

**Gladiator Gear: The unintended consequences of protective equipment in
gridiron football compared to rugby union**

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Abstract: Sports equipment has evolved over time to both enhance performance and reduce the injury risk. Protective equipment is particularly important in contact sports where injuries are frequent. In American and Canadian football, helmets and shoulder pads are two pieces of protective equipment that are strictly implemented to absorb hits of massive force to reduce the risk of head and upper body injuries respectively. While the risk of injury is reduced, the athlete's calculated perspective of risk might be altered. This change in risk equilibrium has the potential unintended consequence of the individual foregoing caution and playing in a faster and more aggressive style. This altered behavior not only increases the individual's own injury risk, but also puts other athletes who are on the receiving end of contact at greater risk. This displacement of risk is particularly dangerous when an athlete is hit in an area that is unprotected and vulnerable, or in an area where the equipment is not as effective as perceived. Drawing on existing research, theories of risk in sport, and qualitative interviews with 11 male, adult athletes who have competed in both football with significant protective equipment and rugby with minimal protective equipment, this study examines the relationships and potential disjuncture between sports equipment changes, athlete perceptions of injury risks, and actual injury risks. The purpose of this study is to compare physical contact, safety, and risk between the two high-contact sports, focusing on the different uses of mandated, protective equipment.

Keywords: Risk Compensation; Football; Rugby Union; Protective Equipment; Sport Injuries

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Chapter 1

Introduction

The purpose of this study was to examine the impact of protective equipment in football on an individual athlete's perception of risk by examining the behavioural and outcome consequences of this alteration. Interviewing those who have played both football and rugby – two sports similar in contact and style while drastically different in equipment use – was used to analyze this risk compensation effect, which is the phenomenon of increased risky behaviour due to a decrease in perceived risk (Cassell et. al, 2006).

Injuries are a significant risk to athletes in any competitive sport, regardless of incentives or level of play. The level of injury risk to an athlete depends on various internal and external factors, as well as the inciting event leading to the injury (Bahr & Holme, 2003). Certain injuries occur at a higher rate depending on the sport played. Head-related injuries are more likely in contact sports such as football, rugby, and ice hockey (Hootmen et. al, 2007). More football players, both current and retired, have been diagnosed with Chronic Traumatic Encephalopathy (CTE), which is associated with cognitive problems that can deplete an individual's way of life (Hootmen et. al, 2007).

Concerns over head trauma in football players have grown considerably in recent years. While injuries are a risk in any physical activity, football has been under scrutiny over its level of physical contact compared to other sports. Youth participation in football has declined over the

past two decades, in part from increased concern over perceived, long-term consequences from its physicality (Feudtner & Miles, 2018). This has led to intense scrutiny and speculation regarding the future and health of collegiate and professional gridiron football in North America.

In 2012, former NFL linebacker Junior Seau committed suicide by shooting himself in the chest, which provided coroners and neurologists an opportunity to inspect his brain for severe trauma (Korngold et. al. 2013). Before his death, Seau associated the hits he took during his playing career with his depletion in cognitive abilities and the manifestation of behavioural problems, such as depression and bipolar disorder. The publicity of his death and the subsequent findings of massive neural trauma raised questions and concerns over athlete health in all football leagues, not just college or professional. The rate of participation in youth football has declined, with parents directing their children to play sports with less head injury risk (Fainaru & Fainaru-Wada, 2013).

While less publicized than CTE, injuries to the lower body are a major concern in football. A 2014 article tracked football player injuries through the regular and post season and reported lower body injuries accounted for 63% of all injuries (Costa, 2014). Football players on defence are taught techniques to tackle around the waist or lower to effectively take down the ball carrier. Furthermore, because of the speed of the game, players making a sudden cut or move can put stress on different areas of the legs, resulting in long term damage over time.

Injuries suffered in sports have short and long-term health consequences, with pain being at the forefront of issues. For those who have played at the highest levels of football,

opioids and other dangerous drugs are used to cope with pain (Cottler et. al, 2011). Former football players who have used opioids during their career are at a higher risk of misusing opioids when they retire along with other dangerous methods, such as heavy drinking or drug use, to manage pain.

Introducing injury prevention programs for youth athletes can help divert dangerous play, but injury risk cannot be completely removed. Multiple factors influence injury risk for an individual athlete (Bahr and Holme, 2003). Protective equipment – an external risk factor – will be the focus of this study. While protective equipment is designed to reduce injury risk, the individual's perception of increased safety could alter their behaviour towards taking more risks. This change in behaviour could at least partially offset the protection equipment provides for the individual, and results in more risk to themselves and other players including opponents and teammates.

Talking to current and former athletes who have played both rugby and football has provided insight into this phenomenon. Participants have attested to the differences in both sports, specifically around the use of equipment. Rugby and football share similarities in physicality and style. Individuals who can compare their experiences with both sports highlight the role that protective equipment plays in risk perception and behaviour. The questions that guided this research are as follows:

1. How do athletes perceive the risk of injury in football and rugby?
2. How and why are perceptions different across the two high-contact sports?

3. Can protective equipment lead to riskier behaviour, in turn offsetting the protection it provides?

This study begins by examining the consequences suffered by players in football and rugby, including injury risk, short and long-term consequences, financial compensation, and pain management for current and retired players. Different forms of risk are then defined- including risk homeostasis and risk compensation – and effects on elements in the game such as individual behaviour and fluctuated risk to injury are explained. The role protective equipment plays in football is considered and discussed, using the various types of risk to hypothesize how it could influence player behaviour. The qualitative, interview-based methodology of this study is outlined, which led to an examination of the phenomenon of risk compensation and the unintended consequences that protective equipment has on individuals in football. Key findings of the study are then highlighted, as well as their significant implications.

Initially, however, it is important to explain the different versions of rugby and gridiron football that are played, identify the specific forms examined in this study, and compare these two sports to each other. Sport historians have identified common origins of both sports, stemming from soccer, which evolved into versions of rugby, that later evolved into versions of gridiron football in Canada and the United States (Fogel, 2012). Due to common origins they share many similarities, but also have significant differences.

Versions of Rugby

Rugby union is the most prevalent version of rugby in the world (Mohdin, 2016). Rugby union involves two teams of 15 players and games last for 80 minutes, broken down into 40-minute halves. Points are scored through tries, conversions, drop-kicks, and penalty kicks. Each try is worth five points, where the ball carrier grounds the ball in the opponent's in-goal area. Following the try, one player from the scoring team attempts to kick the ball through the uprights of the goal post; if the kick is successful, the team is awarded an additional two points for the conversion. Teams can score three points by kicking the ball through the uprights in two different ways: by drop-kicking the ball or from an awarded penalty when the opposing team breaks a rule. Individuals not familiar to this game may recognize certain gameplay from their limited viewing, including the scrum when eight 'forwards' from each team interlock with each other, and the lineout when the ball is thrown in from out of bounds and players jump for possession.

Rugby sevens is a variant of rugby union where teams are made up of seven players and the game lasts for 14 minutes broken into two seven-minute halves. The scoring methods, scrums, and lineouts are the same, but fewer players are involved in the set plays. There are other smaller differences, such as how conversions are kicked and the duration of a yellow card, but the biggest difference is the number of players on the field.

Rugby league is another variant of rugby but has more core differences than rugby union compared to sevens (Prowse, 2018). In rugby league, teams are made up of 13 players compared to 15 in union. While the scoring methods are the same, tries in rugby league are worth four points, drop goals are worth one point, and penalty kicks are worth two points. Conversions in rugby league are worth two points, the same as union. The major difference

between rugby union and rugby league is the gameplay surrounding the tackle (Prowse, 2018). In union, the opposing team on defence can contest for the ball in the breakdown known as the ruck. In rugby league, the offence retains possession after every tackle, where the ball carrier gets back up and rolls the ball between their legs with their foot to a teammate. Teams in rugby league have six attempts to score, otherwise they must kick the ball away or possession is turned over to the opposing team. Lastly, there are no lineouts in rugby league and scrums are used to re-start a game when the ball goes out of bounds ('in touch') in the regular field of play.

This study focuses on rugby union due to its popularity and playing opportunities in Canada compared to rugby sevens and rugby league.

Versions of Gridiron Football

The American version of gridiron football is the most popular and most well-known version. Each team fields 11 players, with one team having possession of the ball while the other defends. Games have 60 minutes of play, divided into four quarters of 15 minutes each. Each team on offence has four attempts (or 'downs') to advance the ball 10 yards. If successful, the downs reset, and the offence must yet again advance the ball 10 yards. If unsuccessful, the team must either punt the ball away on the fourth down, or the ball is turned over to the other team.

The main scoring occurs through touchdowns, where the ball carrier on offence crosses the goal line of the opposing team, awarding that team six points. Following a touchdown, the offence attempts either a one- or two-point conversion. The former requires the team to kick the ball through the uprights while the latter gives the offence one play from the opposing

team's two yard line to score similar to a touchdown. Teams can also attempt field goals by kicking the ball through the uprights of the goal posts; three points are awarded if the ball is successfully converted.

Canadian football is like American football with a few exceptions. The playing field in Canadian football is slightly larger, which allows each team to field 12 players compared to 11 in American football. Teams on offence have three downs instead of four to advance 10 yards. Scoring is the same across both versions except for the added 'Rouge' method in Canadian football, awarding a team one point if they can punt the ball into the opposing team's endzone without the ball being carried out of that zone.

Given the similarities in playing style and rules, and that both sets of rules are used at different playing levels in Canada in which participants in this study would have played, this study has examined both Canadian and American football, with interviews conducted with Canadian football players who have mostly played both versions of the sport, as well as hybrid versions using elements from both. Media examples are also drawn from both Canadian and American football.

Comparing Rugby to Gridiron Football

Discussing the variations of rugby and football show similarities and differences between the two sports. The objectives of both games are similar, with each team trying to outscore their opponents mainly by crossing the ball over their opponent's goal line or kicking the ball through the goal posts, albeit in different ways. Both are contact sports, where tackling the ball carrier dictates the play of the game. The pace of play is dramatically different, where

gridiron football has breaks between 'downs' allowing players enough rest to approach each play at 100% speed. Rugby, on the other hand, is continuous where play does not stop when the ball carrier is taken down. Perhaps the most noticeable difference between rugby and football, though, is in the type of protective equipment worn by the players.

In gridiron football, players are mandated to wear protective equipment, which includes large shoulder pads (solid plastic exterior, foam interior), shelled helmets, and selective padding for the hips and thighs. Other equipment, such as padding for the ribs and knees and mouthguard, are optional for each player. The only protective equipment that is required in rugby is a mouthguard. Scrum caps and lightly padded shoulder gear are optional for players to use, but neither are as bulky as the helmets and shoulder pads seen in gridiron football, and they are comprised solely of high-density foam. Differences between the mandated protective equipment in rugby and football form the basis of this study, where the risk compensation effect is expected to be present in gridiron football but not in rugby.

Chapter 2

Literature Review

Introduction

This study contributes to existing academic research on injury risk perceptions in sport, sports violence, and risk compensation in sport. This chapter provides an overview of the existing literature that has framed the research design and theoretical concepts for the study. First, research on different types of physical contact and violence in sport is identified. Then, research on pain and injuries in football and rugby are discussed, including types and rates of injury, managing pain during and after an individual's career, and the financial components that make older players more dispensable compared to other sport leagues. The inherent risks athletes take in all sports are then examined, including factors that influence the risk of injury to individuals. Definitions of different forms of risk are discussed, specifically the phenomenon of risk compensation, which has been researched both inside and outside of sports. Non-sports and sports-related examples are then compared, leading to a discussion of the current study and its contribution to the body of literature on risk and injury in contact sports.

Violence in sport

Physical actions that would be deemed as violent in society are far more complicated in sports, particularly those where contact is integral to the game (Fogel, 2017). Tackling somebody in the street would get you into legal trouble, but on the football field it is a crucial

element to the game, suggesting that violence is contextual. Fogel (2017) adopted Smith's (1983) typology of on-field violence, which occurs on a continuum, to rely more on "...action, intent, harm, and consent, rather than reactions and labels" (pg. 42). According to Fogel (2017), the three main types of physical contact in sport are routine contact, immoderate violence, and ultra-violence. Routine contact, such as tackling a player around the legs, is considered within the rules of the game and consensual among players involved. Immoderate violence, like pushing a player from behind, occurs when a physical act is against the rules of the game but is not substantial enough to remove a player from that game. Ultra-violence, like tackling a player around the neck in rugby or stomping on their head with their cleats, is an extreme act of violence with clear intent to harm another player.

