries were prevented. Footballers avoided heading the ball, while rugby players responded by buying scrum caps. Chris said, “I got one in America, and I know you got one on the ear, but you then bought a scrum cap, and I bought a scrum cap immediately after mine”. Other participants, such as Rosie, claimed that they would not buy a cycling helmet at the insistence of their parents, but they would if they suffered a head injury: “I think it would have to be me to be honest, it would have to be me that hurt my head”.

The experiences of other people also had the power to influence action. For instance, Rosie later conceded that “if someone really close” to her experienced a head injury, she might wear one. The data suggests that an individual is likely to act in response to another person’s head injury experience to the extent that the injured person is close to, or at least familiar to the individual (i.e. a teammate or friend).

The examples so far suggest that individuals are more likely to act preventively if they have experienced head injury, or known someone who has. However, experience can also lead sportspeople to believe that their injury is not serious enough to warrant terminating play. Many participants who had experienced head injury spoke about how they ‘felt fine’, and as a result continued (or wanted to continue) playing:

Chris: “So why d’you go back on? Because you felt ok?”

Harry: “Because I felt fine, I didn’t think there was anything wrong, so...” (Rugby)

Participants such as Sam also recalled other people that ‘felt fine’ after sustaining head injuries: “Well like, you see people go down a lot, and hold their head, but then usually they’re alright, within about 2 or 3 minutes”. Therefore while participants’ experiences of head injury sometimes made them more protective of their heads, in others it caused them to perceive head injury as less serious and to take more risks as a result.

The participants’ actions regarding head injury were significantly influenced by their knowledge about head injury. However, analysis of the data shows that there are also other factors that are equally, if not more significant than knowledge: individuals’ personal identity as a ‘sportsperson’, and team identity as a ‘team player’. Although these factors can cause individuals to ignore any medical knowledge they have, they can also complement it, encouraging sportspeople to take action in preventing and treating head injury.

Personal identity as ‘sportsperson’. The participants’ enjoyment of sport, desire to protect themselves from harm, and the attitude that ‘it will never happen to me’ are all

important elements of their personal identity as a 'sportsperson'. This identity had significant influences upon the participants' actions regarding head injury.

Enjoyment of sport. In many cases, participants described increasing their risk of head injury for the sake of partaking in sport, ignoring their medical and experiential knowledge. For instance, Erica recalled incidences where players abandoned their crutches to play for an hour: "it's like, anything to play in the game". Similarly, Sam recalled an injured player who "wouldn't let the ambulance drive off when I was in first year, because we were winning 3-2 and he wanted to see the last 5 minutes".

Desire to protect the self. In contrast to the effect of the participants' enjoyment of sport, their personal interest in protecting the self from harm sometimes caused them to act more cautiously. Many were concerned about "permanent damage", while others worried about the dangers of repeated head injury to a "fragile" brain.

Although there was no evidence that the participants acted upon these concerns specifically, it could be suggested that appealing to sportspeople's desire to protect their bodies from harm might be an effective strategy for getting them to be preventive of head injury.

'It will never happen to me'. Despite the urge to protect themselves from harm, all participants had the attitude that 'it will never happen to me'. Converging with Joffe's and Weinstein's findings (1999; 1980), all groups thought "cases like that would be so rare that you would just think well that would never happen to me" (Rosie; rowing). Even those that had experienced many injuries in the past spoke about how many more matches were played without injury than with. Talking about ice hockey, Erica said, "oh it happened to that guy, but look at everybody else that's played this sport ever", while Harry (rugby) referred to a friend's injury, saying, "I've played however many hundreds of games of rugby in my life and never seen anything like that, so the chances that you'll be there when that happens again

are so slim". The certainty with which the participants expressed this attitude suggests that this is a significant factor in individuals' failure to act upon their knowledge of how to prevent and treat head injury.

Team identity as 'team player'. Another major factor that influenced the participants' actions was their relation to other people. It appears that many participants had a powerful team identity as 'team player', which influenced them to take medically-discouraged action by continuing to play after sustaining a head injury. This supports research that finds that social factors, as well as logic, influence behavioural responses to risk (Joffe, 1999). However the same identity also resulted in mutual concern between teammates, and an encouragement of cautious behaviour.

For many of the participants, playing sport involved 'feeling like you can't stop', even if they sustained an injury. Chris said that during rugby, "though you might be staggering around the wrong half, you feel like 'I've gotta stay on this pitch!'".

Social convention. The feeling of having no choice but to continue was found throughout the data, but was particularly strong for the rowing group, who constantly felt that they had to continue. One explanation is that the rowing participants did not want to break social convention by acting differently to the rest of their crew. In rowing, the identical technique that is expected of all crew members makes it particularly obvious when one individual is out of sync with the others. Therefore the desire to adhere to the norm is likely to be especially strong for rowers. Rosie showed how this desire caused her to continue through pain: "you do get winded sometimes [...] you think everyone else must be going through it, or have gone through it, and they've all stayed on, so you can't stop". The desire was also evident in their attitude towards using safety equipment. They explained that they would not want to wear a helmet while rowing because "we wouldn't want to make ourselves

stick out [...] you never see a boat full of people wearing helmets. So I don't think you'd want to" (Nicola), even if one of their friends had sustained a head injury while rowing.

Desire to appear strong. Another aspect of the 'team player' identity is appearing strong to others. For instance, Sarah said that she continued erg training despite excruciating pain in her back, because "I can't stop because then they'll think I'm really weak". If her teammates thought she was weak, she would have deviated from her 'team player' identity, so she avoided this by continuing through her pain. Football participants also expressed a desire to be perceived as strong – for instance, Patrick and Joseph laughed about how they would exaggerate a head injury to their teammates in order to sit out of a match: "You'd make a lot more out of it than it was". Therefore it seems that the desire to maintain the impression of being a 'strong team player' was important in shaping how the participants behaved in response to injury.

