‘Getting back on the bike’: risk, injury and sport-related concussion in competitive road cycling

Abstract

A clear and consistent finding across three decades of sociological work focused on performance sports is that various sports can be considered social spaces in which risk, pain and injury is accepted, normalised and valorised. In recent years, the emergent scientific and popular concern around the short- and long-term consequences of sport-related concussion has seen a resurgence in the use of classic sociological ideas to help understand why athletes appear to downplay, continue competing and sometimes ignore potential brain injuries. Using data from interviews, this paper explores these social processes in the sport of road cycling in Britain. We present the argument that the enduring utility of classic sociological concepts in explaining athlete behaviours toward risk, pain and injury may be indicative of the obdurate nature of the cultural norms which circulate in performance sport settings. With regard to the ongoing problems with concussion in sport, we show the continued need to understand the social context in which much sport is imagined and practiced. This leads to our suggestion that socio-cultural and interactional processes in many sporting subcultures, which support the normative acceptance of behaviours which prioritise performance over health, need to be more readily challenged if we wish to achieve comprehensive change toward improved athlete welfare.

Keywords: Sport-related concussion; Competitive cycling; Sporting subcultures; Injury management

Introduction

Over the past decade, sport-related concussion (SRC) has received increasing attention from medical professionals, governments, the public and scholars from numerous academic disciplines. The injury is broadly defined as "a traumatic brain injury caused by a direct blow to the head, neck or body resulting in an impulsive force being transmitted to the brain that occurs in sports and exercise-related activities" (Davies et al., 2023, p.617). An SRC can result in a range of symptoms including migraine headaches, difficulty concentrating, light and noise sensitivity, sleep disturbances, depression and increased suicidal ideation, increased anxiety, memory loss and cognitive impairment (Bazarian et al., 2020; Kay et al., 2023; Patricios et al., 2023; Wilson et al., 2017). Multiple concussive injuries over an athletic career, as well as repetitive head impacts, have been shown to increase the risk of developing neurogenerative diseases (Nowinski et al., 2022). Likely due to the potential for deleterious long-term health consequences of SRC, alongside the immediate impact the injury can have on an athlete wellbeing, the injury has garnered cultural attention unmatched by other sporting injuries (Malcolm, 2019).

Much of the academic research into SRC comes from disciplines such as neurology, physiology, and psychology. However, there is a growing field of sociologically focused work (see for example, AlHashmi & Matthews, 2021; Benson, 2017; Brayton et al., 2019; Cassilo & Sanderson, 2018; Dean & Bundon, 2020; Dean, 2019; Liston et al., 2018; Malcolm et al., 2023; Malcolm, 2009, 2020, 2021; Matthews, 2021; Parry et al., 2021; Sanderson et al., 2017; Ventresca, 2019). Sociological research on SRC is important because it can provide insights into how sporting injuries, including brain injuries, are experienced and can be understood within the context of socio-cultural processes (McGannon et al., 2013).

Contributions from neurology and physiology, as essential as they are, cannot tell us why athletes continue to compete following a suspected SRC despite the known severity of the injury, nor can they explain the high rates of under-reporting of the injury, but *some* social scientific approaches can (Malcolm, 2019). In this regard, previous sociocultural examinations of SRC highlight how athletes might under-report concussion, accept risks and downplay injury due to the cultural norms in sporting spaces which promote a high tolerance toward injuries (Liston et al., 2018; Matthews, 2021). Moreover, the role of the interactional network around the athlete – such as parents, teammates, coaches and fans –

has been highlighted as also placing pressures on athletes to continue competing through injuries, including SRC (Kroshus et al., 2015).

A distinct feature of much of the work on SRC, across disciplines, is a focus on mainstream, contact and team sports (Dean & Bundon, 2020). Subsequently, there has been limited research into SRC in non-mainstream and non-contact sports and, as a result, little attention has been paid to competitive cycling and its numerous sub-disciplines in relation to SRC (Elliot et al., 2019). Yet, road cycling is a sport with a high risk of physical injury (Barrios et al., 2015), and available epidemiological data from the sport shows that head injuries (including SRC) likely account for 5-15% of all injuries (Rooney et al., 2020). There has also been limited socio-cultural research on risk, pain and injury in road cycling despite it being a sport characterised by these features (Hardwicke, 2023). To address this gap, the present study explores risk, pain and injury within road cycling, with a specific focus on SRC.

A further feature of our work follows on from Malcolm's (2021) calls for research into SRC to be grounded in the wider social scientific literature on sporting injuries if we wish to work toward comprehensive cultural change in athlete welfare. He states a "major unintended consequence" of the increased regulation of SRC is "to position concussion as a unique form of injury" (Malcolm, 2021, p.3). By overly focusing on SRC, the focus moves away from challenging sporting cultural norms which promote the high tolerance of pain and injury (see Hughes & Coakley, 1991), acceptance of harm (see Young & White, 1995) and routinisation of risk-taking (see Matthews, 2021). Therefore, a central purpose of this study is to draw on the socio-cultural literature on risk, pain and injury in sporting subcultures to explore how road cyclists understand, experience, and respond to SRC. In doing so, we answer Malcolm's call by adding fresh empirical details from a previously unexamined sport. As our initial point of department for this journey, we review some classic contributions from the sociology of sport, risk, pain and injury.