How players engage in aggression and violence is influenced by a variety of forces including biological factors, socially learned behaviour, and masculinity (Fogel, 2017). Consequences of aggression and violence in sport is mostly seen through injuries, with more excessive acts leading to more devastating injuries. Acts that are outside the scope of the sport are particularly dangerous and can not only result in a severe or even fatal injury, but legal actions as well. For those on the receiving end of such injuries, this can mean a lifetime of pain management that greatly decreases quality of life and lead to other issues in mental health and substance abuse (Cottler et. al, 2011). There are also financial implications of sports violence with players missing work due to severe injuries and high medical costs spent on treating sport-related injuries (Fogel, 2017).

Pain and Injury in Gridiron Football

Gridiron football (hereafter referred to as football) is the most popular spectator sport in North America, gaining the most revenue and viewership among the four major sports leagues (Deubert et. al, 2017). The National Football League (NFL) gains more revenue from more sources than any other league in North America. Franchises in the NFL are among the elite in estimated value, with the highest rated team, the Dallas Cowboys, having an estimated value of \$5 billion (Forbes, 2018). College football is popular in North America as well, with schools within the NCAA (National Collegiate Athletic Association) and Division I Football Bowl Subdivision (FBS) gaining revenue from sponsors, ticket sales, and merchandise (Fulks, 2017).

Despite financial success, there are those who believe that football is reaching an impasse regarding player safety (Parry, 2017). Football has the highest incidence of in-game injuries across sports (Hootman et. al, 2007). While lower leg injuries are most common in football (Costa, 2014), Chronic Traumatic Encephalopathy (CTE) has garnered mass attention with its implications for athletes during and after their playing career. CTE has been linked to degeneration in cognition, mood, personality, behaviour, and movement (Gavett et. al, 2011). Further challenges arise from diagnosing an athlete who is showing concussion-like symptoms. It is not unheard of for athletes to lie about their symptoms to continue playing (Guskiewicz et. al, 2000). The risk of suffering a concussion is higher for athletes who have suffered one previously, making it crucial for trainers and clinicians to make the correct diagnosis in the moment (Abrahams et. al, 2013). Long-term implications of injuries have led to several prominent NFL players announcing their retirement from professional play earlier than anticipated by fans and media, such as Terrell Davis, Jake Locker, and Patrick Willis (SportsBreak, 2018). Rob Gronkowski, a tight end who recently came out of retirement to play

in the NFL again for the Tampa Bay Buccaneers, cited the pain of the game and its impact on his life outside of football as the primary reason for his decision to retire in 2019 (Chippin, 2019):

Abusing your body isn't what your brain wants... When your body is abused, it can bring down your mood. You've got to be able to deal with that too, throughout the season... Everyone expects us players to be wide awake every single day, and it's like... I just took 50 collisions, and the next day everyone wants you to be up.

Other retired NFL players have not been fortunate enough to leave the game at the right time. One prominent example is the suicide of Junior Seau, former linebacker in the NFL, in 2012 (Parry, 2017). Seau shot himself in the chest and requested to have his brain scanned for trauma by neurologists. Brain scans found severe neurodegeneration associated with CTE. Parents have expressed concerns over these findings and participation in youth football has been declining since 2009, while overall participation in high school athletics has increased in adolescent boys (Feudtner & Miles, 2018). Should this trend continue, it could hold long-term implications for the NFL and other contact sports such as ice hockey. Some have gone so far as to suggest removing football helmets from practices to help young athletes focus on developing better technique and form over destructive behaviour (Belsky & Fine, 2016).

Pain management is an issue in all forms of competitive play but is magnified in football due to the physical nature of the game. A common mantra in football and other sports is to 'play through the pain,' to help the team or to come off as heroic and tough (Parry, 2017). There are plenty of documented cases of players whose short-term decision to play through injury ended up hurting them more in the long run. Robert Griffin III (RG3), a highly rated quarterback drafted second overall in 2012 by the Washington Redskins, effectively ruined his

career when he decided to play in a playoff game despite a lingering knee injury suffered earlier in the season (Parry, 2017). His career has not been the same since; as of the 2020 NFL season, RG3 was the second-string quarterback of the Baltimore Ravens, playing sparingly in a backup role for the team. This is not just seen at the professional level, but high school and college as well, where players under-report concussions because they are either unaware of the symptoms, underestimate the severity of a concussion, or do not want to be taken out of a game (McCrea et. al, 2004).

In contrast, players who decide to take care of their bodies by holding themselves out of games are perceived as weak, not a 'team player,' and expendable, as seen with former Chicago Bears quarterback Jay Cutler during the 2010 NFC championship game against the Green Bay Packers (Parry, 2017). Cutler took a hard hit to his throwing arm, injuring his shoulder in the process. Instead of returning to the game, Cutler opted to stay on the sideline with backup quarterback Caleb Hanie taking over for the rest of the game. As the game continued, cameras continued to catch Cutler sitting on the sideline, confusing broadcasters and fans as to why he was not put back into the game. While his decision, and possibly the coaches and medical staff as well, to sit out gave the Bears a better chance at winning, Cutler received massive criticism from the fans and media, blasted as being 'too soft for football' (Korman, 2016). In some respects, it is a 'damned if you do, damned if you don't' scenario for elite football athletes.

Despite former players glorifying the past and their toughness through physical adversity, playing through pain has severe consequences during and after an individual's career is over. Masking injuries by using painkillers is common in all high-level leagues, with football and hockey being notoriously bad due to their physical styles of play. The use of opioids is seen

in approximately half of NFL players, with 71% of those reporting misuse during and/or after their playing career (Cottler et. al, 2011). Players also look to alternative means to dampen their pain, such as illegal substances (marijuana, cocaine), alcohol, and cortisol shots to affected areas (Parry, 2017).

The level of care from sports organizations, universities, and medical professionals does not meet the needed care football players need, particularly in retirement. While the NFL has more benefits and coverage than the other major sports leagues in North America, there are many issues that makes it harder for current and retired players to get the help they need (Deubert et. al, 2017). Even with increased concern over the neurocognitive disabilities, players must, in addition to other eligibilities, “execute a release releasing the NFL and clubs from any liability for head or brain injuries” (Deubert et. al, 2017, pg. 125). For the average NFL player, there is a large gap in time between their last game played and the qualified age to receive retirement pensions and benefits. While the NFL claims the average career length for a player is six years, the NFL Player’s Association (NFLPA) claims that number to be just over three years, with large deviation between different positions (Keim, 2016).

Due to the unilateral structure of NFL player contracts, NFL teams can cut underperforming and injured players from their roster without taking a financial hit to their books, leaving these players to find a new team or a new career with little notice (Parry, 2017). This has resulted in NFL teams becoming younger since 2005, with rosters being made up of more rookie contracts with players that have less injury history and more potential, rather than veterans whose growth is perceived by team officials as being ‘maxed’ (Pells & Fenn, 2019). Even in college and the NCAA, players who suffer a debilitating injury while on the team risk

losing their scholarships for the remainder of their academic career and can even lose out on getting help for healthcare in severe cases (Parry, 2017). Injuries are a bigger concern in youth football, where players are exposed to more contact by playing both offence and defence (a rare occurrence in collegiate football and at higher levels), the lower quality of the protective equipment used, and the lower skill levels of all players on the field of play (Guskiewicz et. al, 2000).

All sports competitions, regardless of level of play, carry inherent risk to injury. What separates football from other sports is the level of speed and physicality involved. Plays in football are over in a manner of seconds and demands fast and physical play. Football favours physically imposing players who can quickly get in position and make a play.

Pain and Injury in Rugby

Rugby union and rugby league are comparable sports to football, with their similarities in tackling and physicality, but are more fluid in pace. Tackling form is imperative for rugby players given the pace of play and the lack of mandated protective equipment (Hendricks & Lambert, 2010). Common injury rates are similar in rugby to football, with the highest incidence of injuries occurring to the lower body, specifically to the knee and ankle areas (Kaplan et. al, 2008), though some studies have shown injury rates in rugby more comparable to soccer and lower than American football (Kerr et. al, 2008).

However, in rugby, the only piece of protective equipment mandated for every player is a mouthguard. Other equipment to protect the head and body are optional. Football, on the other hand, mandates the use of helmets and shoulder pads throughout all forms of

competition. The use of mouthguards and hip padding are required up to the NCAA level, but are optional for players in the NFL, despite them being linked to a reduction in injuries classified as catastrophic (Daneshvar et. al, 2011). Although the NFL mandates the use of knee and thigh pads, it does not take long to find players who forego this rule and add risk to their play.

Playing through pain has also been looked at in rugby, where social influences on pain and injury behaviour were observed. While financial and commercial pressures in elite sport can partially explain why players are willing to play hurt, there are other social pressures that can better explain why playing through pain is seen as 'part of the game' and seen across all levels of play (Liston et. al, 2006). There are a variety of factors that influence an athlete's decision to hide injuries from their coaches and play through pain, such as identity with and passion for the sport they play and to show courage and willingness to help their team, all of which are seen across genders (Madrigal et. al, 2015). An athlete's level of status – which is influenced by ability, age, social affiliations, masculinity, and conformity – effects how an athlete decides to play through pain or not, with high status individuals less reliant on social pressures than medium-status individuals (Fenton & Pitter, 2013).

In addition to social factors, physiological changes effect a player's return-to-play boundaries, where '...the act of playing with pain and/or injury results in not only subjective but also physical changes that increase a person's pain threshold and tolerance and, in turn, raise a person's return-to-play boundary (Fenton & Pitter, 2013, pg. 221).' As a player gains more experience in injury and pain, they can make a self-reliant decision as to whether they can keep going or not, rather than look to others such as coaches and teammates for advice. Those who

have a higher boundary are at greater risk to significant injury, including career-ending injuries and those that permeate into retirement.

Athletes and Risk

Protective equipment is worn with the intention of reducing the risk of injury for players. In a controlled environment, advances in protective equipment design and construction theoretically helps to absorb more force into the equipment with less force and impact on the body. However, the playing field is not a controlled environment; it is full of multiple factors of risk, some of which are out of the control of an individual player (Bahr & Holme, 2003). While biomechanical models will consider force and body mechanisms, they do not necessarily consider the motivation and values of an individual (McIntosh, 2005). An example would be a defensive player attempting to tackle the opposing ball carrier. The defensive player's ability can drastically change the outcome of the instance. If they are not well trained on tackling, they are more likely to either miss the tackle or engage in the tackle in a dangerous way causing injury to themselves and/or the other player.

The amount of risk an individual is willing to take – risk homeostasis – can change depending on a variety of factors (Wilde, 1982). In an instance where perceived risk is decreased, behaviour will change to take on more risk, known as risk compensation (Hedlund, 2000). Football players may feel the equipment makes them invulnerable, which is a false perception. In turn, they will feel protected enough to engage in riskier behaviour. For example, in football, a defensive player may opt to engage in contact with the purpose of delivering a

harder hit to the opposing offensive player, in addition to taking the player to the ground. Some players, especially younger athletes with less experience, could take it even further:

Often, the helmet itself may be used to initiate contact. This tendency to promote a more reckless style of play may help explain the higher rate of injury in children and adolescents, as compared to adults. (Danesvhar et. al, 2011, pg. 12).

This change in behaviour ends up partially offsetting the protection provided by equipment, while displacing more risk onto other players on the field, both teammates and opponents. This can be especially damaging for young adolescents, who are less trained than elite athletes and take more risks in general (Kontos, 2004). Emphasis on good tackling form is imperative for young athletes, where injury concern is greatest (Hendricks & Lambert, 2010; Stokes et. al, 2010).

Relevant Risk Research Outside the Context of Sport

The effect of risk compensation has been observed in several different areas outside of sports. Some studies have shown an effect with the introduction of seatbelts, where countries who implemented seat belt laws saw an increase in the number of vehicular related accidents, compared to those with no laws in place (Richens et. al, 2000; see also Adams, 1994 for a more comprehensive revision of seat belt legislation in the United Kingdom). Other factors play into driving aggression of individuals, including environmental factors such as weather and traffic density and factors within the vehicle such as number of people in the car. Because our behaviour changes with the perception of risk and reward, it would make sense to observe someone driving down the same road faster if the roads are clear, compared to a snowstorm.

Risk compensation has also been a factor in creating sustainable programs for HIV prevention (Cassell et. al, 2006; Richens et. al, 2000). While the promotion and increased accessibility of condoms has led to a reduction in the rate of HIV transmission, it has led to other unintended consequences including sleeping with multiple partners, inconsistent use, and an increase in risky sexual behaviour. Condoms are not 100% successful, so some of the protective effects are offset when the risk of breaking is coupled with an increase in sexual acts. Other programs focused on increased accessibility of antiretroviral therapy have reported some of the effects being offset by some individuals engaging in riskier sexual behaviour (Stolte et. al, 2004; see also Crepaz et. al, 2004 for a meta-analysis). According to risk homeostasis and risk compensation, a reduced perception of STI transmission should lead to a change in behaviour that engages in more risk, including engaging in more sexual activity with multiple partners.