Desire to not let the team down. Another reason that participants continued sport despite injury was that they did not want to let their team down. The participants' identity as a 'team player' caused them to feel obligated to their team. They did not want the team to perform badly because of their inability to play, and as a result tended to ignore their injuries and participated regardless. For example, Harry (rugby) said, "I wouldn't want to go off the pitch because I'd be letting people down". This phenomenon was more pronounced when the injured individual could not be replaced, or if the team had collectively invested a great deal of time and effort into the team.

Overall, all groups were likely to prioritise the team's performance over their own injury, suggesting that the 'team player' identity is common to all 'sportspeople'. It is evidently significant, as injuries were perceived as a symbol of sacrificing the self for the team. They were described as "taking one for the team" (Chris; rugby), "a matter of pride" (Rosie; rowing), and a "status symbol" (Adrian; football).

Pressure from teammates. However, the participants did not always choose to act in accordance with their team identity by continuing for their team, but felt pressured to by their teammates. The participants constantly made their own judgements about the severity of others' injuries. As Sarah described, "I think one thing you do is ask yourself how serious their injury is, straight away. And even if you think you're being a bit nasty, you think come on, can they really row?" In many cases, teammates' judged another's injury to be trivial, and used this judgement to put pressure on them to continue: e.g. "We've had a few players in my time that we've always just been like, just get on with it, stop being a baby" (Sam). Therefore the participants' actions were sometimes actively shaped by their teammates' judgements of what the 'team player' identity entails, rather than their knowledge or desires.

Concern for teammates. Although participants' relations to others often discouraged them from taking medically-informed action, there is also evidence that their 'team player' identity caused them to feel concern for their teammates' injuries. If teammates judged an injury to be serious, they tended to encourage the injured to take a break from sport. As Robert (football) explained, "if someone clearly had something quite wrong with their head, then you'd, like as a friend, you'd just say no you're not playing on". This occurred more frequently for the football group, who often refereed matches. As referees, the participants felt responsible for the safety of the players, so treated head injury as serious to avoid being blamed later on: e.g. "Particularly when you're refereeing and you're responsible for the players' safety, you don't want to be taking the risk of having somebody do themselves some damage and having them come back to you and being like why didn't you tell me to get off?" (Adrian).

Therefore participants' team identity did not always cause them to ignore the medical knowledge that they had. Sometimes, it led to 'concern for teammates', making them more cautious and likely to act according to medical knowledge. However, in the majority of

cases, the 'team player' identity caused injured individuals to continue playing regardless of their injury.

Action regarding head injury: conclusion. Analysis of the data showed that the actions taken by the participants to prevent and treat head injury were influenced by a variety of factors. They valued and possessed some medical knowledge, but tended not to act according to what they knew to be medically appropriate. Although their personal experiences of head injury often caused them to be more cautious, at the precise moment of injury they tended to act according to how they felt at the time. Injured participants were reluctant to take time out of sport because they enjoyed it, felt as if they were not personally at risk, and strongly identified with their team which resulted in both wanting and having to sacrifice themselves for the team. However, the same team identity also caused teammates to look out for each other.

Discussion

Implications and Suggestions

The findings from this study have important implications for organisations seeking to inform and protect people from head injury. It shows that sportspeople gain their knowledge from a variety sources, and act according to many different factors related to their sport. Organisations need awareness of this if they want sportspeople to appreciate the importance of abiding by safety guidelines. In order to stress the medical dangers of not taking enough time off sport after an injury, they need to utilise a broad range of strategies for transmitting information that encourages safe behaviour. The study has shown that while medical knowledge is valued, it is not always acted upon. Combining this finding with the recent attention paid to processes of communication about risk (e.g. mental models approach; Morgan, Fischhoff, Bostrom, & Atman, 2002), it seems that organisations need to find new ways of transmitting medical knowledge to sportspeople. For instance, as sportspeople's

behaviour is strongly influenced by their team identity, organisations could promote schemes where teams learn basic medical skills as a group, as part of their regular training schedule. Organisations could also utilise sportspeople's love of sport – for instance, by stressing the fact that if an injury is not prevented, it could prevent you from ever participating in sport again.

The study also reveals that media is a significant source of knowledge for groups whose sport is well-documented. Several participants referred to an effective television advertisement on how to perform CPR³, and thought that this type of medium, if targeted at the right audience, could be used to inform sportspeople about how to deal with head injury. There is potential for organisations to transmit medical information in this way, to counter sportspeople's team identity, personal identity and experiences.

Limitations and Future Research

The explorative nature of the study meant that rich data and depth of analysis was prioritised above the use of a large, representative sample. Therefore the resulting sample was limited to students from one university. The findings cannot be generalised to all sportspeople, as the student context within which the participants engage in sport is not universal to all sportspeople. However future research could explore the applicability of these findings to the wider sporting community.

The sample was also limited to team sports. Although effort was made to include members of the boxing club, it was not possible to assemble a group within the timeframe. This could be indicative of a weaker team identity for participants of individual sports. In order to explore this further, it would be useful to include individual sports in future research regarding the influence of team identity on representations of head injury.

³ British Heart Foundation. Hands-Only CPR [advertisement]. Retrieved from http://www.youtube.com/watch?v=JR0aZX1_TD8

A third limitation of the study was that it was not possible to explore many themes in depth, as the focus group discussion was designed to be led by the participants. Therefore whilst the findings indicate that there are various avenues through which knowledge could be transmitted, it is unclear precisely how they should be approached. Future work could focus more specifically on the distinct nature of different sports, or the media's effect on instantaneous reactions to head injury. Other areas in this field that would benefit from further research include the representations of head injury in the media, and the relationship between head injury and perceptions of gender.