Classic theorising of risk, pain and injury in sport

A large body of sociological literature examines the intersection of risk, pain and injury in sport and a consistent finding from this work, across three decades, is that various sporting spaces are frequently sites where risk, pain and injury is accepted, normalised and valorised

(Hughes & Coakley, 1991; Nixon, 1992; Roderick, 2006; Theberge, 2008). Atkinson (2019) highlights three theoretical concepts which have held utility for understanding this cultural phenomenon: 'the sport ethic', 'cultures of risk' and 'sportnets'. These concepts prove to be useful heuristic devices for the data discussed in this paper and thus we provide an overview here.

Nixon's (1992) work focused on the significance of the interpersonal context in which sport is practiced. He argued that many athletes train and compete within a network of social actors, whose normative beliefs and behaviours produce a 'culture of risk' where risking the body is accepted and normalised. The concept of 'cultures of risk' aligns neatly with Hughes and Coakley's (1991, p.309) work on the 'sport ethic' wherein athletes' learn to make various sacrifices for sporting success. When such arguments are accepted, it becomes apparent that, in many contexts and situations in sport, there are cultural expectations, for 'real athletes' to put their bodies 'on the line' in order to win at almost all costs. In this regard, behaviours that might be considered 'deviant' in broader society can become valued and rewarded in sport (Hughes & Coakley, 1991). Nixon (1992) argued such beliefs circulate within sporting subcultures via 'sportnets', which he defines as the influential social networks formed by athletes, their teammates, coaches, fans and significant others. Within such networks the acceptance, normalisation and glorification of risk, pain and injury is often reproduced (Nixon, 1992).

These ideas are often central to sociological understandings of risk, pain and injury in sport. Whilst Nixon's (1992) concepts of 'cultures of risk' and 'sportnets' have been subject to critique and refinement (Nixon, 1998; Roderick, 1998), they have also shown continued relevance for scholars seeking to theorise and explore a range of problems athletes face in relation to acute and chronic injuries (for a few examples see AlHashmi & Matthews, 2022; Malcolm & Pullen, 2022; Theberge, 2008). Various work has also highlighted that, despite important conceptual refinement and empirical nuances (Charlesworth & Young, 2005; Safai, 2003), an understanding of the power of sportnets within sporting subcultures, especially in relation to performance sports, is essential to appreciating the inculcation, promulgation and substantiation of risky approaches to the body in athletes (Matthews, 2021; Tynan & McEvilly, 2017; Young, 2019).

With reference to the analysis in this paper, the continued utility of these classic ideas is highlighted in various research seeking to understand athletes' responses to SRC (AlHashmi & Matthews, 2021; Dean & Bundon, 2020; Malcolm et al., 2023). Liston et al. (2018), for example, examined the notion of being 'head strong' whereby rugby players would play through concussive injuries and/or downplay and ignore the significance of such injuries. These ways of approaching sport were shaped by rugby players being socialised into an institutional structure and sporting subculture in which performance is prioritised over health. Moreover, Matthew's (2021) work on boxing suggests risky body cultures become engrained in boxers' bodies and thus the various brain injuries sustained through participation become routinized and reproduced as an expected, and accepted, part of being a boxer. Such classic concepts relating to risk, pain and injury have not been sufficiently used to consider competitive road cycling. This represents an opportunity to further our understanding of road cycling, while also advancing sociological analysis on risk, pain and (brain) injuries more broadly.

Risk cultures in competitive road cycling

Throughout this paper we use the notion of 'subculture' to denote a broadly coherent group of people linked by the significance they find in a cultural phenomenon with quite clear, specific and normative understandings of (in)appropriate behaviours, values and attitudes. When considered in this way, the subculture of competitive road cycling contains many overlaps with other sporting spaces in that there are numerous partially hidden behaviours, mannerisms, social norms and values, that an individual must learn and adopt in order to achieve sustained membership in cycling subcultures (Albert, 1999; Hardwicke, 2023; Rees et al., 2014; Williams, 1989). In this regard, Drinkell (2021, p.5) highlights how, "there are literally thousands of unwritten rules – from the length of your socks to the 'luft' of your cap to the nuances of behaviour when cycling in a group".

Much like other performance sports, risk, pain and injury are central features of road cycling (Hardwicke, 2023). Indeed, crashes have been described as "part of the daily routine" in professional road cycling (Albert, 1999, p.157). One of the 'unwritten rules' most cyclists learn through their socialisation into the sport is to accept the risk of crashing as part and

parcel of competing and to not display 'weakness' in the form of quitting a race due to injury (Albert, 1999). In parallel to such experiences, there is a long history of journalists valorising images of injured cyclists crossing the finish line (Sidwells, 2015). It is perhaps unsurprising, then, that research highlights competitive cyclists, across all levels of the sport, frequently report continuing to train and compete with significant injuries (Dahliquist et al., 2015; Hardwicke et al., 2022; Hurst et al., 2018).