The risk compensation effect has also been seen in the use of sunscreen, which is applied to help protect individuals from sunburn and harmful Ultra-Violet (UV) rays from the sun (Green et. al, 2010). Individuals may feel more comfortable engaging in outdoor activities in the summer because of the presence of sunscreen. However, improper or inconsistent application of sunscreen means more exposure to dangerous radiation, resulting in increased chance of sunburn and the development of skin moles, which are an indicator for skin cancer and melanoma (Autier et. al, 1998).

Each of these examples point to a reduced effectiveness of a program due to the altered behaviour of the population. A program is only truly effective if it can also somehow implement changes that take altered behaviour into account (Cassell et. al, 2006). For example, when safety measures for driving are introduced, the enforcement of those laws are equally

important. If the police action fails to enforce driving laws (not just seat belts, but also speeding and other recklessness), then those behaviours will continue to permeate throughout the population (Vrolix, 2006). It is much harder in HIV programs, where it is virtually impossible to regulate how people engage in sexual activity, but it is important that these programs ‘...plan ahead to ensure that the benefits will significantly exceed any potential offsetting limitations’ (Cassell et. al, 2006, pg. 606).

Pain, Injury, and Risk Compensation in Sport

Most sports-based or athletic risk compensation research comes from looking at helmets. Studies on biking behaviours have shown that bikers who wear helmets take safety precautions more seriously in general, including biking at slower speeds (Hagel & Meeuwisse, 2004). The most direct evidence for a risk compensation effect in cyclists was found in a study showing that those who were used to wearing a helmet went slower when they were not wearing one (Phillips et. al, 2011). In the same study, they found that participants who did not generally wear helmets showed no difference in speed or behaviour when wearing a helmet or not. Even though helmets greatly reduce the risk to injury should an accident occur, any legislation to pass a mandatory helmet law might have the undesirable effect of reducing the number of traditional cyclists in a population (Fyhri et. al, 2012). Fyhri et. al (2012) found that cyclists segmented into two primary groups; those who were speed-happy and have lots of equipment (‘hardcore’ cyclists) and those who rode more slowly (‘traditional’ cyclists). Introducing a helmet law could discourage the traditional, safer cyclists from continuing to bike, leading to a net decrease in social health and putting the traditional rider in a more dangerous position with fewer cyclists overall on the road, offsetting a ‘safety in numbers’ phenomenon.

In a follow-up study, researchers attempted to habituate participants who were not familiar with wearing a helmet to see if there was a risk compensation effect like those who were used to wearing one, but there was no statistically significant difference (Fyhri et. al, 2018). Another study with bicycle helmets found a moderate risk compensation effect in men wearing bike helmets – though not enough to completely offset the effectiveness of a helmet; the same effect was not seen with women (Messiah et. al, 2012).

Some studies have looked at behaviors in snowboarders and skiers to see if protective gear, like a helmet, can lead to a risk compensation effect. There are certain traits that are associated with risk taking behaviour such as age and perceived ability (Willick et. al, 2019). When it comes to helmet use, Willick et. al (2019) found that those who reported inconsistent helmet use reported riskier behaviour than those who always or rarely wore a helmet, indicating the presence of a subgroup that shows a risk compensation effect when wearing a helmet. Studies have also shown that skiers and snowboarders who have a high level of sensation seeking are also likely to show higher risk taking and risk compensation behaviour, indicating that not wearing a helmet is part of the sensation seeking trait (Ruedl et. al, 2012). Another study found a gender difference between male and female ski and snowboard instructors, with men less likely to wear helmets than women (Masson et. al, 2019). This is particularly troubling as they set the example that novice skiers and snowboarders should follow.

Risk compensation has also been observed in sports (Hagel & Meeuwisse, 2004). When football introduced plastic shell helmets for players, players were taught to initiate tackling with their head, known as 'spearing.' Spearing was outlawed in 1976, citing a sharp increase in

severe neck and head injuries in practices and games, resulting in cases of paralysis and even death (Mueller, 1998). Even with sport participation increasing in the years that followed, severe and fatal injuries to the spine and neck drastically decreased, demonstrating ‘...accompanying rule changes can counteract any compensatory effect’ (Hagel & Meeuwisse, 2004, pg. 194).

Outside of football, behavioural changes due to equipment have been observed in rugby players with the introduction of the scrum cap made of fabric-covered, high-density foam padding. Players who never wore a scrum cap before reported feeling more protected, and 67% of players surveyed indicated that they were more likely to engage in physical contact and tackled harder when wearing it, suggesting that wearing the helmet brought about a risk compensation effect (Finch et. al, 2001). Another study rugby teams comprised of players under 15 years of age, showed that there were more cases of concussion in those wearing headgear compared to those who did not; however, the concussion rates were not significantly different, suggesting that the scrum cap in rugby is ineffective in preventing concussions at the junior level (McIntosh & McCrory, 2001). While there has been no direct evidence of scrum caps or shoulder pads increasing injury rates in rugby union in the 90’s, it has not stopped some authors from recommending to the International Rugby Board (IRB) the removal of certain equipment until further research can be done (Garraway et. al, 2000). One study found no significant difference in tackle force between players with headgear and those without, although the participants were tackling an instrumented tackle bag and not another player (McIntosh et. al, 2011)

There is some evidence to suggest compensatory behaviour with the addition of certain equipment in sport. However, comparing athlete experience between sports and their differences in equipment has yet to be explored. This study seeks to fill that void through a qualitative study of athlete experiences and perceptions of risk and injuries, consulting subjects who have actively participated in both football (with significant protective equipment) and rugby (without significant protective equipment). The study compares physical contact, perceived safety, and risk between the two high-contact sports and focuses on the different uses of mandated, protective equipment.

Chapter 3

Methodology

In this study participants described their different experiences when engaging in contact with or without equipment to protect them and how their perception of risk altered their on-field behaviour. Their described perceptions are based on real-life experiences while playing football and rugby rather than examined through an experiential design, which has been shown to have the potential to significantly alter athletes' behaviours and perceptions (Martens, 1979).

Use of a Qualitative Approach

Studies researching the risk compensation phenomenon in sports have largely taken a quantitative approach in their design. Some have looked purely through the lens of injury data (Phillips et. al, 2011; McIntosh, 2001), while others have made use of questionnaires and surveys that have later been broken down to facilitate quantitative analysis (Fyhri et. al, 2012 & 2018; Finch et. al, 2001). These are all valuable approaches to researching risk compensation, but few have taken the step to interview individuals about their specific experiences. That level of detail can only be achieved through a qualitative approach, where participants can share their stories and experiences, creating a rich data set from which themes and messages can be extracted (Creswell & Poth, 2016).

Qualitative approaches to research are a way of following-up on specific observations and supplement quantitative studies (Creswell & Poth, 2016). While the raw data from quantitative research can be used to extrapolate correlations and trends, qualitative data is rich in detail and allows participants to express the phenomenon in their own words and meaning. Qualitative studies have the advantage of being able to ‘tell us about the process that people experience, why they responded as they did, the context in which they responded, and their deeper thoughts and behaviours that governed their responses’ (Creswell & Poth, 2016, pg. 46).

This study took a qualitative approach to this phenomenon for two reasons. First, for the reasons stated above, it provides greater insight on risk compensation from the perspective of participants, who draw from their life experiences to give an understanding of something that is not easily measured. One’s perception of risk is not always an accurate read of the absolute, real risk involved, so getting some perspective from the individual is valuable. Second, there are few, if any, qualitative studies on the risk compensation phenomenon in sports. This study compliments quantitative studies that have been published on risk behaviour and demonstrate qualitative methods that could be used by other researchers to examine risk compensation in sport in the future.

Semi-Structured Interviews

Interviews are commonly a primary source of data collection in qualitative studies (Creswell & Poth, 2016; see table 4.2, pg. 105). Gathering information on a phenomenon by talking to people about their life experiences provides excellent detail that can be broken down into meaningful themes (Longhurst, 2003). This can be achieved to great effect if the

interviewer can successfully establish strong cohesion and rapport with the interviewee, creating an atmosphere that the participant feels comfortable in.

Structured interviews follow an exact line of standardised questioning where answers are used to generate quantitative data (Whiting, 2008). Unstructured interviews involve more free-flow discussions with the participants (Longhurst, 2003). Semi-structured interviews, on the other hand, are 'conversational and informal in tone' (pg. 105). A list of open-ended questions is formulated, allowing participants to answer in better detail than yes/no questions. It also allows the interviewer to ask follow-up questions based on responses provided by the interviewee, creating a verbal narrative and sharing of experiences through personal stories (Whiting, 2008). While the interviewer has control over the proceedings, the openness of the questions and ability to ask follow-up questions allows participants to feel as though they are truly being heard and respected for their opinions and experiences.

A semi-structured interview format was chosen for several reasons. First, the open-ended nature of the questions allows participants to share their experiences in their own words with rich detail, providing high-quality data that can be analyzed and separated into important themes. Second, the ability to follow up on certain responses allows the interviewer to develop a more thorough understanding of the perspective taken by the participant. This leads to more favourable data compared to that obtained in an unstructured interview, where the format is better suited for quantitative analysis that could be helpful in other fields such as health (Longhurst, 2003). Finally, it is more convenient to set up an interview with an individual rather than a focus group, where the schedules of the interviewer and multiple participants needs to be flexible and open enough to find a time and place that works for everyone. Setting up face-

to-face meetings can be a challenge under normal circumstances but was made even more difficult in 2020 due to the Covid-19 pandemic which disrupted many aspects of everyday life, although the use of online chat services has helped overcome such challenges (Whiting, 2008). All interviews in the current study were carried out over speaker phone, and all interviews were recorded to ensure accurate data collection.

During the interviews, certain elements were established to ensure participants felt comfortable sharing their experiences, leading to richer and more reliable data for analysis. Building rapport is done through various phases that help the interviewee feel a connection with the interviewer (Whiting, 2008). Building rapport allows the interviewer to explore the answers given by the interviewee in more detail, asking follow-up questions to help paint a clearer picture of the phenomenon. Asking open-ended questions helps to accomplish this, but having a participant feel sufficiently comfortable to share their full experiences without fear of judgement or of their responses being dismissed is important. Coupled with this, it is beneficial if the interviewer has experience in the subject material being discussed and the sports themselves as it creates an opportunity to use common language and promotes a rapport through shared experiences. In this case, the interviewer has experience playing, refereeing, watching, and analyzing all levels of rugby and gridiron football.

Before beginning the interview, interviewees were sent (via email) and read a script that outlined the goal of the study, defined terms used in the questions and around potential risks of harm, assurance of confidentiality and voluntary participation, assurance of anonymity, and protection of the audio and transcribed data. Once read, participants were asked to give verbal consent to participate, which was included in the audio recordings. The interview schedule

(Appendix B) starts by asking basic demographic questions of participants to establish age and playing experience. Base questions were formulated to allow participants to share their experiences with protective equipment and the impact it has on their perception of risk. The semi-structured nature of the schedule allowed participants to share their personal experiences and what they witnessed with teammates, opponents, and as fans of the sports (at local or professional levels of play). Other questions were formulated whereby participants discussed their general experiences of playing each sport, the injuries they endured, differences in playing cultures, and their opinions on how to make each sport safer. The interview concluded up by asking participants if they had anything more that they wished to share that they believed would be relevant to the study. The average length of each interview was approximately 45 minutes.

Participant Sample

Participants were recruited through a combination of criterion and convenience sampling. Individuals eligible for this study were to be 18 years of age or older and to have had at least one year of playing experience in both rugby and gridiron football. The minimum age requirement was included in the criterion to eliminate the need to acquire consent from a participant's parent or guardian. Participants were contacted through personal and publicly available contacts, such as rugby club websites, emails, and university coaches. The one year minimum of playing both rugby and football - at least at the high school level - was to ensure participants had sufficient game experience at a more mature level of play (compared to peewee or bantam ages where the game is mostly introduced) to speak to the different experiences of playing contact sports with and without protective equipment.

Eleven men over the age of 18 who met the participant criteria were interviewed for this study. All participants resided in Southern Ontario, Canada at the time of the interviews. The average age of participants was over 33 years ($SD = 12.99$). The average playing experience in rugby was 15.3 years ($SD = 9.7$) and 5.2 years in football ($SD = 2.9$). Every participant had played rugby beyond the high school level, which includes university leagues (such as the Ontario University Athletics (OUA)) and club rugby. Three participants played football beyond high school, all at the university level. Four participants have experience coaching both sports.