Conclusion

The results from the thematic analysis support the clinical literature, as they suggested that young sportspeople do not always abide by guidelines regarding appropriate responses to head injury. The study also revealed that knowledge about head injury is gained from a variety of sources, and that the extent to which representations of head injury are shared and acted upon depends on the individuals' identities as 'sportsperson' and 'team player'. If organisations seek to inform young sportspeople of the risks, preventative measures and appropriate treatment of head injury, they should consider transmitting information via all these sources. They should also acknowledge the significance of sportspeople's identities in directing their understanding and behaviour concerning head injury in the context of sport. After all, the prevention of any risk-taking behaviour does not depend exclusively on the accuracy of people's individual knowledge of the risks, but also on the processes of communication about the risks and the importance of the social group for the individual (Breakwell, 2001).

References

- Bailes, J., Maroon, J., & Robinson, S. (2011) 'Introduction: Sports-related neurosurgical injuries'. *Neurosurgical Focus*, 31(5): Introduction.
- Whitley, R. (1985) 'Knowledge Producers and Knowledge Acquirers: Popularisation as a Relation Between Scientific Fields and Their Publics', in T. Shinn and Whitley (eds). *Expository Science: Forms and Functions of Popularisation, Sociology of the Sciences Yearbook, Vol. 4*. Dordrecht & Boston, MA: Reidel. pp. 3-28.
- Bauer, M. & Gaskell, G. (1999) Towards a paradigm for research on social representations. *Journal for the Theory of Social Behaviour*, 29(2): 163-186.
- Bazarian, J.J., McClung, J., Shah, M.N., Cheng, Y.T., Flesher, W., & Kraus, J. (2005) Mild traumatic brain injury in the United States, 1998-2000. *Brain Injury*, 19(2): 85-91.
- Braun, V., & Clarke, V. (2006) Using thematic analysis in psychology, *Qualitative Research in Psychology*, 3:2, 77-101.
- Breakwell, G. M. (2001) Mental models and social representations of hazards: the significance of identity processes. *Journal of Risk Research*, 4(4): 341-351.
- Cantu, R. (1991) Minor head injuries in sports. In P. G. Dymont (Ed.) *Adolescent medicine: state of the art reviews*. Philadelphia: Hanley & Belfus.
- Cantu, R. (2006) 'An overview of concussion consensus statements since 2000'. *Neurosurgical Focus*, 21(4):E3.
- Cantu, R. C. (1996) Head injuries in sport. *British Journal of Sports Medicine*, 30(4): 289-296.
- Collins, M.W., Lovell, M.R., Iverson, G.L., Cantu, R.C., Maroon, J.C., Field, M., Bailes, J.E., Valadka, A.B., & Bullock, M.R.R. (2002) 'Cumulative effects of concussion in high school athletes'. *Neurosurgery*, 51(5): 1175-1181.

- Dubourg, J., & Messerer, M. (2011) 'Sports-related chronic repetitive head trauma as a cause of pituitary dysfunction'. *Neurosurgical Focus*, 31(5): E2.
- Duveen, G. M. & Lloyd, B. (Eds.) (1990) *Social Representations and the Development of Knowledge*. Cambridge: Cambridge University Press.
- Finch C, McIntosh A, McCrory P. (2001) What do under 15 year old schoolboy rugby union players think about protective headgear? *British Journal of Sports Medicine*, 35:89–95.
- Gerberich, S.G., Priest, J.D., Boen, J.R., Straub, C.P., & Maxwell, R.E. (1983) Concussion incidences and severity in secondary school varsity football players. *Am J Public Health*, 73:1370–1375.
- Herzlich, C. (1968/1973) *Health and Illness: A Social Psychological Analysis*. London: Academic Press (Original 1968).
- Irwin, A. & Wynne, B. (1996) (Eds.) *Misunderstanding science? The public reconstruction of science and technology*. Cambridge: Cambridge University Press.
- Iverson, G. L., Gaetz, M., Lovell, M. R., & Collins, M. W. (2004) Cumulative effects of concussion in amateur athletes. *Brain Injury*, 18(5): 433-443.
- Jodelet D (1991) *Madness and Social Representations*. Hemel Hempstead: Harvester Wheatsheaf.
- Joffe, H. (1999) *Risk and the Other*. Cambridge/Boston, MA: Cambridge University Press.
- Joffe, H. (2002) Social representations and health psychology. *Social Science Information*, 41(4): 559-580.
- Johnston, K., McCrory P., Mohtadi N., & Meeuwisse, W. (2001) Evidence based review of sport-related concussion: clinical science. *Clinical Journal of Sports Medicine*, 11:150–60.

- Jovchelovitch, S. (1996) In defense of representation. *Journal for the Theory of Social Behaviour* 26: 121-136.
- Jovchelovitch, S. (2007) *Knowledge in context: representations, community and culture*. London: Routledge.
- Kelly, J.P., Nichols, J.S., Filley, C.M., Lillehei, K.O., Rubinstein, D., & Kleinschmidt-DeMasters, B.K. (1991). 'Concussion in sports. Guidelines for the prevention of catastrophic outcome'. *Journal of the American Medical Association*, 266(20): 2867-2869.
- Lunt, P., and Livingstone, S. (1996) Rethinking the focus group in media and communications research. *Journal of Communication*, 46(2), 79-98.
- Maddocks, D. & Saling, M. (1996). Neuropsychological deficits following concussion. *Brain Injury*. 10, 99–104.
- Malgorzata A., Kolodziej, M. A., Koblitz, S., Nimsky, C., & Hellwig, D. (2011) 'Mechanisms and consequences of head injuries in soccer: a study of 451 patients'. *Neurosurgical Focus*, 31(5): E1.
- Mansell, J.L., Tierney, R.T., Higgins, M., McDevitt, J., Toone, N., Glutting, J. (2010) Concussive signs and symptoms following head impacts in collegiate athletes. *Brain Injury*, 24(9): 1070-1074.
- McClincy, M.P., Lovell, M.R., Pardini, J., Collins, M.W., Spore, M.K. (2006) Recovery from sports concussion in high school and collegiate athletes. *Brain Injury*, 20(1): 33-39.
- McCrorry P. 'Neurological injuries in rugby and Australian rules football.' In: Jordan B, Tsaris P, Warren R (eds.) (1998) *Sports neurology*. Philadelphia: Lippincott-Raven. pp. 441–9.
- McCrorry, P. (2001) Do mouthguards prevent concussion? *British Journal of Sports Medicine*, 35:81–3.