A dramatic example of the injury management practices in cycling occurred in the 2020 edition of the Tour de France when professional road cyclist, Romain Bardet, crashed heavily on stage 13. Within the TV coverage of this accident, he is seen struggling to stand and gain his balance, yet he was helped by his support team to remount his bike and procced to complete the remaining 86km of the stage (Cycling Weekly, 2020). This effort was described as "heroic", displaying "admirable courage" and that he fought "like a lion" by his team manager (Road CC, 2020, p.1). That evening he was diagnosed with a brain haemorrhage and subsequently withdrew from the tour for an 'indefinite period of rest' (Cycling Weekly, 2020). This led to media coverage that suggested competitive road cycling was "lagging miles behind other sports" with regard to concussion protocols (Coverdale, 2020, p.1). While this is a dramatic example, such events are far from unique and feature quite regularly in the sport (Hardwicke, 2023).

Since this event, the *Union Cycliste International* (the world governing body for competitive cycling) have updated their policy on the management of concussion (UCI, 2020). *British Cycling* (the governing body for competitive cycling in Britain) followed suite in 2023 by producing their first publicly available policies on concussion management (British Cycling, 2023). Much of the public discourse addressing SRC, across sports, is driven by the logic that by increased education for athletes and stakeholders there will be an associated shift towards a more cautious approach to risk and SRC management. However, research has shown that many competitive cyclists report willingness to compete following an SRC, despite holding knowledge of the severity of the injury (Hardwicke & Hurst, 2020; Hurst et al., 2018; O'Reilly et al., 2020). Furthermore, Dahliquist and colleagues (2015, p.88) comment that, "cyclists are frequently injured but continue to participate in cycling at volumes equal to their healthy peers". Hardwicke (2023) has argued a key feature of cyclists

continuing to train and compete when injured is, in part, due to the precedence placed on performance over health within the sport.

This paper expands on these issues by focusing on a small sample of British competitive road cyclists. Within this setting, cycling has seen a net growth in popularity over the past ten years. For example, British Cycling (main governing body) had 150,000 active members in 2019 representing a three-fold increase since 2012, and the largest recorded membership base since its establishment (British Cycling, 2019). Given this rise, and the preceding arguments about the culture of risk in relation to pain, injury and SRC in road cycling, we are drawn to this topic as it presents an emergent, and perhaps already existing, public health issue. Alongside this broad issue, we are also compelled to explore this topic as a means of helping individual cyclists better understand how their risk taking is related to the cultural norms they appear to so readily consume and reproduce. We turn to our findings around these points after a discussion of our methods.

Methods

Most of the research to date on SRC has been quantitative in nature, and there is relatively less research using the qualitative methodologies that are particularly well suited to exploring links between SRC, risk and sporting subcultures (Dean & Bundon, 2020). Specifically, we are not aware of any previous studies using qualitative inquiry to examine SRC in cycling. Furthermore, when designing our study and engaging with previous literature in the area, we expected cyclists' experiences of injury to be complex and emotionally significant, particularly as sport-related injuries have been discussed as 'emotional events' (Malcolm & Pullen, 2020). With this in mind, we used semi-structured interviews as we expected the flexibility they provide to be important in helping participants and the first author, who conducted the interviews, to explore emotionally challenging topics in supportive and ethically sensitive ways (Gray, 2022). Alongside gaining institutional ethical approval we also followed the ethical guidelines of the British Sociological Association.

Participants were recruited via online social media posts and through the first author's personal network. Furthermore, a snowball sampling method was also utilised, as participants recruited to the study provided other referrals from within the sport. The only

eligibility criteria were that participants had to be 18+ and be currently competing within the UK in a road cycling discipline. It was not stipulated that participants had to have had a diagnosed or suspected SRC, as we were interested in knowledge of the injury and the broader injury culture in the sport. A total of 18 road cyclists were recruited and interviewed, with seven recruited through social media, six through the first author's personal network of which he was already familiar with the interviewees and five recruited through referrals from participants. The average age was 31 (± 10yrs) and participants represent a mixed level of competition, sex, and experience levels. The sample included four professional riders, with the rest participating across the amateur spectrum. All reported that the sport played a significant role in their life. The data is anonymised and each participant is referred to using a pseudonym. Supplementary file 1 provides an overview of the participants characteristics.

The interviews were conducted throughout 2020/21 using video conference software. Although we would have preferred to conduct interviews in person, government COVID-19 restrictions in place at the time of data collection prevented this. This may have potentially limited some of the 'rapport' building with participants, but video conference software was chosen as it still allowed for the visual interaction to aid communication and conversation development.

The lead author undertook all interviews. While reporting and quantifying 'rapport' in any research setting is challenging, he drew on his familiarity with competitive road cycling, previous experience competing in the sport and experience with cycling-related injuries (including SRC) to ensure the participants knew he at least understood parts of their experiences in the sport. In this regard, he could be tentatively considered as an 'insider', which Merton (1972) has described as someone who holds a substantial amount of knowledge of a community and its members. We consider such personal involvement to have been important to the research, and this echoes other discussions around the utility of personal experience in the SRC field (See AlHashmi & Matthews, 2021; Dean, 2019; Dean & Bundon, 2020; Matthews, 2021). Moreover, previous research has identified road cycling as a somewhat 'closed' sport with a subculture that can be hard to access for 'outsiders' (Albert, 1999; Rees et al., 2014). With the potential sensitivities of the research, the

research team thought that competitive road cyclists would be more responsive and/or open in their interview responses to someone with a history in the sport.