Bracketing Experience

Before analyzing the data from the interviews, it is important in phenomenological studies for the researcher to take a step back and bracket their personal experiences. Doing so allows researchers to approach the data set with less bias and with a perspective to allow novel ideas to come out naturally (Creswell & Poth, 2016; Moustakas, 1994).

It is important to be able to critically consider the literature reviewed, methodology used, and data acquired to identify and acknowledge biases that can affect the research process. The bracketing concept, also known as phenomenological reflection, allows researchers to share their experiences with the phenomenon being studied and to 'partially set them aside so that the researcher can focus on the experiences of the participants in the study' (Creswell & Poth, 2016, pg. 77). This bracketing is seen in scientific research, where a hypothesis is created and tested through experimental methods, but the results do not support the hypothesis. It is also seen in law, where evidence brought into trial may be inadmissible and the judge must convey that message to the jury, even if the evidence seems damning (Giorgi,

2009). This approach allows the researcher to develop a fresh perspective of the phenomenon and although it is rarely done perfectly, it helps to focus on and record the experiences of the participants rather than the interviews and responses being influenced by the views and experience of the interviewer (Moustakas, 1994). I bracketed my own experiences as follows:

The earliest and fondest memories I have are on the rugby pitch with my dad. He played rugby for most of his adult life, ranging from high school, university and club teams in England, as well as club rugby in Israel and Kenya before moving to Burlington, Vermont in the early 90's. Since my mother often worked evenings and sometimes weekends, my dad would often take my brother and I along to some of the rugby games.

As a result, I grew up with the game of rugby and loved everything I experienced. I would watch all my dad's games closely as a child, cheering him and his team on with my limited understanding of the game. As I got older, I would analyze games more closely and started watching higher levels of play, including the Rugby World Cup in 2003, my fondest memory being watching England win their first World Cup. I eventually started taking an interest in refereeing and acquired level one certification with my dad and some other members of the rugby team. Around the age of seven, I started volunteering as an assistant referee (or touch judge, as it was called back then) for my father's club games. While this may seem like a conflict of interest, it ultimately taught me the importance of remaining unbiased to protect the spirit of the game. There were times my dad's teammates would get upset with me when I made a call they disagreed with, but I never wavered from my position, even if it meant they teased me ruthlessly once the game was over and the beers started flowing (I stuck to water and pop, of course).

My first chance at playing rugby came when I was 12 years old when we moved to New Zealand, where we lived in a small town 20 minutes away from Christchurch, the biggest city in the South Island and home to some of the best rugby players in the world. I started playing for my local team at the beginning of 2006, and quickly learned just how physically demanding the sport is. It is one thing to watch it from the sidelines, but it is entirely different when you are in the thick of it. Even though I played with the backs, whose play is more based on speed and athleticism rather than power and tenacity of the forwards, I found myself overly cautious and admittedly scared to engage in tackling. After getting my first lick of physicality, I was reminded by the types of injuries my dad endured when he played. Broken noses, broken arm, dislocated elbow, torn muscles and ligaments; all the price of playing a contact sport like rugby. I did have a phase when I played in the forwards and found myself less scared of contact, purely because I was engaging in contact more often, allowing my body and mind to 'get used to it' over the course of the game.

I took time away from rugby for the next couple of years and shifted to basketball, where I had the privilege of not only playing for my senior team as a junior, but also for the Canterbury province at my age bracket. When I was 14, at one point I was playing for both my junior and senior teams at my high school and my rep team on the weekends, meaning I had little time for anything other than basketball and schoolwork.

We relocated to Southern Ontario, Canada in 2009. Before we moved, I decided to join a city club with my best friend at the time. At 15, this meant playing with and against players who were much bigger, faster, and more experienced than I was and meant that we played against all-boys schools whose rugby teams are scouted and train vigorously. This new level of play

caught me off guard. Although I started the season strong and made a good impression as a kicker and playmaker, I was still hesitant to engage in contact, which was noticeably frustrating for my coaches and teammates to watch. I was still reminded by the injuries my father and his teammates suffered and I, admittedly, feared suffering those same types of injuries.

After moving to Canada in 2009 and starting in Grade 10 of high school, I decided to try playing gridiron football. While it was not offered at the high school I attended, we partnered with another school and several of my schoolmates and I opted to play. Since I had missed training camp, which started before the school year began, I was at a slight disadvantage. I was slotted into the defence of the junior team and given the left-over equipment.

I had worn a scrum cap and, for a time, light shoulder padding when playing rugby, but in football I had never played with such heavy, bulky equipment in my life. I remember watching the NFL and College football while living in Vermont and recalled how violent and forceful the gameplay was compared to rugby. Both are certainly contact sports and require physicality, but they are drastically different. Rugby requires endurance over 80 minutes of play, while football is more stop-start and built around plays as opposed to the more fluent passing and kicking game of rugby. After putting on the shoulder pads, helmet, and leg padding, I started to understand, at least partially, why players seemed so willing to put their bodies on the line.

At first, I still had the same apprehension when it came to contact. But after a few practices that included tackling and blocking drills and scrimmages where tackling was allowed, I started to feel more confident. Even though I was getting pushed around and sent flying at

times, I found I was able to get back up, stand my ground, and make a meaningful hit on the next play. I started gaining more and more confidence in my play and had the safety equipment to thank for that. I continued to play football throughout my high school career, including one year of rep football in the summer after Grade 10, which gave me more experience and confidence when I went back to playing for the school.

Playing both rugby and football gave me the unique perspective of being able to compare my experiences with and without large, protective equipment. There are other factors in play that led to my different levels of confidence engaging in contact, including the coaching styles, amount of practice (more practices in football than rugby), different cultures, team chemistry/comradery, and age of maturity. But the presence of the shoulder pads and helmet always stood out to me. The equipment gave me the confidence to go into battle with my brothers on the football field. Even if I got knocked down, I would get up, adjust my facemask and helmet, shrug it off, and go to the next play.

As a result, I was able use my past experiences playing both rugby and football to formulate a research study on the altered perception of risk that protective equipment may cause in individuals in contact sports. By discussing and acknowledging my experiences, I was able to set aside my biases and focus solely on the stories and experiences that participants brought forward in their interviews. This allowed the data to be analyzed critically so that novel ideas and patterns could be created independently that give a wider and more comprehensive view of the risk compensation phenomenon in these two contact sports.

Analysis Technique

By recording the interviews I was able to focus on the flow of conversation taking place, rather than being distracted by the need to take notes and asking participants to repeat themselves (Longhurst, 2003). All recorded interviews were transcribed and checked to ensure that notes accurately captured everything that had been said in the interview.

Once the accuracy of transcriptions had been confirmed, a master document of all interviews was created, separating data by each question from the interview schedule. Certain words and phrases that stood out as interesting, important, or consistent in a theme were highlighted, while quotes that summarized a theme or sub-theme were also identified. This allowed common themes and significant statements to be found within a single interview, within a single question, and between each question. Interview data went through thematic coding, where risk literature was consulted to identify, words, and phrases of particular relevance (Bowen, 2006). Base code words such as risk, protection, behaviour, violence, and aggression were reduced to themes shared among the participants.

The master document was paired with a notebook that also separated all transcripts by question. This allowed intriguing thought processes to be combined with the digitized coding (Rapley, 2016). Notes were taken from the transcripts of each interview, separated by each question in the interview schedule. It was a condensed of the master document, where meaningful codes and themes were summarized and connected to other themes within and across questions in the interview schedule. Each question was completed with a summary of the themes and codes that were most prevalent. These notes were combined with the

highlighted codes and quotes from the master document, allowing ideas and meaningful messages to be identified and connected.

Ethical Considerations

This study received ethics clearance from the Brock University Research Ethics Board. Conducting this study through semi-structured interviews brings up ethical issues that need to be addressed. Participant confidentiality and anonymity is paramount to any qualitative study and must be assured (Longhurst, 2003). This is particularly important for studies like this one when violent acts may be described by participants when discussing their experiences. For example, when participants were asked to define violence in sport or talk about injuries they suffered, they may bring up personal examples of violence or intention to hurt another player. Therefore, prior to any interview, participants were read an approved script from the Brock University Research Ethics Board that outlined the purpose of the study (which gives transparency between the interviewer and interviewee), defined terms and potential risks of harm, and ensured the confidentiality, security, and anonymity of interviewees, along with the caveat that they could withdraw from the interview at any time before acquiring verbal consent. Participants will also, if interested, be given a summary of the results of this study (Longhurst, 2003).

Participant confidentiality must also be maintained when transcribing and publishing data. This was done by removing names from transcriptions and replacing them with pseudonyms (e.g. P1 for 'Participant 1'). All audio files and transcriptions are stored on the

researcher's laptop and are protected through password. Only the primary researcher has knowledge of the password, ensuring safe storage for all data files created in this study.

There is also inherent risk to participants when discussing their life experiences (Whiting, 2008). Participants may feel some strong emotions when answering certain questions, bringing on psychological discomfort. In the script read at the beginning of the interview, this issue was acknowledged and a phone number for a mental health support line that provides free services was included. Psychological discomfort from interviews can be an issue in the health field when the topic discussed is of a sensitive nature (Whiting, 2008). No participants withdrew from the study or expressed any feelings of unease through the research process.

Research Design Limitations

Qualitative studies are conducted to get a deeper understanding of a phenomenon through the lived experiences of participants (Queirós et. al, 2017). The objective is to produce a more in-depth analysis of the phenomenon that quantitative data alone cannot provide, including social dynamics, motivations, and values. Human behaviour is influenced by the environment, so taking a qualitative approach to understand how that behaviour may change is best done through qualitative studies (Atieno, 2009). Despite the strengths of qualitative studies, there are some limitations that are addressed here.

The presence of the interviewer – either in person or in voice only – can influence the responses of the interviewee (Schonfeld & Mazzola, 2013). Building a rapport between the interviewer and interviewee helps to create a more comfortable environment, but it is also

important for the interviewer to not ask leading questions, make assumptions, or put words in the mouth of the participant. The issue of reactivity is more of an issue in observational studies but it is important to recognize and be prepared for this in research that involves subject interviews.

While it is a strength for the researcher to have experience and knowledge of both rugby and gridiron football, it also posed a challenge with over-identifying with study participants (Schonfeld & Mazzola, 2013). There are jargon or slang terms that are commonly known within the games of rugby and football that may not be shared with the general population. For example, there are several gridiron football drills that have different names to them, such as the Oklahoma Drill (involves two defenders against a blocker and running back, restricted to a small lane on the field). If mentioned by the participant, it is important for the researcher to be able to explain these jargon terms in a way that a reader who may have no knowledge of the subject can comprehend. It can also lead to the interviewer putting words in the mouth of the interviewee in anticipation of what they may or may not say.

There is a level of ambiguity in human language that can make analysis more difficult in a qualitative study (Atieno, 2009). For example, people may have a different meaning to what they may consider the colour 'red' than others, even if it is a slight difference. It also becomes a problem when the phenomenon or concept being discussed is not well-defined in the general population or is difficult for subjects to effectively communicate (Affleck et. al, 2012). For example, the definition of sex is different across populations and cultures (Peterson & Muehlenhard, 2007). It is important in these cases that the phenomenon or concept is either clearly defined from the outset by the researchers, or participants ask for a definition at the

beginning of their interview. After initial questions to establish participant-associated demographics (Appendix B), participants were asked to define violence in contact sports. This was done to help understand how people view contact and aggression as different from acts of violence off the sports field.

Reactivity and overidentification can both bias collection of qualitative data (Schonfeld & Mazzola, 2013). There are ways to combat this bias, which includes training other interviewers, engaging in probability sampling, and basing the interview schedule on previous research. All three of these can help but could not be used in the current study. First, there are costs and game-knowledge challenges associated with hiring an extra interviewer. Second, convenience sampling is a more appropriate method of participant outreach than probability sampling because the study required participants to have sufficient playing experience of both rugby and gridiron football to be able to speak to the risk compensation phenomenon being researched. It would not make sense to select someone to participate in an interview about protective equipment in gridiron football if they had never played the game in their life. Finally, the interview schedule was based off previous work done by the supervisor of the primary researcher, Dr. Curtis Fogel. However, it was adapted to fit the needs of this study. Further, research on the risk compensation phenomenon that has taken a qualitative, interview-based approach to data generation is extremely limited.