- McCrorry, P., Johnston, K., Meeuwisse, W., Aubry, M., Cantu, R., Graf-Baumann, T., Kelly, J., Lovell, M., & Schamasch, P. (2005) Summary and Agreement Statement of the 2nd International Conference on Concussion in Sport, Prague 2004. *Clinical Journal of Sport Medicine*, 15(2): 48-55.
- McIntosh, A, McCrorry, P. (2000) Impact energy attenuation performance of football headgear. *British Journal of Sports Medicine*, 34:337–42.
- McKinlay, A., Grace, R.C., Horwood, L.J., Fergusson, D.M., Ridder, E.M., MacFarlane, M.R. (2008) Prevalence of traumatic brain injury among children, adolescents and young adults: Prospective evidence from a birth cohort. *Brain Injury*, 22(2): 175-181.
- Morgan, D. L. (1996) Focus Groups. *Annual Review of Sociology*, 22:129-152.
- Morgan, M. G., Fischhoff, B., Bostrom, A., & Atman, C. (2002) *Risk Communication: A Mental Models Approach*. Cambridge: Cambridge University Press.
- Morley, D. (1980) *The nationwide audience: structure and decoding*. British Film Institute Television Monograph no. 11. London: British Institute.
- Moscovici, S. (1976) *La psychanalyse, son image et son public*. Paris: PUF, 2nd revised edition (first edition, 1961).
- Moscovici, S. (1984). The phenomenon of social representations. In R. M. Farr and S. Moscovici (Eds.), *Social representations*. Cambridge: Cambridge University Press.
- Mueller F. O. & Blyth C. S. (1985) 'Annual survey of catastrophic football injuries: 1977-1983.' *Physician and Sportsmedicine*, 13(3): 75-81.
- Offir, J. T., Fisher, J. D., Williams, S. S. & Fisher, W. A. (1993) 'Reasons for inconsistent AIDS-preventive behaviours among gay men'. *Journal of Sex Research*, 30(1): 62-69.
- Schneider, R.C. (1973) *Head and Neck Injuries in Football*. Baltimore: Williams & Wilkins.

- Smith, C. W. (1997) The ontological status of ideation: a continuing issue. *Journal for the Theory of Social Behaviour*, 27: 129-137.
- Strauss, A. & Corbin, J. (1998) *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage.
- Wagner, W. & Hayes, N. (2005) *Everyday Discourse and Common Sense: The Theory of Social Representations*. Basingstoke: Palgrave.
- Weber, M., & Edwards, M.G. (2010) The effect of brain injury terminology on university athletes' expected outcome from injury, familiarity and actual symptom report. *Brain Injury*, 24(11): 1364-1371.
- Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology*, 39, 806-820.
- Willig, C. & Stainton-Rogers, W. (Eds.) (2008) *The Handbook of Qualitative Research in Psychology*. London: Sage.
- Yard, E.E., and Comstock, R. D. (2009). Compliance with return to play guidelines following concussion in US high school athletes, 2005-2008. *Brain Injury*, 11(23): 888-898.

Appendix A

Consent form: included for transparency's sake, and not to be read in-depth. Not included in word-count.

Purpose of the project: This focus group is being conducted by Kaori Takenaka for the purposes of a PPSIS Part IIB dissertation. The dissertation aims to explore the social representations of head injuries held by student sports people. Social representations are a system of values, ideas and practices held by groups of individuals that help them to make sense of ideas (as described by Moscovici, 1984). The purpose of the focus group today is to help the researcher understand, in particular:

- How different types of head injuries are understood (e.g. their dangers, their causes, their consequences and how they could or should be prevented)
- How information about head injuries is transmitted to student sports people

Your role as a participant in this study is to discuss head injuries with the other participants in the focus group. The discussion will follow the following structure:

1. General discussion about head injuries
2. You will be given 4 short fictional case studies and asked to discuss them.
3. Discussion about where you receive information about head injuries

The moderator will introduce each section in more detail and answer any questions you may have. You are not required or expected to refer to personal experiences but may do so if you feel it is relevant.

Case studies: While the case studies are not particularly graphic, some participants may find them disturbing in nature. If you have any concerns about how to respond to a case study, you may opt out of contributing to the focus group. If you feel upset or unwell during the study, please inform the researcher immediately so that she may assist you in seeking help. You may withdraw from the study at any time, and for any reason.

Recording: With your permission, the focus group will be audio recorded. You will be informed before recording commences and when it is terminated. All recorded data will be deleted after the dissertation is completed to ensure anonymity.

Confidentiality: Data will only be made available to the primary researcher (Kaori Takenaka). In the write-up, pseudonyms will be used and no personally identifying information will be included. It is also requested that all information discussed during the focus group is not repeated after the study. This is to ensure the privacy of other participants.

What will happen to the study results? The results will be written up and submitted as part of the Part IIB dissertation in May. No participants will be made personally identifiable.

Withdrawal: You may withdraw from the study at any stage without explanation. You may also request that a particular portion of your discussion is excluded from the study. You can also contact the researcher by e-mail after the discussion if you would like to have any part of your discussion removed from the study, and you do not have to give any reason for this.

Approval: The project has received ethical approval from the Social and Developmental Psychology Research Ethics Committee of the University of Cambridge.