A broad interview guide was followed for each interview, which covered the participant's history in the sport, understanding of SRC, experiences of injury and SRC and perspectives on the culture of the sport with regard to injury and risk. The lead author developed a conversational approach, leaning into the semi-structured design to facilitate flowing discussions focused on key areas of interest. In practical terms this meant that rather than focusing on the series of questions as a guide from which to 'conduct' the interview, the lead author used them as something akin to an *aide-mémoire*. Doing so allowed him, following Schutz' (1972) account of intersubjectivity, to 'tune in' to the what the cyclist were telling him (see Matthews (2021) for a detailed discussion of this). The interviews varied from 45 minutes to 2.5 hours, with an average interview time of approximately one hour. All interviews were transcribed verbatim by the lead author.

The transcripts were then thematically analysed, guided by the phased process outlined by Braun and Clarke (2022). The first and second authors familiarised themselves with each transcript and produced initial coding which were then collated and grouped together in a second phase of analysis whereby coded data were reduced into 'patterned themes'. These data were considered and refined in relation to key literature on cycling, risk, pain and injury. This was an iterative process involving reflexive discussions of findings, with the second and third author encouraging the first author to confront his positionality and theoretical proclivities when interpreting the data. We believe this process went some way to enhance the 'reality congruence' of our findings (Elias, 1991 [1984]), and while still fundamentally tied to the authors' interpretations of the world, we are confident that there is an important utility in framing the following data using 'classic' ideas from the sociology of sport, risk, pain and injury. Drawing upon such sociological literature, as well as discussions about performance cultures in sport, we (re)considered key academic ideas in the empirical 'light' provided by comments from our participants. Specifically, when sensitising our data to concepts (see Blummer (1969) for a discussion around this idea) in the broad literature based on pain and injury in sport, the theoretical ideas around the sport ethic, cultures of risk and sportnets outlined above spoke to our data most clearly.

This analytical process produced two overarching themes: 1) 'Getting back on the bike', which was taken to mean, the acceptance of risk, pain and injury in road cycling, and 2) Experiencing and dealing with brain injuries within a performance sport subculture. These ideas, of course, overlap but they also have distinctive elements. When taken together, they help us identify important ways in which the high tolerance toward risk, pain and injury in road cycling subculture influenced how cyclists understood, managed and responded to SRC, and in doing so, reinforced, and usually recreated such experiences**.** We turn to a discussion of this data now.

'Getting back on the bike': the acceptance of risk, pain and injury in road cycling

All participants referred to road cycling as a sport with significant physical risks, and this appeared to be accepted as a normalised part of participation. Nixon's (1992) 'cultures of risk' speaks well to the 'taken for granted' and assumed 'nature' of such experiences in the sport. Gavin, for example, commented that, "everyone that races knows it's a high-risk activity. I mean there's an awful lot that can go wrong…It's a bloody dangerous sport". And, Dan's comments resonate with this notion of the assumed and accepted nature of crashing in road cycling, "I've crashed more times than I can count, I often say to people that if you road race you are fairly likely to have a big crash at least once a year".

Within this 'culture of risk', the act of 'getting back on the bike' to continue competing following a crash and/or injury was framed as a normal, even expected, behaviour amongst members of the competitive cycling subculture we accessed. For example, Phillip commented, "I think you could call it an expectation, if you have a crash, you carry on. There is no real kind of thought process behind it". Interestingly, such an acceptive and somewhat irreverent attitude toward risk and the body was present across all participants regardless of sex, years competing, age, and professional or amateur status. Our sample had a mixed level of competition, from professional to serious recreational amateurs, and such sporting level had little influence on the adoption of the 'getting back on the bike' attitude. Illustrating this point, Gavin, a professional cyclist, suggested, "I think in cycling, if you crash and you can get back on the bike and back in contention then you just do it. Even down to the grassroots [Amateur] level that's the attitude". Moreover, Scott, an amateur cyclist, commented, "I'm quite confident in saying there's zero crashes where I haven't got back on the bike after".

This echoes Liston and colleagues' work in rugby (2006, 2018) which highlights the normalisation of pain and injury is not exclusive to the professional sport, but forms a significant feature at amateur levels also. At the core of this process amongst the interviewees in the present study was a focus on performance, and a concomitant lack of concern for short- and long-term health, as John suggested:

> When you're injured, it's always like 'Okay, how quickly can I get back on the bike and training'. It's not how well can I recover and do what my body needs me to do for long term injury prevention or, you know, long term wellbeing.

Various pressures to conform to the 'getting back on the bike' attitude were identified by our participants. These pressures – often framed as the need to compete when injured and withdrawal from racing as being a last and regretful resort – were reported to come from coaches, team managers, teammates (reports of not wanting to let teammates down were common) and personal expectations held by the athletes. Such comments point toward the importance of the network of people around the athletes in reproducing cultural understandings of risk, a point which aligns with Nixon's (1992) detailing of the significance on 'sportsnets'.