An important limitation to remember is that a causal hypothesis cannot be drawn from raw, qualitative data (Schonfeld & Mazzola, 2013). While a criterion can be put in place to find participants who may share similar experiences to the phenomenon being studied, there are too many other factors that cannot be controlled in the qualitative design, compared to the

controlled settings of a lab in quantitative research. This can be counteracted somewhat by looking at some of these factors and distinguishing responses based on these factors. For instance, if participants vary greatly in age, you may be able to find a theme that distinguishes the differences in experience and attitude between older and younger participants.

Since the data are acquired in a qualitative manner and the sample population was already pre-selected according to their satisfying certain criteria, any results cannot be widely applied to the population at-large (Atieno, 2009; Queirós et. al, 2017). Any findings in a qualitative study are not tested to be statistically significant, instead opting to code transcripts and find major themes. This means that any findings from a qualitative study can only be applied to a specific population or group that share the same characteristics identified as pre-requisites to participation in this study. In this study, for example, we cannot apply the same themes and conclusions found from interviews with those who have only played gridiron football, since they may not have any experience playing a contact sport without protective equipment.

Perhaps the biggest limitation to qualitative research-based design is the amount of resources needed to conduct them (Queirós et. al, 2017). Time is the biggest resource needed, and was required to establish participant criteria, create an interview schedule, reach out to participants, interview them, transcribe the audio files verbatim, coding the data, and extract themes. Researchers need to be flexible in their time management, particularly when finding a time and place (if the interview is face-to-face) to conduct the interview. Finding willing participants can be difficult and time-consuming, not only to find those who fit a specific criterion but also to locate participants who are willing to share their experiences. This

generally means that qualitative studies must make a trade-off between the richness of the data collected and the number of participants in the study. While quantitative studies tend to aim for a larger number of participants in order to minimize variability in their statistics, qualitative studies must rely on the essence of the experience shared by participants in interviews and put high value on the transcripts and subsequent codes and themes.

Chapter 4

Results

This research study was designed to study the risk compensation phenomenon, specifically as it applies to protective equipment worn in gridiron football. The primary goal was to interview those who have played both rugby and gridiron football about their experiences playing both sports, particularly around perceptions of injury risk. A primary objective was to consider differences in the protective equipment worn in both and examine how it alters an individual's perception of risk and subsequent behaviour. It also looked at some of the other differences between the sports, including culture and pace of play. These results not only give a deeper understanding of the risk compensation phenomenon in sports, but also emphasize the importance of educating athletes, especially at younger ages, on the risks of playing contact sports and the importance of proper technique and practice to engage in contact as safely as possible.

After conducting and transcribing 11 interviews, major themes emerged that helped answer the research questions created for this study, each with their own meaningful subthemes that paint a picture of risk compensation and perceptions of risk. The previous chapter outlined the methods used to create a research design, conduct interviews, and collect and analyze the subsequent data. This chapter will detail the findings from the analysis and provide a deeper understanding of the risk compensation phenomenon and the underlying mechanisms that affect how risk is perceived in sports and the on-field behaviours that

influence the risk of injury to players. From the 11 verbatim transcripts, significant statements were extracted. After arranging those significant statements into clusters, seven major themes emerged including: 1) protective equipment provides a false sense of security, 2) protective equipment can be used as a tool or weapon, 3) contact differs between the two sports, 4) aggressiveness is valued differently within the different sport cultures, 5) different injuries accompanied each sport, 6) knowledge exchange between the sports can make them safer, and 7) effective coaching and communication is essential to safe play.

Theme 1: Protective equipment – A false sense of security

Participants used a variety of words to describe the feeling protective equipment gave them and others wearing similar gear. Words used included 'safe,' 'confidence,' 'invincible,' 'invulnerable,' and 'gladiator.' While confidence is an important element for contact sports, overconfidence can lead to riskier behaviour that offsets the protection equipment provides. There is a direct risk compensation effect with protective equipment, where players – under the perception of decreased risk – will engage in riskier behaviour for a perceived higher reward. As Participant 2 stated, "I think having the increase in protective equipment, [the players] are more likely to sacrifice safety for some contact speed and physical level."

Participant 2 is describing the risk compensation phenomenon in gridiron football. The protective equipment players wear gives them a decreased sense of risk to their body. As a result, players will feel protected from contact around them and are more willing to engage in contact in a faster and more aggressive way. This change in behaviour to accept more risk onto themselves will, at least partially, offset the protection offered by the equipment. A similar

sentiment is shared by Participant 3 who stated, “The safety equipment allows you to be more physical. It does in a way protect you, but it also allows you to get hit a lot harder.” Tying more physical play to the wearing of protective equipment is mentioned again by a different participant. This does not just apply to one player, or one side of the ball (offence or defence), but to everyone on the field. Even if an individual feels more protected, they may overestimate how much work the equipment is doing to prevent injury.

The helmet protects the player from superficial injuries to the face and head, but wearing the helmet allows defenders to use their helmet to engage in contact. While helmet to helmet contact was banned in the NFL and other major leagues, defenders are taught to put their helmet across the body of the ball carrier, rather than to the side like rugby, since their helmet will absorb some of the force.

Participants also noted that there are differences in equipment within the game of football. While larger leagues like the NFL, NCAA, and some well-funded high school programs have mandated equipment that’s accessible to all players, most programs will have different makes of each piece of equipment. This means that some players, usually seniors, will get the best equipment first before the older, perhaps outdated equipment is given to players with less seniority. This is particularly troublesome when those players go against each other in scrimmages or games, where the player with older, less effective equipment may have the same perception of risk as another player with updated equipment. Participant 8 talks about a head injury he suffered in a football drill in high school: “He had a nice bright helmet...I had this old helmet...he put his hat right on my hat, and he cracked my helmet in two and knocked me out.”

While the quality of the two helmets were very different, it demonstrates the consequences of a player overestimating the protection offered by their worn equipment. In this case, the difference in quality was large enough that Participant 8's helmet was damaged beyond repair and did not prevent him from being knocked unconscious. If a player is hit in an area that is unprotected or are not physically or mentally prepared for a big hit, the equipment will do nothing to help protect them from possible injury.

While there is some light padding in rugby for the head (scrum cap) and torso, it is nowhere near the level of protection afforded by football gear. This may seem to create extreme risk of injury to those who have little to no experience playing or watching rugby, but for those who have played, the lack of equipment can mean more awareness of their body and its limits and the need to execute good technique, as identified by Participant 5:

“...relating it to rugby, it's a lot more common for guys to think about where their head is going, where their arms are because they don't have that protective equipment, and we are just throwing our bodies into another body with nothing in between.”

Football players can think more about making a high impact hit rather than a technical one due in part to the equipment worn. Because the head and body of rugby players are less protected than football, proper tackling technique is emphasized more strongly in rugby. This is not only to allow effective tackles to be made to bring the ball carrier to ground, but more importantly to minimize injury risk to both the defender and the ball carrier. This is coupled with tackling laws in rugby that penalize unsafe contact such as high tackling, shoulder charges, and dump tackling. The lack of protective equipment can make players more aware of their body and the

limits they are willing to go. This is explained by Participant 4 who stated: “You can’t hit anybody too hard because you only hit them as hard as you’re willing to do it because whatever they feel, you feel. So, the tackle becomes more of a technique than a punishing play.”

Since the player’s body is more exposed to direct contact in rugby and is not protected by equipment as in football, players need to rely on form and technique to make an effective tackle and to not harm themselves in the process, rather than seeking to make a huge hit. That is not to say that big hits do not occur in rugby, but technique is prioritized over impact. It can be a shock for players coming from football to playing rugby with no equipment. Participant 6 recollects his first game playing rugby: “My first rugby game, I separated my shoulder. The first one ever. Obviously, I didn’t have shoulder pads on. My first hit, I hit somebody the way I hit them in football, and I separated my shoulder.”

Participant 6 relied on his experience playing football attempted to apply that in his first rugby game. The injury instantly highlighted the differences between rugby and football in their approach to contact. This outlines the importance of proper coaching of players going from rugby to football and vice versa, particularly in youth athletes who have little to no playing experience and are therefore more vulnerable to injury than older, more experienced players (Kontos, 2004). Participant 7 had a teammate who did not change his technique going from football to rugby: “I remember this one guy specifically; he always tackled the way he did in football in rugby. He had some injuries, but he was crazy, he was always pretty hard and would fight through it.”

Putting yourself at greater risk of injury in order to make a big play is a trade-off that was once more acceptable and seen as 'heroic' or 'manly,' but with the rising concerns surrounding the long-term implications of injuries, particularly concussions and CTE, this mindset is seen as more reckless and undesirable than in the past. Who knows what this particular individual may face later on in life as a result of the injuries they suffered during their playing days.

The equipment may also unintentionally hurt players in the middle of a play. Participants 2 and 9 both share their common experience of breaking their fingers because of protective equipment in football: "I just got my hand in the chest area of the shoulder pad and then had just run a push to make a block on someone. My finger just got stuck in the wrong way" (Participant 2,) and "...these small injuries in football, were mostly in my hands and either getting my hands caught between two helmets or between the pads and jamming fingers up. I broke a finger while doing that and scrapes just from the actual protective equipment and sharp edges and whatnot and the helmet masks [facemasks]" (Participant 9).

Hand contact in football is important for both offence and defence when it comes to blocking. When the hands are in the chest area of the shoulder pads, one slight move can put the player's hands out of position and at risk of breaking or tearing. The hands are also vulnerable when stuck between two pieces of equipment such as the helmet or shoulder pads. Unprotected parts of the body are in even greater danger in gridiron football because they may be exposed to high level contact from the protective equipment. It is an even bigger problem if the player who engages in contact uses the equipment deliberately to make a high impact hit.

Theme 2: Equipment as a tool

While football equipment protects the wearer, it does not necessarily protect others on the playing field. This not only applies to the opponent, but teammates as well. Participant 7 discusses his experience with protective equipment in football: “It was definitely encouraged to use your equipment to your benefit, use your helmet to make tackles and use your shoulder pads to gain leverage... this is a tool to use. I played football for five or six years and I never once heard anyone talk about it in terms of safety.” Participant 7 is going beyond using equipment as a tool. Here, he is discussing how coaches teach their players to use the equipment to gain a competitive advantage. Gaining leverage in football is an important element for both sides of the ball and getting an advantage wherever you can certainly help, even if it means putting others at greater risk of injury.

Participant 11 expressed a similar sentiment: “It gives you the mentality that when you have a helmet on, and when you have your shoulder pads on, you can literally use your head as a weapon.” This comes from an individual’s perspective of how they felt when wearing protective equipment in football. Feeling that sense of security also gives rise to using that equipment to your advantage when engaging in contact with the opponent. This was seen when plastic helmets were introduced in the 1960’s in the NFL and coaches started teaching players to spear tackle by using their helmet as the first point of engagement in tackling (Mueller, 1998; from Hagel & Meeuwisse, 2004).

If a player hits their opponent with their padding on an unprotected area of the body, the resulting damage can be staggering, especially if the player about to be hit is not expecting contact. Participant 3 shares his experience being the aggressor in one such event:

“...this kid got the ball passed to him and he didn’t see me...Just as he hit the ground, I came in the side and I remember hitting him with my shoulder pad and I felt his rib cave in. I still think it’s the grossest thing I’ve ever felt. I felt his body contort.”

Participant 3 in this case was the one who caused the injury. The player he tackled was focusing so much on the ball, as is taught across all sports, that he lost sight of his surroundings.

Participant 3 engaged in the tackle and it so happened that his shoulder pads contacted the unprotected rib cage of the offensive player. When you combine these two elements together, the result is a gruesome injury that is acceptable within the confines and rules of the game.

The question, then, is why shoulder pads and plastic shelled helmets were introduced in the first place? The evolution of the game of gridiron football – with the different pace of play and higher impact hits - led to the introduction of equipment to reduce injury risk in players. These changes were made with the intention of safeguarding players from injury and from the outside looking in seems like a positive change. However, it does not consider how human behaviour changes when factors change in their environment, as Participant 4 describes:

“What started out as probably great intentions, I think, had some un-projected consequences that whenever you have equipment, you seem to use that to target the non-protected parts of a player in various sports, whether it be hockey, football or lacrosse.”

Introducing protective equipment to contact sports where contact is central to the objective of the game, player safety should be increased by mandating equipment that helps absorb the force from such hits. Unfortunately, only some parts of the body can be protected to not restrict body movement too much. Flexibility is an important factor to injury risk, with less flexibility meaning a player is more prone to getting hurt (Bahr & Holme, 2003). This means that some parts of the body are more vulnerable than others, making any contact to those areas more harmful than flesh-on-flesh contact that you see in rugby. This is made worse if a player engages in riskier behaviour because of the equipment and deliberately goes for big hits or 'kill shots' to unprotected areas of the opponent's body.