Statement of agreement: I, [participant name, printed] consent to taking part in the study outlined above and agree to the conditions.

Participant signature:

Date:

Appendix B

Debriefing document: included for transparency's sake, and not to be read in-depth. Not included in word-count.

Thank you for taking part in this study. It is greatly appreciated.

You are reminded that the data collected will be stored securely, and no personally identifying information will be used in the write-up of the study.

In order to respect the confidentiality of the focus group, we request that you do not repeat the discussion to anyone else.

If you have any questions regarding today's focus group or the study in general, please do not hesitate to contact the researcher:

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07825834340

If you have any concerns or questions about head injuries, please contact the following organisation:

Headway Cambridgeshire
Headway House
Brookfields
Mill Road
Cambridge
CB1 3DF
01223 576550
info@headway-cambs.org.uk
<http://www.headway.org.uk/home.aspx>

<http://www.headway.org.uk/Useful-organisations.aspx> also has links to other useful organisations in the field.

Appendix C

Vignettes used in focus groups: included for transparency's sake, and not to be read in-depth.

Not included in word-count.

Gavin is in Fiji on a rugby tour with his local club, Berksville RFC. The last match of the tour is fast-paced and competitive. During the match, Gavin runs into a ruck and his head collides with the head of a member of the opposing team. He remains on his feet but feels that something is not quite right, so staggers over to the edge of the pitch. He can see stars and is told by a spectator that there is a cut on his head. Another member of the team comes over to Gavin and asks him to follow the movement of his finger. Gavin is conscious but cannot follow the movement of his teammate's finger with his eyes, and while aware of where he is, is confused as to who the opposing team is.

After a long day at work, Priya takes a hot shower to relax. As she steps out of the shower, she slips on the wet floor and falls to the ground, hitting her head on the side of the bath as she does so. Her boyfriend is in the next room, and rushes into the unlocked bathroom after hearing the sound of her fall. He finds Priya on the ground, unconscious. He splashes cold water on her face, and she regains consciousness. She is confused and disorientated. After a few minutes, she starts to vomit in the toilet.

8 months ago, 19-year-old Thomas suffered a head injury as the front-seat passenger in a road traffic accident. He spent two months in hospital, where it was found that he had damaged the frontal lobes of his brain, and sustained injuries to his lower limbs and torso. He was then transferred to a head injury unit, where he was found to be very verbally aggressive. Some people were frightened of talking to him because of his aggression and intimidating manner, and he had few visitors. Friends say that he was not aggressive preceding the accident.

David is a 54-year-old father of three. 3 months ago, he survived a stroke, and was told that he would have to adopt a healthier lifestyle to help prevent a recurrence. The stroke damaged a part of his brain that is associated with the coordination of the throat muscles, and as a result David has been left with dysphagia, a difficulty with swallowing. He is undergoing therapy to help overcome this difficulty, and must ensure that his food is of a particular consistency to make eating easier.

Appendix D

Focus group topic guide for researcher: included for transparency's sake, and not to be read in-depth. Not included in word-count.

1. General discussion about head injuries
2. You will be given 4 short fictional case studies and asked to discuss them.
3. Discussion about where you receive information about head injuries

Opening question: 'What do you think of when someone talks about a head injury?'

General discussion:

The following may come up...

What does the phrase 'head injury' mean to you?

Is it different to 'brain injury'?

How would you define and classify it?

Principle causes of head injuries?

Consequences of head injuries?

How at risk do you feel of head injuries?

Prevention of head injuries?

How relevant are head injuries to you in your life?

Importance of head injuries (injuries in general) for (sports person) identity?

Vignettes:

Please read the following and discuss:

The significance of how it happened

The seriousness of the injury

What should he/she do next?

What could/should he/she have done to prevent the accident?

Do they reveal something new about head injuries that you did not know before?

What if the gender was different..?

What would you have done?

Information transmission:

In the context of sport, where do you get information about:

Causes/risks of head injuries

Preventions

Consequences

Treatment

What (if anything) do you learn from experts?

Do you act on this advice?

Is there anything that you would like access to/information about?

Appendix E

Full code list with themes and sub-themes in bold: included for transparency's sake, and not to be read in-depth. Not included in word-count.

Definitions

Classification

Brain/head injury

- 16. brain injury more severe than head injury
- 17. brain injury is more long term than head injury
- 19. head and brain injury are the same
- 221. Head injuries are external, brain injuries are internal
- 440. term 'brain injury' is not used as much as 'head injury'
- 222. Head injuries and brain injuries are different
- 224. Do not think of brain injuries, only head injuries
- 43. uncertain about appropriate terminology

Internal/external

- 18. head injury is external
- 445. face injury is different to head injury

Stroke

- 153. strokes are brain injuries not head injuries
- 227. stroke is not an injury
- 228. stroke is an event
- 229. stroke is a condition
- 230. stroke is unlucky
- 231. stroke is an illness
- 234. stroke is ambiguous to categorise
- 235. stroke is an affliction
- 381. Stroke is not necessarily a result of action
- 387. Stroke is more serious than external injury
- 390. Stroke can cause deterioration

Causes of head injury

Head injury

3. Impact

- 431. head injury caused by ball
- 239. head injury from being tackled
- 268. head injury as a result of colliding with others
- 461. head injury from hitting the post
- 320. head injury as a result of a football header
- 478. danger of hard balls
- 225. brain injury involves shaking
- 37. danger of high speeds
- 34. fear of getting hit

Player's actions

- 66. head injuries are the result of bad technique
- 365. Less experienced, bad technique players cause head injuries
- 280. inexperienced players have bad technique/don't protect head
- 274. head injuries can occur when protecting self
- 150. Unhealthy behaviour can lead to strokes
- 512. less training makes injury more likely