For those competing at the 'higher' levels of the sport, particularly those being financially rewarded, there were additional pressures from team managers and coaches with greater expectations:

> Yeah, I mean they're [Team managers and coaches] quite hard on it all really. Especially when you get to a fairly decent level they almost see you as like an object. Like we give you money, we give you this kit and we expect you to be on the start line. The minute you're not, they are like well get back there as quick as possible! (Harley).

> A lot of team managers want calmness from their riders. So, if a rider has had a crash, they don't want to see them going 'ahhh no, I've crashed!' at the side of the road, they want calm. Maybe telling riders to be calm all the time might manifest itself in riders hiding injuries (Gavin).

Of course, various literature has highlighted how professional athletes sacrifice their bodies in return for money (see Matthews & Maguire 2019 for an overview), as such, a cultural, as well as economic, framing becomes obvious. This is an important point, and Malcolm and colleagues (2023) recent work on professional wrestling argues that any calls for cultural change within sport regarding the management of brain injuries must be coupled with calls to address the structural-cultural pressures and economic precarity that many professional athletes face. Such organisational features of professional sport can work to reinforce and encourage risk-taking behaviours in athletes, as well as the embodiment of an attitude which prioritises performance over health (Malcolm et al., 2023). Yet, such economic framings do not explain the apparent existence of this attitude towards the body amongst amateur athletes who do not gain financial return, but still find enough significance in their activity to place their body on the line.

Here, the 'sport ethic' (Hughes & Coakley, 1991) proves useful as participants highlighted that amongst their peers, the glorification of behaviours which prioritise performance over health played a significant role in them adopting such ways of approaching cycling. In adhering to their versions of the sport ethic, the participants commented on the praise and positive reinforcement they received for taking actions which prioritised sporting performance over protecting health. Indeed, John suggested that sustaining injuries and returning quickly to competition were a "metaphorical badge of pride that cyclists wear" and when discussing dealing with injuries, George commented "…overcoming injury is a big part of being a *proper cyclist*". Conversations around ideas linked to the sport ethic led Dan to speak to his view on the broader responses to injury in road cycling races:

> We don't talk about the riders that pulled out of races, we talk about the ones that continued… you don't hear 'yeah he was so brave pulling out of the race' even though that's the hardest decision to take, it's the most sensible but no value gets applied to it.

Capturing part of Safai's (2003) discussions around the 'culture of precaution', wherein sportspersons at university would priorities elements of their health over and above sporting performance, which sits alongside the 'culture of risk', Dan firmly highlights how such precautionary, health preserving behaviours are symbolically stigmatised and minimised within road cycling.

Further to this, our participants spoke of wanting to live up to normative expectations, not let teammates down and to earn the respect of peers in relation to how they dealt with injury. Tom, for example, commented that, “If you’re racing in a team, there’s also the fact you don’t want to let them down by withdrawing from a race”. The following stories recalled by participants further illustrate this:

> A few years ago my teammate crashed, I think it was literally a kilometre from the finish, and she got a lot of road rash and it was sort of like, there was no question, she was going to get back on. We all expected her to get back on. And, I think if she hadn’t got back on, we would have thought, like, what are you doing? Like come on, that’s what you do unless you are seriously injured and cannot ride you are expected to get back on (Lydia).

> One of the riders crashed on the day, he was quite young lad. Got back to the hotel in the evening and he had some bandages on and there was a there was an older guy on the team who had been around cycling for a long time. One of the old guard, so to speak. And I just remember him saying like, ‘you're not going to quit, are you? You are gunna carry on tomorrow? You look a bit soft. You look a bit downbeat. It's just a few grazes like…get on with it’ (Sean).

It appeared that the network of athletes around the cyclist was important in terms of framing how they understood the sport, pain, injury and the notion of what a ‘proper cyclist’ constitutes. Central to this was the idea they should get ‘back on the bike’ despite the presence of minor, and sometimes major, injuries. The embodiment of the ‘getting back on the bike’ attitude is captured in the following story Brett recalled:

> There was nothing physically apparent stopping me riding the bike. If I could breath, and I can see, then I could ride a bike and that’s it, I’ll continue. There was never any thought like that’s it, I’m going to drop out the race or anything. What followed was like an absolute nightmare. I couldn’t sleep, I was sticking to the bedsheets [due to unhealed skin abrasions], I was excessively tired. I don’t even know how I managed to drag my carcass around the stages that week it was just terrible.

A last point around this discussion of networks and the development of culture focuses on the place of medical professionals in this process. Our participants reported official race medics often being complicit in supporting them 'getting back on the bike'. Take the following examples:

> When I crashed in a race the other day and got concussion, I got straight back on the bike and carried on. The only reason I didn't get back in the race was because of a mechanical [problem with bike]. The medic didn't check me or anything, I said to the medic yeah I'm fine and they said 'Bloody hell' they were shocked I got back up so quickly, but yeah adrenaline was through the roof and I said 'I'm fine' so they were like 'ahh right okay then' and then they were gonna tow me back on to the race but my bike had a mechanical (Gavin).

> It's always about getting back into the race quickly after a crash as the peloton doesn't stop. In the moment I think everyone knows that the deal, I've had medics helping me back to my bike and giving me a push off (Harley).