When play gets out of hand, players may decide to take matters in their own hands and commit acts considered to be 'ultra-violence', including use of the helmet as a wieldable weapon (Fogel, 2017). One recent example in the NFL occurred in the 2019 season, when Cleveland Browns defensive end Miles Garrett ripped the helmet off Pittsburgh Steelers quarterback Mason Rudolph and struck him over the head with it. This act and the subsequent brawl lead to heavy suspensions and fines for the players involved, including a season long suspension for Garrett. This can happen at lower levels of play and can result in serious injury. Participant 10 describes one such example, where the foul play of an opponent lead to a suffered concussion:

"An opposing player intentionally injured one of our players and wasn't called for it... I made contact with him and he was on the ground crying about it hurting...He got up, tough guy got up and next play he grabbed my helmet and shook my helmet back and forth. He knew what he was doing and shook it back and forth causing a concussion."

This is a grassroots example of how equipment can be dangerous when the spirit of the game is broken. In this case, from the perspective of Participant 10, an opposing player was going out of his way to injure players. When he was on the receiving end of a hit, rather than move on to the next play he decided to take the matter into his own hands. This instance fell short of an on-field fight, but the reckless behaviour from the opposing player resulted in serious injury to Participant 10 and his teammate. Rules in the game to prevent such behaviour can only go so far as how they are interpreted and applied on the field of play by the referees and how much the players respect the rules and referees in the first place.

These two examples are clearly outside of the rules and spirit of the game but do emphasize the notion that the equipment worn can be used as a tool or weapon against an opponent. There are even times where teammates can put each other at risk, attempting to go for an impact hit on the ball carrier with their equipment. Participant 10, for example, suffered an injury from a teammate's reckless play:

“...you can't leave your feet while making a tackle. I had my elbow dislocated in football by my own teammate as he jumped to make a tackle, and his helmet went through my elbow and dislocated my elbow... I still get tendonitis anytime I lift because of that injury.”

This time, the reckless behaviour came from a teammate trying to make a big play. While their intention was to hit the opponent, Participant 10 was in the wrong place at the wrong time and received the brunt of the contact. Not only did this knock them out of the game, it also meant losing out on games played that season and a lasting injury that still affects his livelihood today.

This sort of play is common in football because yardage gain is the driving force behind play. Every player on defence must use contact to stop the ball carrier from gaining any ground. Although helmet to helmet hits are banned from play, participants talked about instances where the helmet was used to help engage in tackling and blocking, including putting the head across the body (the same direction the ball carrier was going) to stop them from gaining yardage as quickly as possible.

Protective equipment in football is top heavy, with the helmet and shoulder pads providing the most padding for players. Contrast that to the lower body, where some padding is present around the hips, thighs, and knees, but not to the extent shoulder pads apply. This may at least partially explain why lower body injuries are more prevalent in football than any other (Costas, 2014).

Theme 3: Different games, different contact

Many participants noted differences across football and rugby that alter the way contact is initiated. Contact in rugby always follows the ball, which is seen in tackling the ball carrier and physical competition in different stages of the game such as the ruck (breakdown area of a tackle), scrum, maul, and lineout. The contact in football can take place away from the ball, which is seen in the contests around blocking and defensive backs covering offensive receivers. The way the game of football is played, the introduction of protective equipment may have evolved as a necessity, as Participant 8 explains: “I think in football...the need for that equipment became a requirement...given the fact that contact was occurring on and off the ball for very specific reasons.”

Tackling occurs in both rugby and football, but there are other points of contact in football that is not present in rugby. Blocking is one of the core elements in football, where the offence attempts to stop the defence from reaching the ball carrier. The physicality on the line of scrimmage can be equated to sumo wrestling, where players use their hands and bodies in attempt to best their opponent. The introduction of equipment was done to protect players from this kind of physicality, but the subsequent changes in behaviour to accept more risk will offset some of the protection offered.

The pace of play also impacts the level and frequency of contact. In football, since there are breaks in between downs so teams can call plays and strategize, players are able to briefly rest or even be substituted out for another player. This allows players to go at full speed on every down, resulting in larger collisions overall. Rugby has a continuous pace of play which alters the level of impact in each tackle, which was outlined by Participant 7: "...in rugby, you start off at 100% and you're downhill from there...by the end of the game, the intensity level is not the same. You just can't sustain that level of intensity for 80 minutes."

In rugby, the flow of the game requires players to pace themselves, only using 100% exertion of energy when it matters such as an open field sprint or a goal line offence or defence. It is not like football where players can be substituted after every play. In rugby, strategic substitutions usually occur in the second half to replace tired players or bring in a different pace or style of play. Although rugby is a more fluent game and play is continuous until an infraction occurs, the ball goes out of bounds or one team scores, players do not engage in every phase of play at full speed. This contrasts starkly with the stop-start nature of gridiron football.

With notable differences in the nature of the game in football and rugby, tackling techniques are not only taught differently in rugby versus football, but are also more important for player safety. Many participants described the many steps that go into a rugby tackle: “wrapping the arms around the ball carrier,” “taking them to the ground with you,” “not leaving your feet, contact below the armpit,” and “head placement to the opposite side of where the ball carrier is going.” In football, the result of the play matters more, and players will put themselves at risk to either stop or gain yardage, as outlined by Participant 1:

“...the mechanics of the tackle are a lot different than what I was taught in football, where again you’re trying to stop for that extra yard gain or you’re trying to maybe reach out and put yourself into a more vulnerable position for that extra yard in football.”

This fight for inches means players are going to be constantly on their front foot when engaging in contact to drive back their opponent or take them out of the play. There are prominent examples of players getting punished for doing so, such as diving for the end zone but leaving the ball exposed for the defence to swat away. But there are also instances where the ball carrier is doing everything they can to get that extra yard, only to expose themselves to a big hit and a greater chance for the defence to turnover possession to their team.

Theme 4: Sport cultures value aggression differently

Contact sports carry a different appeal for spectators because of the level of physicality involved. Men who watch football, for example, are drawn to the physical dominance a player can put on their opponent (Hartmann, 2003). That dominance manifests itself differently

between rugby and football and is due to a variety of factors which have been discussed in other themes. Participant 8 describes the experience of physically dominating the opponent: “It is such a physically exhilarating feeling to have executed contact in that fashion where you just own somebody. It’s all within the rules of the game.”

The draw to play contact sports is due in part to the desire to see ‘your’ team dominate opponents and to experience vicariously by watching the competition (Hartmann, 2003). This is a reflection of how children use sports as a means of self-expression and in defining themselves, where boys tend to engage in rougher games with other boys compared to girls. As children get older and start playing in organized leagues, their skills are refined and their desire to win comes from their desire to dominate their opponent. There are certainly cases of retired NFL players who relished the physical dominance in football. Bill Romanowski, for example, was a player who was known for his physicality and aggressiveness, some of which was considered dirty play and against the spirit of the game. For example, in his autobiography he writes,

“When I was at the bottom of the pile I reached to rip the ball out of the hands of Giants’ running back Dave Meggett, all I could get a good grip on was his finger. So I just grabbed it and *crrraaaccckkk*. Broke it like a chicken bone. I could hear him scream in agony. Oblivious, I got up and headed back to our huddle as if nothing happened. My thinking was, Dave Meggett’s finger is broken....*Good. Better for our team. Helps our chances of winning – which we did, 44-3*” (Romanowski, 2005, p. 110, italics original).

In popular leagues such as the NCAA and the NFL, players can stand out from their peers for their exceptional level of skill, including big hits. Legendary players such as Dick Butkus,

Lawrence Taylor, and Ray Lewis are all known for their physical dominance on the defensive end of the field. Being known as a high impact, physically imposing player not only provides value to their team, but also serves as a status symbol. Participant 3 discussed a system their coaches implemented to recognize players for their skills and accomplishments on the field, including big hits:

“...the film sessions that we had, when you had a big hit, then you get a skull on your helmet. There was a sense of pride... Your helmet by the end of the season would be filled with stars for big plays or skulls for big hits and stuff.”

Similar reward systems are typically seen outside of sports. Cub Scouts, for example, receive merit badges for completing certain tasks; acts of bravery and courage by soldiers are recognized through the award of medals which signify the degree of valour displayed. It can also be seen in a hierarchal system, where players who have more of these stickers or badges are more highly regarded by their peers and opponents, perhaps like war paint or armour before battle.

Such reward systems in football may be considered as remnants of old-school coaching, where hard hits have historically been celebrated and encouraged. Some participants shared instances where the coaching mentality was to go ‘hit someone so they don’t get up.’ While physical dominance in contact sports is appealing to both players and spectators, deliberately hurting other players or getting away with dirty plays (“If you’re not cheating, you’re not trying hard enough” – Participant 7), is not only bad optics for an already physical game but puts players on either team at greater risk of physical injury.

Limiting physicality and aggression to the field of play, and not continuing after the game is an important element in all sports but is particularly relevant in contact sports like rugby. Participant 8 describes what happened after some of his rugby games:

“You’re at the clubhouse. I’d go and take a jug of beer and I move over to my opposite number who, 45 minutes ago, we were trying to punch each other’s lights out and we’re sharing a beer and having a laugh... There wasn’t that inter-team camaraderie in football...once the game was done, you’d shake hands at half and that’s it.”

The social aspect of the game is important in rugby, particularly at the club and recreational level. Even across sports, getting involved in sports for men as much to do with connecting to other boys and men as the athleticism and exercise the game offers (Hartmann, 2003; Madrigal et. al, 2015). In male dominated sports like football, it allows men to “think about and develop their masculinity, to make themselves men, or at least one specific kind of man” (Hartmann, 2003, p. 14). Participant 8 makes a distinction in post-game socializing between rugby and football, where the latter seems to have more focus within the team rather than interacting in a positive manner with the other team like rugby does. This may be partially due to the different mindset each sport has going into the game, as Participant 7 discusses: “When you play football, you’re like “I’m going to kill this person.” In rugby, I find there is much more mutual respect of the opponent.”

The mentality of physically dominating your opponent is shared between both sports within the game, but the mindset going into the game may explain how players interact post-game. While both sports are team games, the mutual respect shared among players in rugby

continues once the game is over and both teams socialize, compared to football where teams just shake hands and go their separate ways.

There are a few reasons why this is the case. Lack of equipment in rugby makes players more aware of their vulnerability and approach to contact in a way that does not put themselves or the other player at greater risk. The different pace of play also prevents players from putting everything into each tackle to preserve energy to last the full 80 minutes of the game.

Theme 5: Superficial vs. Major Injury

All 11 participants stated that football held a greater risk to injury for players than rugby. While both sports carry a high risk of injury compared to non-contact sports (Hootman et. al, 2007), participants talked about the different types of injuries that occur between the two sports, based on their experiences. Participant 9 talks about the types of injuries in rugby:

“The injuries or scrapes I would have, the small injuries I had from there would be scrapes on my back or on my leg from rugby cleats and those were superficial sort of things. You only notice them when you’re taking a shower afterwards.”

Superficial injuries – scratches, contusions, and other bumps and bruises – are more likely to occur in rugby, where there are more contact incidents at lower impact and velocity. While those injuries are more numerous in rugby, participants often said that football carries a greater risk for major injury. Describing this Participant 6 said:

“If you’re talking about the number of injuries, it might be rugby...because of black eyes and broken noses. To me, those aren’t major injuries. Major injuries, I would say are [more likely] in football because of the high impact contact.”

A similar sentiment was shared by Participant 5:

“I feel like football has an extreme, where you often see guys with torn knees and ankle injuries, head injuries... there’s a lot more chance of season-ending injuries, or career-ending injuries, just because of the way that their tackle is set up.”

Both quotes differentiate injury types between rugby and football. In rugby, there is a higher number of contact incidents because of the continuous nature of play, but that also means that there are fewer high-impact hits compared to football. This means that any small, superficial injuries are characterized as ‘being hurt’ and can be managed. In football, the number of contact incidents are lower because of the stop-start pace of play, but that pace combined with the importance of gaining or denying yards leads to higher impact hits. Players in both sports need to always be prepared to absorb or engage in contact, but the consequences are direr in football where the impact of the average hit is much greater than rugby.

Theme 6: Using rugby to make football safer

As mentioned in theme 3, the tackling technique in rugby emphasizes player safety, both for the defender and the ball carrier. While the games are significantly different, participants reported that introducing rugby techniques into football can help players safely engage in contact without losing physical dominance and assertion. Participants 8 and 9 brought up Pete Carroll, the current head coach of the Seattle Seahawks, who brought in rugby

players to teach rugby tackling style to his football players in a way that allows them to be effective and assert dominance without putting themselves at a greater risk of injury. It can also help players at the grassroots levels when going from football to rugby, like Participant 7 did:

“I never transitioned back to football-style tackling because I didn’t find it as effective, but I also didn’t find it as safe and my primary sport was rugby at the time.”