Blame

- 495. head injuries caused accidentally
- 67. should place blame on the individual with a head injury
- 333. injured are idiots, stupid
- 351. blame not always on injured

Situation

- 28. risk of head injury is higher in rugby than in other sports
- 29. rowing does not pose a major risk for head injuries
- 383. Risky situations can lead to head injury
- 454. goalkeeper most at risk of being injured
- 455. goalkeeper most at risk of injuring others
- 459. head injury as a result of wanting to win

Other

- 152. genetics may be responsible for strokes

General injury**Player's actions**

- 476. injury more likely with aggressive players
- 144. general injuries are a result of bad technique
- 428. deliberately being injured by another
- 463. when injured you risk injuring others too
- 380. Injury is a result of action
- 448. injuries are caused by something external

Other

- 474. inexperienced referee could allow situations that increase chance of injury
- 475. injury could be caused by lack of concentration on the game
- 275. injuries are due to nervousness or lack of confidence
- 381. Stroke is not necessarily a result of action

Consequences of head injury**Blood**

- 220. Head injuries involve blood
- 223. Brain injuries involve blood
- 251. external injuries involve blood

Time period

- 12. fear of permanent injury
- 17. brain injury is more long term than head injury
- 232. stroke has long-term consequences

121. lack of fear of long-term consequences

Effect on brain

118. fear of memory loss

10. Fear of effects on brain function

497. head injury causes headache

460. head injury is brain damage

379. Something goes wrong in the brain

219. Head injuries are internal

44. assume that brain dysfunction can occur as a result of brain injury

245. vision change as a result of head injury

248. worry/concern about vision change

External injury

18. head injury is external

443. head injury is fractured skull

444. head injury is face injury

Concussion

2. Head injury is concussion

500. unconscious

8. memory loss

13. fear of impact on life (incl death)

246. not knowing where you are

343. vomiting

115. dizziness as a result of concussion

Change to self and ability

481. head injury causes worse technique/playing standard

482. head injury lowers your confidence

50. head injury can change personality

479. head injury can cause lower intelligence

310. feel fragile due to head injury

182. hopelessness

187. lack of control

386. Limited by effects of head injury

47. fear of personality changing due to head injury

414. Fear of being unable to walk/move due to injury

Death

427. death is inevitable

355. death more common in car accidents than sport

356. death in rugby very rare

238. sudden unexpected death

Severity

Perception

433. people make a big deal about head injuries

176. Teammates may underestimate seriousness of injury

174. frequent head injuries lead to less serious perceptions

- 253. teammates perceive injury as less serious if it is invisible
- 259. forget about the significance of head injuries if haven't had one in a while
- 106. teammates judge seriousness of each other's injuries
- 190. feeling of guilt for not taking injury seriously

Serious

- 435. head injury is more serious than other injuries
- 117. memory loss is serious
- 116. concussion is serious
- 294. external injury perceived as serious
- 429. head injuries are serious
- 438. need to be careful with head injuries
- 466. better to be cautious with head injuries

Not serious

- 172. Concussion is not serious
- 258. mocking teammates for taking injury seriously
- 250. light-hearted attitude to head injury
- 480. minor head impacts are not serious
- 218. Head injuries are dramatic – c.f. movies
- 188. humour associated with injury or accident
- 354. car crash accidents are more serious than sports injuries

What makes injury seem more serious

- 328. injury is worse when unexpected
- 209. more knowledge of statistics makes you take head injuries more seriously
- 207. more scientific knowledge makes you take head injuries more seriously
- 288. blood injuries are more visible and taken seriously
- 252. vision change/dizziness are more serious than blood
- 420. Seriousness of head injury depends on sport
- 388. High chance of repeat injury makes it more serious
- 387. Stroke is more serious than external injury
- 384. Temporary effects of head injury are less serious than permanent
- 16. brain injury more severe than head injury
- 446. face injury is less serious than head injury
- 441. concussion is more serious than external injury

Prevention and treatment of head injury

Equipment

Scrum cap

- 72. scrum caps are relevant to rugby
- 260. buying a scrum cap
- 261. scrum cap is annoying
- 262. scrum cap protects ears
- 263. wear a scrum cap because feel it is the right thing to do

- 265. scrum caps ineffective for impact
- 266. scrum cap makes you feel safer
- 267. wearing scrum cap makes you play more aggressively/confidently

Mouth-guard

- 491. head injury prevented by mouth guard
- 492. quality of (mouth guard) is important
- 493. not using mouth guard

Helmet

- 430. head injuries involve helmets
- 56. risk-taking by not wearing helmet
- 163. wearing a helmet depends on the social context
- 57. helmets are for cycling
- 162. awareness that people should wear helmets when cycling
- 64. no one wears a helmet for rowing
- 154. helmets for skiing
- 71. helmets in rowing are for non-sports related conditions

Other

- 353. seatbelts are effective in protecting from head injury
- 458. mask to protect face
- 496. goggles to protect face
- 159. cost of safety equipment

Rules and procedure

- 437. responsibility of referee to stop game for serious injury
- 80. trust in safety procedures and rules
- 82. lack of procedure and rules regarding head injuries
- 155. people ignoring safety guidelines
- 406. Rules change frequently
- 407. Some rules in place to protect head
- 408. Penalised for unsafe play
- 434. football rule: have to go off pitch if have head injury
- 436. football rule: game must stop if head injury
- 362. Rules and procedure won't be in place until a serious injury occurs

Behaviour change

Possible

- 119. behaviour change possible as a result of own injury experience
- 59. behaviour change as a result of friend's experiences depends on exact situation
- 55. possible behaviour change as a result of friend's experiences
- 513. knowing dangers of sport make you not want to play
- 210. more knowledge of statistics might elicit behaviour change
- 167. acquaintance's experience of injury is more likely to elicit behaviour change than official talk on dangers of cycling without helmet
- 77. friends experiences are more effective in eliciting behaviour change than media reports