Sporting contexts present problems for healthcare providers, such as event medics, physiotherapists and team doctors, as they must negotiate the tensions between ethical norms of medicine to promote health and 'do no harm', and the strong pressures of performance sport subcultures wherein health often comes secondary to performance (Malcolm, 2017). Due to the normative acceptance of risk, pain and injury it has been suggested that medical management and practice is different in sport when compared to other medical settings (Devitt & McCarthy, 2010). In the present study, the participants recalled various situations where medical personnel aided returns to competition and appeared to act based on sporting rather than medical norms. It therefore appears, at least from what several of our participants suggested, that medical personnel seem to fit within the sportnets that reinforce risky approaches to the body, pain and injury. A more thorough investigation of the practice of medical professionals within competitive cycling would be fruitful and build on the brief insights shared from this data.

When taken together, our data shows how cyclists referred to the interplay of normative cultural ideas and the interactional networks they trained and competed in as key in how 'getting back on the bike' after injury was encouraged, and thus such ideas were reinforced,

recreated and reified in the bodies of cyclists. This culturally normative approach to the body also related to how the cyclists considered potential and actual injuries to the brain, to which we now turn.

Experiencing and dealing with brain injuries within a performance sport subculture

Of the nine interviewees that reported having sustained at least one or more cycling-related concussions, only three had these diagnosed by a healthcare professional (Gavin, James and Tim), with the others self-diagnosing. The participants had limited understandings of SRC and only offered lay descriptions such as, “to me it’s when you hit your head?” (Tom). This is perhaps unsurprising, given the complexity of the injury and lack of clarity that remains in medical domains around definition and diagnosis (Matthews et al., 2023). Moreover, many of the participants expressed feelings of confusion and uncertainty over “what was going on” (Luke) when they experienced SRC symptoms days, and sometimes weeks, following a crash. There was limited understanding across the interviewees that SRC is an unfolding injury whereby symptoms can present days, and sometimes weeks, following a significant head impact (Patricios et al., 2023).

Many of the participants commented on personal stories, or stories of peers, where they would compete following a suspected SRC and not seek medical care for them. Sean disclosed the following, “I know I've had concussions in the past. I've never, ever, had them dealt with. Just never crossed my mind to get it checked out”. And Ben recalled the following observation, “the amount of times I’ve seen people crash, and even if they think they might have hit their head, they just get up and go”. One participant commented on the role of parents supporting their child to return to competition following a suspected SRC:

> I do know one rider who as a youth he suffered from a concussion and his parents had him riding a race on the track literally a day later, which was probably really, really ill advised. It was like a televised event and they wanted him to be part of that (Lydia).

A clear finding from the interviews was that, alongside a lack of knowledge about SRC and its symptomology, there was also an apparently dismissive approach which served to somewhat trivialize brain injuries as the ‘getting back on the bike’ attitude took precedence over preserving long-term health. For example, Scott commented, “most cyclists think, ‘oh,

well, I can carry on as normal. It's just a concussion'". Similar findings have been reported amongst participants in surfing (Dean & Bundon, 2020) and rugby (Liston et al., 2018) in relation to SRC.

Moreover, despite personal experiences of concussion which had encouraged some cyclists to find out more about such injuries, there was a broad agreement that SRC was an injury without much prevalence in cycling. Sean commented, "I know very, very little about it. If someone mentioned concussion in sport to me, I'd think of rugby, American football, boxing, hockey but definitely not cycling". This appeared to aid the cyclists in symbolically neutralising (see Matthews & Channon (2016) for a discussion around such a process) the risk of SRC based on the belief road cycling was not a sport with a 'concussion' problem and it is, notionally, non-contact:

> I've heard about it [concussion] in general, you know it's been in the press about rugby players that smack their heads together and all that, but I guess we don't talk about it much within cycling as it's not a contact sport (Charlie).

Despite the broad view amongst the interviewees that SRC may not be seen as an injury with much prevalence in road cycling, largely due to the sport not being considered a contact sport, all participants readily highlighted that injures in general are common. A logically following issue with all sporting injuries is the need for various forms of medical treatment, care and advice. In this regard, some of the participants noted the difficulties with accessing medical support in road cycling, particularly for SRC, due to the structure of how the sport is practiced. For example:

> They [race day medics] can't check everyone, like if there's a 30-person crash they can't check everyone for injuries and concussion. So, I think it's really hard to monitor in cycling, I think it's really difficult as we will all just try get back to the race as quick as possible as it won't wait for us (James).

Following an SRC, and after the race had finished, only three of the nine participants that had experienced a suspected or diagnosed SRC reported seeking medical care, and all reported continuing in competition or training shortly after. The following extract captures this:

> The doctor did the shining light in my eyes stuff and said 'Look, it's been 6 hours now, you are probably fine but looking at the state of your helmet you've almost certainly got a mild concussion' but that was it, I wasn't given any follow up guidance. I drove myself home which probably wasn't the best idea. I was back on the bike the following day (Gavin).