Even though football highly prioritizes yards being gained or prevented, Participant 7 decided that the techniques he learned in football were not as effective or safe as the techniques learned while playing rugby. It certainly helps that he chose rugby to be his number one sport at the time and it would be interesting if others Participants share similar sentiments in high school with football as their primary sport rather than rugby.

Many of the ideas shared by participants to make football a safer sport revolved around rule changes, some of which are adapted from rugby (e.g. arm wrapping). Implementing rules to dissuade players from making large hits could help increase player safety. Equipment was also discussed, with Participant 8 comparing the equipment worn during his playing time to today: “When I played, shoulder pads were huge... you look at shoulder pads now, shoulder pads are getting to be the size of hockey shoulder pads.” Former Canadian Football League (CFL) player Matt Dunigan (2007) made a similar statement about football:

“We are talking here about a game constantly being altered by the laws of physics: bigger, stronger, swifter, more muscular people wearing lighter, stronger equipment that allows them to move faster and hit harder and thus collide with greater force and impact than ever” (p.21).

Lessening the protective equipment in football, more akin to torso padding in rugby, may cause players to be more aware of their body and engage in contact with more caution, but would also change the game significantly and could turn a large portion of fans away from watching, which Participant 11 explains:

“...it [football] has such a long history and being America’s favourite sport and the most profitable when it’s in season... doing something like taking away pads would completely change the game. The NFL would be making less money, people would not be perceiving it as the same. I just don’t think that would ever happen.”

This is the biggest obstacle to creating any meaningful rule changes in football, whether it is changes to how contact is legally done or altering the size or amount of equipment worn.

Football is a violent spectator sport where fans come out to watch elite players hit each other as fast and as hard as they possibly can. Introducing rules to improve safety may be in the best interest of the players from a health perspective, but not necessarily from a fan, and ultimately financial, one.

The transition period when introducing a new rule is also a concern. When helmet-to-helmet contact was banned in the NFL in 2018 by ‘prohibiting players from lowering their helmets to initiate contact with an opponent,’ players struggled to translate this rule change on the field (Seifert, 2019). Referees also struggled to enforce the new rules and were inconsistent in applying the rules. While the number of helmet-to-helmet contact incidents decreased by 20% from 2017 to 2018, they were still occurring, and concussions were still happening at a high rate. Large leagues like the NFL and NCAA would have to take each rule change, such as

wrapping the arms in a tackle, and weigh the upside of improved player safety with the downside of potentially losing fans and revenue.

Theme 7: Communication improves safety

When discussing rule changes to football to increase player safety, Participant 6 outlined the reality of the sport:

“Football is just not a safe sport. I think people need to understand that first and foremost... It’s not badminton, it’s not golf. There’s 12 guys on the field trying to hit you...you need to be aware that it’s a contact sport and it’s a high impact contact sport.”

Contact sports inherently carry more injury risk than non-contact sports. The difference between rugby and football comes at the impact point of contact, where rugby puts priority on proper technique through coaching and rules, while football prioritizes the ends rather than the means. Being able to teach athletes, especially youth athletes who have less playing experience, about the dangers of sports and educating them on how to engage contact safely will go a long way to creating a safer environment for all players.

With youth participation in football decreasing (Feudtner & Miles, 2018), football programs at the high school level need to create a space where parents and players can be educated on the dangers of the sport and learn how to protect themselves. The altered perception of risk from protective equipment, for instance, can be combatted through good coaching and education, and was a motivator for Participant 6 to coach: “That’s why I volunteered [to coach], I think it’s very important for kids to understand that equipment does not free them from the chance of injury especially head injuries.” (pg. 57)

If young athletes can understand the intended protection their equipment provides and the limits of the protection, rather than relying on their perception, it could help combat some of the severe injuries observed from reckless play. Some people, like Participant 6, take it upon themselves to give back to the community by volunteering to coach kids not just because they enjoy the game and teaching, but to also help ensure the kids are learning the game properly. While some participants mentioned crude examples of old-school mentalities in coaching, proper training will allow coaches to educate their players to engage in contact with more awareness and in a safer manner.

Because of its popularity in North America, parents are more exposed to the game of football compared to rugby. While some parents take pause with the severity of injuries in football, others see rugby - a game they likely have less experience with – and the lack of equipment as far more dangerous and barbaric. Participant 11 talks about immigrant families and parents enrolling their children in sports:

“...a lot of parents that come in are immigrants, so they’re not fans of violence in sports from my personal experience. On top of having no clue of what rugby is, they’re more likely to put their kids into football at first because they perceive that it’s safer because they’re wearing equipment...I feel that’s a lot of parent’s perceptions are uneducated about rugby.” (pg. 119)

It is understandable that parents who have no experience watching or playing rugby would think it is a more dangerous than other contact sports like football and ice hockey where protective equipment is mandated. Like seatbelts and sunscreen, the equipment worn in these

sports are meant to mitigate harm by helping to absorb the force from hits. Compare this to rugby, where little to no equipment is worn by the players, it makes sense that parents would be hesitant to have their child play rugby. Educating parents on the dangers of these sports, the risks of injuries, and ways to improve safety for the players is just as important as teaching these children how to play the game.

Chapter 5

Discussion

The primary purpose of this study was to understand how an individual's perception of risk is altered while wearing protective equipment in gridiron football. This was achieved by conducting interviews with participants who have experience playing both rugby and gridiron football, where both are contact sports but differ significantly in the amount of mandated protective equipment worn by athletes.

Three research questions were created to focus this study on risk compensation in contact sports and to get a detailed understanding from individuals who have lived experiences of this phenomenon. The three questions were as follows:

1. How do athletes perceive the risk of injury in gridiron football and rugby?
2. How and why are perceptions different across the two high-contact sports?
3. Can protective equipment lead to riskier behaviour, in turn offsetting the protection it provides?

This chapter will use the results from this study to answer these three questions. It will also look at some of the unexpected findings and their significance to the literature and to those directly affected (i.e. society). The discussion will conclude by examining how these findings build upon existing literature and how this study contributes new information to the field.

Different Perceptions of Risk Between Football and Rugby

Injury risk is an inherent feature of both rugby and football due to the contact and physicality involved in each sport, and each interviewed athlete recognized the common occurrence of injuries in both sports. Even though they share similarities in origin and play, the perceptions of injury risk across the two sports are different due to the pace of play, cultures, and protective equipment worn.

In rugby, play is more continuous, meaning players must always be alert and cannot afford to have a mental lapse of judgement. Players also do not wear a lot of protective equipment, which means that contact is blunt forced and superficial injuries like bruises and cuts are more common than serious injuries involving tears and broken bones.

On the other hand, there is a higher risk of sustaining a serious injury in football which is characterized by high impact contact. This occurs for three main reasons. First, the stop-start flow of the game allows players to catch their breath between each play, meaning they can engage in the next play at near 100% speed. The pace of play in football is more like a sprint than a marathon like it is in rugby. Second, the emphasis on yardage gain is much greater in football than in rugby, meaning players will be fighting harder to gain extra yards on offence or trying to prevent it on defence. If an offensive player is reaching out for that final yard, they put themselves in a vulnerable position that exposes the ball to be turned over and unable to brace their body for a big hit. Last, protective equipment impacts the way football players engage in contact. It can be utilized by players to gain an advantage over their opponent, including using

shoulder pads to initiate contact or grabbing the pads to gain leverage, and to generate a high impact hit on an opponent.

Is there a Risk Compensation Effect with Protective Equipment in football?

A major difference between rugby and football lies the type and amount of protective equipment worn. In football, the players are required to wear league-regulated shoulder pads, helmets, and hip padding with the option of other equipment such as mouthguards and knee pads. Rugby, on the other hand, only mandates the use of a mouthguard and cleats that are not sharp, with the option for players to wear other gear such as light shoulder and torso padding and scrumcaps. The main purpose of this study was to determine whether there is a risk compensation effect in football, where the wearing of protective equipment decreases an individual's perception of risk, which results in that individual engaging in riskier behaviour. While a causal statement cannot be made in a qualitative study, interviews with participants who played both rugby and football allowed them to share their experiences with different of protective equipment across both sports and to provide commentary on how it altered their perception of risk and subsequent behaviour on the field of play.

Based on the interviews, there seems to be a risk compensation when players are wearing protective equipment in football. Feeling safe from injury – words used like 'gladiator' were mentioned several times in interviews – players will engage in riskier behaviour in order to obtain a higher perceived reward, such as landing a big hit on an opposing player or turning the ball over. A player may also use the equipment as a tool to gain leverage on their opponent. Finally, the decrease in risk perception that one player experiences is transferred to other

players on the field, as they are subject to the consequences of reckless play. This decreased perception does not apply equally to all players, since risk calculation and perception are different across individuals, which is why it would not cancel the effect out entirely.

Unexpected Findings

Most of the findings in this study are in line with existing research on risk compensation. However, there were some unexpected findings. When discussing how to make rugby a safer sport, some participants suggested that mandating protective equipment at junior levels would be a good idea. Even though there are studies that suggest the presence of light equipment has a negligible effect in lowering concussion risk (Finch et. al, 2001; McIntosh & McCrory, 2001), some participants believed it would help lower the consequences of inexperienced play. Introducing and mandating certain equipment such as torso padding, and scrumcaps could help alleviate some of the safety concerns parents may have. While the extra padding could lead to risk compensation as has been seen in football through this study, the positive impact of having more youth participation as a result of perceived enhanced safety, combined with appropriate coaching on technique and form, could mitigate unintended negative effects.

Another interesting finding that emerged was related to how violence in sport is interpreted by the participants. Actions that go on between players on the field would probably be considered assault if the game was not refereed. However, this type of contact was not identified as violence by participants. Rather, participants described violence in contact sport as actions that are against the rules or outside 'the spirit' of the game. Actions such as throwing a

punch, committing a dangerous tackle deliberately, or anything that puts other players in danger seemingly fit under this definition. As Participant 2 put it:

“I think violence is anything that goes beyond the contact that’s within the parameters of the game. Illegal hits I would define as violence. Anything beyond the scope of regular contact in contact sports, I would consider that to be violent.”

The interesting context is the fact that the line between violence and aggression is determined by the rules of the game. In that case, actions such as spear tackling would not be considered violent in the 1960’s or 70’s, where it was a common technique taught to players at the time. Helmet to helmet contact is considered violent now, but not before the rules were changed, according to this definition. Some purists may consider both rule changes being contrary to the ‘spirit’ of the game but helmet collisions in football are now met with shock from spectators and discipline from referees and league officials. This is an important distinction for league officials who consider rule changes to improve player safety, who may be concerned about subsequent effects on spectator popularity.

Contribution to Existing Literature

How has this study built on previous literature and how do the results contribute new information to the field? The qualitative design of this study is its most unique feature when compared to related studies in the field. Some studies have measured impact force directly and compared groups with or without protective equipment to see if there was a significant difference between the two groups (McIntosh et. al, 2011). Studies on rugby scrum caps separated groups based on whether they wore headgear or not and used injury and concussion

data to determine the effectiveness of headgear in preventing injuries in junior players or affected self-reported levels of confidence (McIntosh & McCrory, 2001; Finch et. al, 2001 for self-reporting). Some studies demonstrated a risk compensation effect in a controlled lab setting with cyclist with or without helmets, while other studies with cyclists, skiers, and snowboarders relied on self-reported questionnaires to find risk compensation behaviour (Fyhri et. al, 2012 & 2018; Phillips et. al, 2011; Willick et. al, 2019). In contrast, the current study relies purely on qualitative data and was set up to understand the life experiences of participants through semi-structured interviews. The level of detail obtained in interviews provides more depth of understanding compared to quantitative studies. Hopefully, more qualitative studies can be done to understand how people process risk and justify their risk-taking behaviour, particularly when deciding to not wear helmets when biking, skiing, or snowboarding. This sort of qualitative data compliments the body of quantitative data and allows the risk compensation phenomenon to be studied from multiple perspectives, thereby generating a better understanding of its effect on subsequent behaviour.

The scope of most risk compensation research in sports looks at helmet use in skiers, snowboarders, and cyclists. Few have looked at contact sports, the exceptions being those that have assessed the use of headgear in junior rugby or face shields in ice hockey (Hagel & Meeuwisse, 2004). The introduction of plastic shelled helmets and the subsequent influence on head and spinal injuries and fatalities has been measured, but effects of shoulder padding has not. An important element in this study is that the risk compensation phenomenon is dangerous not only to the individual in question, but also to others on the field, opponents and teammates alike. Recall the excerpts from players who experienced injuries from the reckless

behaviour of a teammate throwing themselves into a tackle, or an opponent being hit in an unprotected area. These outline the importance of education, not only for the safety of all those on the field of play.