- 278. learn from own mistakes
- 410. Listening to parental advice

Unlikely

- 58. no behaviour change as a result of friend's experiences
- 160. saying one thing, doing another
- 161. not following parental advice
- 171. Parental advice not always taken seriously
- 215. Changing behaviour is difficult

Stopping play

- 241. going off pitch
- 126. medical professionals restrict return to play
- 109. more serious head injuries are acceptable to teammates as an excuse
- 143. knowing that you should stop
- 244. knowing that returning to play is stupid
- 283. wanting to stop/go off
- 311. welcoming break from sport
- 270. not playing rugby would reduce head injury risk
- 129. lower status within team results in lower likelihood of saying that you are not competing
- 132. high status and responsibility results in higher likelihood of saying that you are not competing
- 271. humour at idea of never playing rugby
- 272. perception that not playing is too extreme a measure
- 52. fear of personality changing results in desire to stop rowing
- 200. sad to stop
- 254. frustration at not being able to play
- 149. continuing regardless of injury is madness

Continuing despite injury**For the team**

- 135. higher status members unwittingly cause others to feel obligated to continue
- 107. put pressure on teammates to continue
- 285. need to continue as no one else can take over position
- 141. feeling like you can't stop
- 195. acceptance of need to continue
- 194. continuing but feeling sick with over exertion

For self

- 271. humour at idea of never playing rugby
- 148. wanting to continue for self
- 243. feeling fine after a head injury
- 127. desire to compete regardless of injury
- 254. frustration at not being able to play
- 112. story of continuing sport despite injury
- 242. returning to play

193. less likely to stop during rowing than during a match of another sport

Technique

366. New players should get training
 368. New players pick up technique quickly
 273. need to actively protect head via technique
 276. confidence benefits technique
 277. protecting head is instinctive
 279. responsibility of coaches/trainers to teach good technique

Sport

Relevance to head injury

What sport

46. boxers hit their head frequently
 432. head injuries in American football
 494. ice hockey
 505. softball/baseball
 498. horse-riding
 28. risk of head injury is higher in rugby than in other sports

Low relevance

24. head injuries are less relevant to rowing than other injuries
 25. don't need head for rowing
 29. rowing does not pose a major risk for head injuries
 30. lack of awareness of head injury as a result of rowing
 31. no knowledge of others gaining head injury from rowing
 35. head impacts in rowing are rare

Enjoyment of sport

Pleasure

313. enjoy playing sport
 416. Love of sport
 486. Sport is a good break from work
 514. enjoyment of playing with a team
 123. health benefits of sport

Commitment

124. reluctance to take time off training
 128. high investment in training

Intensity

282. adrenalin of match
 477. not thinking about injury while playing
 113. placing importance of sporting event above safety of player

Standard of performance

280. inexperienced players have bad technique/don't protect head
 364. More injuries in lower standard (rugby)
 365. Less experienced, bad technique players cause head injuries
 469. higher standard sport have medical professional/physio present
 511. college-level lacrosse is more dangerous

472. less injury in lower standard games

The body

4. Head injury related to other injuries

Importance of head

11. Brain is fragile

21. head/brain is more needed than other body parts

Relation to other team members

Team identity

61. importance of social convention in sports

60. desire to not be laughed at by others

62. desire to not 'stick out'

70. humour of deviating from social norms

142. desire for teammates to think you are strong

Status within team/society

129. lower status within team results in lower likelihood of saying that you are not competing

131. higher status within team results in more responsibility

135. higher status members unwittingly cause others to feel obligated to continue

136. fear of higher status teammates

Team as one

103. importance of training as a group

105. difficulty for team due to one member's injury

181. team has to stop for one person's injury

489. Team spirit (positive)

101. sports injuries are gained while sacrificing the self for the team

514. enjoyment of playing with a team

97. boys injured during sport are heroic

98. being proud of sport injuries

Obligation to team

104. desire to not let down team

284. team has few players

285. need to continue as no one else can take over position

128. high investment in training

Pressure from teammates

108. teammates annoyed at others' injuries

107. put pressure on teammates to continue

258. mocking teammates for taking injury seriously

Looking out for each other

106. teammates judge seriousness of each other's injuries

147. teammates think injured should stop

184. teammates' responsibility to help injured player

Communication with others

During focus group

- 38. personal experience
- 130. contradicting another participant
- 114. asking another participant a question

Advice

- 39. maternal warning or advice
- 158. paternal advice/warning
- 410. Listening to parental advice

Teammates' perception of injury

- 97. boys injured during sport are heroic
- 105. difficulty for team due to one member's injury
- 68. concern for friend's head injury
- 106. teammates judge seriousness of each other's injuries
- 108. teammates annoyed at others' injuries
- 109. more serious head injuries are acceptable to teammates as an excuse
- 147. teammates think injured should stop
- 149. continuing regardless of injury is madness
- 176. Teammates may underestimate seriousness of injury

Responsibility

- 216. Desire to let others take responsibility, not self
- 131. higher status within team results in more responsibility
- 184. teammates' responsibility to help injured player

Concern for others

- 68. concern for friend's head injury
- 88. fear of looking after someone with a head injury

Self**Concern for self**

- 34. fear of getting hit
- 291. lack of trust in teammates expertise regarding head injuries
- 120. fear of repeating head injury
- 369. Fear of being injured by another player
- 45. danger of frequent head injuries
- 65. it will never happen to me

Gender**Difference in injuries**

- 299. girls are less physical in sport
- 301. girls head injuries are less common
- 499. more mens injuries than womens

Reflection of male status

- 302. girls are impressed by boys' injuries
- 304. boys with injuries are tough
- 97. boys injured during sport are heroic
- 316. injury/weakness diminishes manliness/attractiveness
- 488. Complaining about head injury makes you weak