In this study, participants suggested that medical management was mostly left to the athletes' discretion, or as Harley put it "…you're just left to your own devices". Even the elite level cyclists reported not having access to regular medical care, with Gavin commenting, "we don't have a team doctor, there's race doctors, but it's up to yourself to decide to race or not". It became clear through conversations with the cyclists that it is not until the very top of the professional sport that athletes may have access to team doctors and dedicated medical support. To our knowledge there has been no previous socio-cultural research on medical support for competitive road cyclists. This is an area rife for future, dedicated, research to further our knowledge of medical support in competitive road cycling across the competitive spectrum.

Echoing accounts from different sporting spaces (AlHashmi & Matthews, 2021; Safai, 2003), in the absence of established medical support, the cyclists we spoke to suggested medical care was mostly left to their discretion. Here, their medical knowledge and behaviours towards managing injury largely came from experiential and embodied 'know-how' which were shaped by the sporting subculture they interacted with. The following extract captures this idea:

> I've come off enough times now that you get a fairly good feel of the damage and if you've broken something or not, so in the last crash I just patted myself down and got back on the bike….I've competed injured loads of times (Dan)

Similar social processes have been reported in recent research in wrestling (Malcolm et al., 2023) and boxing (Matthews, 2021), where athletes in these sports held a belief that they could mostly self-manage or mitigate the risk of SRC through embodied knowhow and experiential knowledge. Perhaps in part due to the absence of medical care, and the belief cycling was not a sport at risk of SRC, our participants discussed a process of self-diagnosis for injury which was largely shaped by the sport ethic that circulated in the performance

sport subculture of which they were part of. With regard to SRC, the cyclists mostly framed this as a trivial injury as, at least in all the incidents reported to us, they felt they were safe to still compete following a potential SRC. For example, Ben commented, “it’s the broken bones I worry about because they often take you out of training and racing the longest”.

The lay understanding that one can be concussed and still be functional and perform within athletic settings has been previously noted (Liston et al., 2018; Malcolm 2009, 2017). Moreover, the ‘invisibility’ of SRC may further contribute to such ways of approaching sporting practice and injury because of the inability of athletes to ‘see’ a concussive injury in the same way as many musculoskeletal injuries (McGlynn & Cassilo, 2023). This can lead to lay understandings that brain injuries may not prevent continued participation in the same way that a musculoskeletal injury, such as a broken bone, might. With this in mind, the cyclists we spoke to appeared to self-assess injury primarily through the lens of performance:

> When you crash, first questions are often is their damage to my legs? Because that’s where the power comes from. Or maybe the arms as you need to grip the handlebars. If it’s neither of them then we [cyclists] don’t care. Like if I crashed in training or racing, and I got up and felt a bit dizzy I mean I would carry on (Susan).

The finding echoes some of Matthew’s (2021) discussion of how boxers, despite holding very little medical knowledge, self-assessed injury severity in relation to the immediate impact on sporting performance, which took precedence over how injuries might affect long term health. Here, then, we have a confluence of the subcultural minimising of brain injuries as something prevalent in ‘other’ sports, with a lack of medical knowledge and support, and a culturally normative approach to accepting and valorising risk. As might be expected, this led several of the cyclists within this study to take an approach to (brain) injuries and their management that was largely shaped by continuing performance rather than maintaining or enhancing health.

Concluding comments

Scholars have suggested that the subculture of road cycling functions as a "secret world", in similar ways to other sports, which has an intricate system of values which are governed by layers of "unwritten rules and unspoken knowledge" (Rees et al., 2014, p.466). Whilst our sample size is modest, we have provided important glimpses into some of the social processes at play within this "secret world", in particular, focusing on how our participants understand, value and deal with risk, pain and injury (and SRC).

Our methodological approach produced data from one-time interviews, and further research might focus on observing the on-going interactions between cyclists, teammates, coaches and medical professionals in order to provide empirical 'flesh' to the findings we have reported (see AlHashmi & Matthews (2021) for a discussion around some methodological implications of what they call 'snapshot methods'). Moreover, while we expect there to be experiential, cultural and social commonalities across the globalised subculture of road cycling, our focus on Britain means caution must be taken when considering how such issues play out in different countries and social spaces. In this regard, research in other locations where road cycling is popular would be well placed to extend our work. This would help us consider to what degree the different structuring of medical care and variations in popular discourses about brain injuries shape the experiences of cyclists.

Notwithstanding these limitations, and suggestions for future scholarly development, we have provided novel insights to the injury culture in competitive road cycling and, to our knowledge, the first socio-cultural exploration of SRC in road cycling. We have shown how the interplay of culturally normative ideas, and the interactional networks within which cyclists train and compete, (re)produced an acceptance and valorisation of 'getting back on the bike'. This led to an acceptance of risk and injury frequently being reinforced, recreated and reified in the bodies of the cyclists. When such processes play out, athletes see and experience socially learned behaviours so regularly that they can become 'naturalised'. That is, despite appearing strange, deviant and damaging to 'outsiders', cultural insiders, in this case cyclists, risk their bodies and brains in ways that feel comfortable, relatively easy and a 'natural' extension of their sporting identities (Matthews, 2021).