Through this qualitative study, much is now known about risk compensation in football. Adult male athletes who have played both rugby and football have indicated that protective equipment in football can lead to higher impact collisions, taking of more risks, perceptions of being less vulnerable to injury, and that protective equipment can be utilized as a tool or weapon to apply additional force.

Chapter 6

Conclusion

This study attempts to explore the risk compensation phenomenon in football which results from players wearing protective equipment. Participants were asked to share their experiences playing with and without protective equipment through the comparison of rugby and football. All participants talked about their perception of risks and how it differed between the two sports, providing examples from their playing experiences by discussing their injuries, and approach to contact. Others also provided commentary on their new roles as coaches and spectators.

Participants talked in detail about their experience with protective equipment, and how it made them, their teammates, and the players they coach feel safer from risk. Words used to describe this feeling included 'gladiator' and 'invincible' among others. Participants discussed reasons for the differences in physicality across sports including protective equipment, pace of play, the importance of gaining ground, and a culture that celebrates big hits.

Participants were also asked to give their opinions on ways in which both sports could be made safer. Rugby seems to be a sport that has changed rules on a yearly basis to improve player safety, including a no-tolerance policy to punching or any contact to the head. In Ontario, the Blue Card was introduced to ensure that players who suffer major head trauma during a game are required to leave the field, and they are not allowed to actively return to

playing until they have received medical clearance. While some participants suggested implementing rugby laws into football, others urged caution to changing football to the point of no return.

Implications

Education in safety in contact sports should be a mandatory requirement for sports leagues moving forward. This has recently been implemented in Ontario, Canada following the death of 17-year-old Rowan Stringer in 2013. Before her fatal brain injury that was sustained in a high school rugby game, Stringer had discussed previous head injuries with her friends through text message. This included receiving kicks to the head that Stringer self-diagnosed as a concussion following a Google search on its symptoms (Tator et. al, 2019). Despite her self-diagnosis, she continued to play and did not mention her symptoms to her parents or other adults before the fatal incident occurred. Legislation was passed in March 2018, which was created to protect amateur athletes through improved and mandatory concussion protocols and guidelines that all schools, public or private, must follow (Tator et. al, 2019).

Similar education on protective equipment would be a valuable resource for young amateur athletes, coaches, and parents. Some schools already provide information about concussions and the limits of protective equipment, as Participant 6 mentions:

“...our school has a pretty in-depth concussion protocol system. We educate them. We work in class with them prior to any practices, letting them know that this helmet is not going to prevent you from getting a concussion if you do foolish things.”

While concussion safety has gained traction over the past couple of decades, similar protocols and education should also extend to the shoulder pads and the lack of protective equipment for other areas of the body, including the legs and lower torso. Helping young athletes understand the risks of playing contact sports will help them engage contact with more awareness and a safer attitude. The 'BokSmart' program in South Africa, for example, contributed to a significant decrease in the number of catastrophic (serious) head and neck injuries in junior rugby players (Brown & Lambert, 2016). In Canada, organizations such as The Sport Injury Prevention Research Centre (SIPRC) can collaborate with researchers, clinicians, communities, and other sport organizations to use models to implement policies to help increase Knowledge Transmission (KT) surrounding injury risk and consequences in sport (Richmond et. al, 2013). Some of this work has begun with Canadian football coaches now required to complete mandatory training through the National Coaching Certification Program (NCCP) on safe blocking and tackling techniques, as well as head trauma prevention and management.

In rugby, the lack of equipment can be a concern for parents who are not familiar with the sport, but Participant 1 shares some ways that can help combat these precautions:

“...those extra steps had to be taken in rugby to convince the students or kids or whatever as well as the parents that it is a safe sport if you engage in these proper techniques...What if we gave you this thin layer of shoulder pads and this thin do-nothing helmet? That was enough to convince some parents that that made it safer.”

While there is some pause for concern around the false confidence headgear in rugby (scrum caps) could give athletes (Finch et. al, 2001), education around the risk of playing rugby and proper, responsible coaching techniques can help convince parents to allow their children to play the sport.

The age at which players are allowed to engage in contact is debated among sporting bodies, parents, and coaches, and has resulted in some changes over the years. While some may believe that starting contact later when bodies have developed is a better way to increase player safety, others believe that teaching contact at a young age helps amateur athletes develop foundational technical skills that they can build on, as Participant 2 explains:

“...introducing to use proper form of tackling at a young age and then allowing the player to build on that I think is probably the most important aspect of keeping it safe...developing those tackle skills as you get older and beginning every season...with those fundamentals again to refresh making sure that everyone knows the proper tackle form.”

He goes on to explain why introducing it younger is better than holding off until an older age:

“I think that a difference in the gap of physical maturity is less when kids are young than when they are already in grade 9 and 10. I think that introducing tackling at an older age where the gap may be bigger is actually more dangerous than when the kids are younger... That leaves smaller kids to feel more comfortable tackling bigger kids because they learn that at a young age and the safe procedures of it.”

Parents will certainly have concerns over introducing their children to contact sports at a young age, given their lack of experience and knowledge of the game. The key to addressing this concern will be the availability of proper training programs that coaches can go through before passing on that knowledge to young, novel athletes. Education around player safety is just as important for coaches to learn and understand. It may also benefit young athletes who are interested in playing football to learn rugby tackling techniques at a young age, techniques that can be transferred into football when equipment is introduced.

Rule changes to football were discussed with the study participants. There was a small divide between those who thought implementing rugby rules into football would be best and those who thought those same rule changes, along with equipment alterations (e.g. smaller equipment), would change the game completely. Some rules may be helpful to implement, such as wrapping the arms and not leaving the feet when making tackles in football, but the important part of any rule change, whether in sport or in legislation, is the ability to enforce the new rules consistently and to punish those who break them (Hedlund, 2000). Perhaps a more pragmatic approach would be to implement some of these rugby techniques that can be implemented in the rule book at the high school level, rather than college and professional leagues, similar to how face shields in hockey are mandatory for amateur youth athletes and are optional in the NHL.

Limitations

The experience disparity for participants between rugby and football is one of the bigger limitations of this study. The nearly 10-year difference in experience between the sports is likely

due to the larger availability of rugby clubs and leagues versus football, outside of high school or university. All but one participant in the study has more years playing rugby than football. Participant 4, who has 34 years of playing rugby versus only one year of playing football, talks about how levels of experiences influences the perception of safety among players:

“I’m probably biased just because I spent most of my time playing rugby. I’m probably more comfortable with the sport, so I would say that I think rugby is safer. Most of my good friends were more football players than rugby players...they might say football is safer because that’s what they grew up with.” (pg. 55).

A future study with a stricter participant criterion, such as even playing experience between the two sports, may address this bias and give a clearer picture to the different perceptions within the confines of protective equipment. However, more restrictions can slow down the process of participant recruitment.

Generational differences were noticed in transcriptions but were not considered in the analysis of the data. Older participants grew up with football when it was a physically different sport compared to some of the younger participants, when certain forms of contact were commonplace rather than outlawed. Future studies may wish to compare generational differences of risk perception between rugby and football.

Lowered perception of risk is the basis of risk compensation behaviour. However, more confidence does not always equate to more reckless behaviour. There is a danger for players, especially inexperienced youth athletes, to engage in contact without proper technique and conviction. Players who are hesitant may put themselves at greater risk to injury, since they are

not fully preparing themselves for the impact they are about to engage in. It is important to teach the difference between confidence and recklessness to athletes early in their development as players.

While this study highlights some of the issues around the abuse of protective equipment in football, should be noted that equipment has evolved as the game itself has evolved. Football equipment has improved significantly over the years as well, as mentioned by Participant 4: “The equipment is probably more sophisticated than it used to be...there has been advancements on that front.”

This study is not taking a stance against the use of protective equipment in sports. Given the physical nature of the sport, equipment in football is necessary to protect players given the level of physicality that occurs near and away from the ball. The problem lies with the false sense of security provided to the wearer that leads to riskier behaviour which, at least partially, offsets the protection provided by the equipment. Risk compensation is not a phenomenon that denounces protective policies or substances. Sunscreen is still an important way to protect people from sunburn and skin cancer. Condoms protect people from transmitting or obtaining STD's. Seatbelts protect drivers and passengers from vehicular collisions. The purpose of all these studies is to understand the human reaction to these protective measures and to use these insights to develop better laws or recommendations. Products and legislation that are introduced to help protect people should include plans that recognize that human behaviour can change with new safety measures in place, providing appropriate steps are taken to support and enforce such measures.

Future Research

Because of the nature of the questions in the interview schedule (talking about violence, aggression, etc.), one participant criterion was that individuals had to be over the age of 18. It may be of interest in a future study to interview football and rugby athletes at the high school level, with the remaining criteria staying the same. This would be valuable to develop an 'in-the-moment' picture of how equipment alters risk perception. While obtaining permission from parents, guardians, and school boards may be a challenge, the information obtained would be based on the present day, rather than participants recollecting their playing experiences.

All participants in this study are male, but with women's rugby becoming a more popular sport globally (World Rugby, 2018), and national football teams for women being introduced, there may be enough women who would fit the participant criterion and could take part in this study. There have been gender differences reported in adolescents, with girls reporting higher levels of perceived risk and lower levels of risk taking than boys (Kontos, 2004), but to date there has not been a study that focuses on gender differences in adults in contact sports. One study suggested that risk compensation is a male behaviour, with the phenomenon being observed in men wearing bike helmets but not in women (Messiah et. al, 2012).

Other studies that have examined the risk compensation phenomenon in other contact sports, including face shields in ice hockey (Benson et. al, 1999). While those who wore full face shields suffered fewer injuries than those who did not, there was an increased risk of facial injuries (excluding concussions) for those wearing half shields compared to full shields, which may indicate a small risk compensation effect. The data used in these studies were compiled

from injury reports and quantitative statistics for analysis, which provides an unbiased way of determining the effectiveness of equipment in reducing the risk of injury. However, expansion of this research into the qualitative realm would also be valuable, by asking players to provide insights on protective equipment in hockey. Perhaps there are some who have used both full and half face shields, or even none, that can provide commentary on their experiences as a player, coach, parent, or fan.

One participant in this study has extensive experience playing rugby league, having competed at the national level. Rugby league is a variation of the game of rugby that is more like gridiron football than rugby union (the more popular of the two). Rugby league, like football, gives the offence a limited number of downs or plays to gain yardage and to score, with failure to do so resulting in a kick away or a turnover. The defensive team in rugby league also must give 10 meters of separation for the offence, allowing the ball carrier to gain significant speed and momentum before contact is made, resulting in similar velocity in hits to football with only limited use of protective equipment. Some players from rugby league have even transitioned to gridiron football, including Jarryd Hayne from Australia. Future research could directly compare injury rates between the two sports, or even a qualitative study similar to this one that allows players to share their experiences playing rugby league and football.

Conclusion

Participants in this study were asked to reflect on their experiences playing both rugby and football by providing insight on their playing experiences, including the role of protective equipment, their injuries, playing cultures, injury risk, and rules to make each game safer.

Participant 11 wrapped up his interview by summarizing what he, and others in the study, feel about protective equipment in football:

“They [kids] perceive football as a safer sport because of the equipment, but I think they forget that, in reality, you’re using your body differently and in a more violent, unethically sound way. Football is a lot more dangerous to play, but people don’t know that because they just know, ‘Hey, your head and your upper body is protected so it must be safer,’ but it’s not.”

The spirit of both games is always considered when creating rule changes to improve player safety. Perhaps it is time for the safety of players to be considered as part of the spirit of the game, rather than a separate entity, for the sake of young athletes, their parents, coaches, and spectators alike.

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Appendix A: Interview Schedule

1. Basic Demographics
 - a. Age
 - b. City of Residence
 - c. How many years have you played rugby? What is the highest level you have played in rugby?
 - d. How many years have you played football? What is the highest level of competition you have played in?
2. How would you compare rugby and football in terms of on-field contact?
3. What role do you think the presence of safety equipment has on the level of contact in football?
4. What injuries have you experienced in football? In rugby?
 - a. Possible follow up; were these injuries as the result of too much aggression from yourself or other parties involved?
5. In your experience, which sport has a greater risk of physical injury? Why?
6. Do different playing cultures or codes of acceptable contact exist in rugby versus football?
7. Do you have any ideas on making football a safer sport?
8. Do you have any ideas on making rugby a safer sport?
9. Do you have any other comments that you think might be useful to my study on physical contact in football and rugby?