Difference in treatment

509. men's sport have more access to medical care than women's

Feeling towards injury

Negative

- 295. frustration at being injured
- 305. external signs of injury are annoying
- 254. frustration at not being able to play
- 306. do not feel like a hero because of injury
- 307. annoyed at repeated head injury
- 308. regret at repeated injury
- 309. bored by repeated injury

Positive

- 99. liking sport injuries
- 98. being proud of sport injuries

Knowledge

Own experience of head injury

- 1. Pain
- 38. personal experience
- 240. feeling dazed
- 247. less fear, more 'weird'
- 246. not knowing where you are
- 243. feeling fine after a head injury
- 310. feel fragile due to head injury
- 269. unexpected head injury
- 177. the more common the injury, the more knowledge of how to deal with it
- 278. learn from own mistakes

From other's experience

- 31. no knowledge of others gaining head injury from rowing
- 338. knowledge of people dying from domestic setting head injuries
- 424. Learn what to do from others who have experienced
- 462. never seen anyone get a serious head injury
- 208. myths about head injuries

Frequency

Frequent

- 317. head injuries in football are common

Infrequent

- 453. serious head injuries are rare
- 9. external injury is uncommon
- 330. more games without injury than with
- 318. college-level head injury is infrequent
- 301. girls head injuries are less common

Media

Changing behaviour

- 76. media reports are more effective in eliciting behaviour change than friends' experiences

77. friends experiences are more effective in eliciting behaviour change than media reports

Scepticism

78. do not take the media seriously
79. do not trust media reports

Communicating information

212. online adverts – Facebook
213. TV adverts are effective in raising awareness and informing procedure
214. Posters in visible place
358. no adverts about sports injury exist
360. TV adverts for sports injuries have to be relevant to audience

Learning from media

73. media reports on common occurrences
236. story from media/celebrity/famous person
264. information from media
319. professional sport
376. Copying professionals/sport in media
377. Improving technique via copying professionals/sport in media
378. Subconscious copying professionals/sport in media

Medicine/Science

Trust in science

173. Trust in medical profession
90. seek professional help when someone has a head injury
291. lack of trust in teammates expertise regarding head injuries
470. trust in other figures e.g. groundsman
469. higher standard sport have medical professional/physio present
421. Leaflets from hospital
345. guessing scientific explanations
126. medical professionals restrict return to play

Lack of trust in science

422. Ignore advice from leaflets/medical professionals
286. medical professionals should not be annoyed at players stopping play
289. medical professionals mock players injury/not continuing

Lack of availability

471. lack of medical equipment/first aid
290. lack of consistent medical professional presence
423. Need an forced opportunity to read the leaflets

Statistics

209. more knowledge of statistics makes you take head injuries more seriously
210. more knowledge of statistics might elicit behaviour change
348. desire for knowledge about prevalence/statistics
211. lack of knowledge about statistics about head injuries

Desire for knowledge

419. Desire for more knowledge about procedure

206. desire for more knowledge about science behind head injuries

204. Question for e.g. Headway

457. information from school/education

Lack of knowledge

14. lack of understanding about brain

15. fear of not knowing what will happen

43. uncertain about appropriate terminology

89. not knowing what to do when someone has a head injury

507. lack of education about head injury

506. lack of awareness of risks associated with sport

179. not knowing that teammates are injured

502. lack of knowledge of long-term effects

395. Lack of knowledge of how to reduce risk of stroke

205. Fear of doing the wrong thing

Miscellaneous

Age

504. irresponsible to let children play dangerous sports

226. brain injury affects babies

465. young people are vulnerable and important

Risk

Risk in sport

28. risk of head injury is higher in rugby than in other sports

29. rowing does not pose a major risk for head injuries

What is a risk

56. risk-taking by not wearing helmet

170. Not wearing a helmet while cycling is a health-risk

83. drowning is more of a risk than head injuries in rowing

84. drowning is only a risk in some contexts

342. head injury is risky

402. Rugby is a risk

400. Unhealthy behaviour is risky

Awareness of risk

164. awareness of risk of falling off bike

506. lack of awareness of risks associated with sport

329. subconscious awareness of risks

32. need experience of the sport to understand its risks

413. Desire to evaluate risks for self

339. not constantly aware of risk in domestic settings

425. fear of hearing about risks of injury too often

Who is at risk

331. anyone is at risk

454. goalkeeper most at risk of being injured

455. goalkeeper most at risk of injuring others

Nature of risk

- 397. Risk involves the long-term
- 418. Risk is inevitable/common
- 401. Risk is cumulative

More miscellaneous

- 349. more fear of car crash than sport accidents
- 48. personality changes might not be due to injury
- 487. Not noticing head injury
- 81. trust in university
- 96. relate accidental concussion to drunken behaviour
- 151. those with head injuries do not deserve them
- 178. lack of visibility between teammates in rowing
- 187. lack of control
- 442. psychology of football
- 508. lack of university-organised medical care
- 516. frustration at others' lack of care/prevention
- 292. difference in injury procedure in foreign countries
- 483. 'English' trait
- 484. Signs of injury make other players more careful
- 293. cost of healthcare
- 314. lack of experience in stopping play due to injury
- 315. identifying own physical weakness
- 321. football is girly
- 322. faking injury
- 323. football is less physical than rugby
- 324. rugby is physical but not likely to cause injury
- 334. bath matt is annoying
- 337. impact on head is worse on hard surfaces – in sport, bodies are soft
- 371. Bigger players are more likely to injure others
- 372. Bigger players are less likely to be injured
- 373. Desire to challenge self, push self
- 374. Lack of understanding of the novice experience
- 385. Mechanical effects are different to neuronal effects
- 409. In rugby, protecting the neck is more important than protecting the head
- 473. lack of trust in inexperienced referees
- 504. irresponsible to let children play dangerous sports