A specific dimension of risk, pain and injury becoming accepted and normalised was the way in which apparently medical knowledge circulated in cycling subcultures. In this regard, in the absence of formal medical support and care, the subcultural understandings toward risk and the body were shaped by a focus on performance instead of maintaining short- and long-term health. Therefore, examples of SRC were mostly 'assessed' as injuries that would not prevent the cyclists 'getting back on the bike' in order to complete training or competition.

The findings from this study are distinct from much previous research on SRC because road cycling is a sport which has had little academic attention within the on-going problems of brain injuries in sport, and there appears to have been only limited changes in policy and practice (Hardwicke, 2023). In regard to the latter point, the governing body for the sport in Britain, British Cycling, was one of only two sporting bodies in the United Kingdom to not have publicly available SRC guidelines as of 2022 (Scullion & Heron, 2022). It was not until 2023 that British Cycling released such guidance (British Cycling, 2023). As a logical extension of this point, it is our contention that notionally 'non-contact' sports which can involve high velocity impacts and collisions, such as the various cycling disciplines, equestrian sports, snow sports and motorsports, must be examined for the possible lag in SRC knowledge filtering to participants and an associated lag in changes in practice required to protect athlete welfare. By way of comparison, popular contact sports, such as rugby and American football, have had over two decades of research, media attention and changes to policy and practice, whilst cycling, motorsport and equestrian sports have only very recently been included in the broader conversation despite all being sports in which SRC presents as a risk (Malcolm, 2019).

Through the analysis in this paper, we have also highlighted how classic ideas within the sociological analysis of sport still offer much in terms of explanatory potential. Such classic work continuing to speak to contemporary experiences may be indicative of the obdurate nature of cultural norms in sport whereby performance is largely prioritised over health (Curry, 1993; Hughes & Coakley, 1991; Theberge, 2008). Within our sample, at least, there appears to have been little progress made in challenging the subcultural context in which risk, pain and injury is accepted, normalised and even celebrated in sport. Perhaps some will read this, sigh and think, 'we already know this', and while we have provided important

insights into a new sporting subculture in relation to brain injuries, we share such frustrations. The fact scholars have been detailing these issues for decades with minimal effective changes in practice is perhaps reflective of the limits of academic research papers to change the world in positive and progressive ways, but also of the enduring power of performance sport. So whilst highlighting these ongoing and shifting problems remains important, it is clear academic work must be better coupled with public, policy and practice orientated efforts in order to make a significant difference to the ways cyclists, and by extension other athletes, willingly sacrifice their bodies and brains.

With regard to the ongoing problems with brain injuries, we show the continued need to appreciate the social context in which sport is imagined and practiced. Our data highlights why road cycling might continue to exist as a broad subcultural space in which enduring normative beliefs encourage the acceptance of injury and valorise self-sacrifice for 'the team' or 'sport'. Here, our argument maintains that such behaviours are in large part an artefact of social context. If meaningful change to promote athlete welfare is desired, then the social context within which athletes learn to accept and normalise such behaviours must be changed, or at least more readily challenged. However, our data from road cyclists – alongside recent work across sports (see AlHashmi & Matthews, 2021, Dean & Bundon, 2020; Liston et al., 2018; Malcolm et al., 2023; Matthews, 2021) – points toward the social context of performance sport being resistant to meaningful change. Such findings reinforce the continued need for academics to work towards solutions to the ongoing problems associated with concussion and brain injury in sport, particularly using social scientific contributions which have been noticeably absent in influential policy and practice discussions around SRC (Casper et al., 2022; Patricios et al., 2023).

With that in mind, we thus put forward some recommendations for changing practice, across sports, which flow from our discussions. Following Malcolm (2021), we argue those who care to do something about brain injuries in sport should not overly focus on SRC as a unique injury – despite its obvious 'uniqueness' in terms of potential seriousness – in order to avoid losing sight of the cultural norms in sporting spaces which encourage athletes to downplay, ignore and play through various injuries. And based on our work, alongside the decades of social scientific explorations of risk, pain and injury in sport, we recommend that

within sporting spaces where damage to the body and brain is a regular and normalized 'part of the game', coaches, managers, parents, teammates, fans and anyone else with an interest in promoting sporting participation should be openly, and honestly, discussing the potential long-term consequences of performance sport in terms of health, and particularly brain health. This would move us closer to a position whereby athletes may engage in such spaces *consensually* and with increased individual sovereignty and empowerment to withdraw from training or competition when injured without detriment to their sporting identity.

Therefore, there is a responsibility for all stakeholders in sport to, 1) challenge the cultural norms which circulate in performance sport cultures which encourage acceptance and celebration of risk, pain and injury, and 2) actively work towards creating a culture in which it becomes 'normal', and even celebrated, for athletes to prioritise health over performance. Addressing these two recommendations should instigate more comprehensive cultural change across sports, and has particular promise for managing the ongoing problems with concussion in sport. Within sporting spaces in which athletes participate for economic renumeration, there is also need for a continued focus on the organisational features and structural-cultural influences which can compound and encourage cultural norms which normalise risk taking and promote a high tolerance toward pain and injury (see Malcolm et al., 2023). It is clear that more work is needed to address the social causes of athletes downplaying, ignoring and playing through (brain) injuries if we wish to promote meaningful change for athlete welfare across all levels of sport.

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