

**The relationship between empathy and support for rule changes intended to reduce the
rates of concussions in the National Football League**

by

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Abstract

Concussions can have daunting and relentless consequences. They are relatively common in sport, especially football (Kontos et al., 2004; Mack et al., 2021). Many concussions occur annually in sport; thus, research surrounding concussion prevention is imperative (Schweizer & Baker, 2022). One way to prevent concussions is to implement rules that make the game safer for the players. However, people, particularly fans may differ in their willingness to support such rule changes. Research suggests that empathy motivates individuals to engage in prosocial health behaviours (Masten et al., 2011). The aim of my research was to determine if fans are more supportive of concussion preventative rule changes if they feel more empathic toward athletes suffering from concussions. I conducted two studies to test the association between empathy and support for these rule changes. Study 1 tested a correlational relationship between National Football League (NFL) fans' support for concussion preventative rule changes and their levels of empathy. The results supported the hypothesis that there was a positive correlation between support for rule changes and empathy. A second study was conducted to further explore the causal relationship between empathy and support for rule changes. Study 2 was an experimental study in which fans indicated their levels of support for concussion preventative rule changes in the NFL. However, prior to making these ratings, some participants read a scenario of an athlete who had suffered a concussion while following empathy-inducing instructions (*empathy* condition), some read the scenario while being instructed to keep an objective focus (*objective* condition), some read the scenario without any prior instructions (*no instruction* condition), and some did not read any scenario (*control* condition). The results showed that there was no statistically significant difference between the four groups on levels of support for the rule changes. However, through an exploratory contrast analysis, results showed that participants who had read the athlete scenario reported greater support for the rule changes compared to those who had not. This research provides insight into how empathy can be used to create support for rule changes aimed at reducing concussions in the NFL.

Keywords: concussions, empathy, football, mild traumatic brain injuries, NFL

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Introduction

An average of 1.7 to 3.8 million individuals report suffering from a concussion each year in the United States (Daneshvar et al., 2011). In Canada there had been over 200,000 concussions that were reported in 2020 (Statistics on Brain Injury, 2022). Over the last 20 years there has been more research and attention on the devastating effects that concussions are having on athletes lives (Schweizer & Baker, 2022). In fact, this research suggests that concussions can be considered to be an epidemic, especially in the sporting world (Cassidy et al., 2004; Daneshvar et al., 2011; Schweizer & Baker, 2022). Therefore, there is an imperative need for the rates of concussions to be reduced.

Previous research has suggested that the best way to reduce the harm caused by concussions is to prevent them from occurring in the first place (August & Torres, 2019; Schweizer & Baker, 2022). One preventative strategy that has been implemented in the National Football League (NFL) is rule changes (e.g., creating restrictions on the number of full contact practices allowed during training camp/regular season, eliminating any helmet-on-helmet contact on ballcarriers, the elimination of a three-point stance for players at the line of scrimmage; Maske, 2021). Gaining fan support for these rule changes is critical because fans are the primary source of revenue for the NFL; thus having their support is imperative (DeSarbo & Madrigal, 2012). However, some fans may not support these rule changes because they may be perceived as making the game less entertaining or authentic. It is therefore critical to understand how to increase fan support for rule changes intended to prevent concussions.

The purpose of this research was to test if fan support for such rule changes in the NFL could be enhanced by increasing fans' empathy levels toward athletes. Previous research has shown that empathy can be enhanced within individuals (Eisenber & Strayer, 1990). Increasing the level of empathy felt by a fan toward an athlete suffering from a concussion should increase their willingness to support concussion-preventative rule changes in the NFL. I conducted two studies that tested the hypothesis that increased empathy levels are associated with increased willingness to support rule changes aimed at preventing concussions within the NFL. Study 1 was created to test a correlational relationship between NFL fan's empathy levels and their support for rule changes intended to reduce the rates of concussions. Whereas Study 2 progressed upon this relationship by testing if there was a causal relationship between empathy and support for rule changes in the NFL.

Literature Review

Empathy

Empathy is described as “feeling what another person feels, imagining oneself in another’s situation or imagining being the other person in their situation” (Lake, 1992, p. 107). This definition suggests that empathy involves the capability to understand how an individual feels. This emotional comprehension is reflected in the way that someone responds to that emotional state. To further support this description of empathy, Eisenber et al. (1990) defines empathy as “putting oneself in the place of either a living or non-living thing” (p.27); this additional definition emphasizes the fact that empathy has the power to possess the emotional understandings of what another individual is experiencing. It is a foundational element for human interaction, which is essential for survival (Masten et al., 2011).

Although empathy has been described as being a response to something or someone’s experience, the response is often times an automatic reaction to the emotional state of another (De Waal, 2008; Pfattheicher et al., 2022). This automatic response will be experienced when responding to those emotional social targets of another (Zaki, 2020). Although empathy is most often automatic, it is also a learnable skill that has the ability to be induced or enhanced (Abe et al., 2018; Capraro & Barcelo, 2020; Goyver, 2019; Lake, 1992; Pfattheicher et al., 2022; Sassenrath et al., 2016). Being able to enhance or induce this personal attribute provides the opportunity for it to be a powerful tool to promote prosocial behaviour.

Comparing empathy, sympathy, and compassion

Empathy is a personal attribute that allows for an individual to feel and understand what another is feeling (Miu & Balteş, 2012; Pfattheicher et al., 2022; Sassenrath et al., 2016) . There are, however, many other concepts that are comparable to empathy, including sympathy and compassion. Empathy can be thought of as encompassing constructs such as sympathy and other emotional contagion (Sassenrath et al., 2016). Empathy, sympathy and compassion share similar foundations, they all acknowledge the suffering of an individual (Miu & Balteş, 2012; Sinclair et al., 2017; Singer & Klimecki, 2014). These three terms are often used interchangeably, but they differ in various and significant ways.

Sympathy is the term that is often used in conjunction with empathy. However, sympathy is the term that contrasts the most among the three. It can be defined as an “unwanted, pity-based response to a distressing situation, characterized by a lack of understanding and self-preservation

of the observer” (Sinclair et al., 2017, p. 437). Essentially, displaying the trait of sympathy is used in a way to make the observer feel at peace with regards to the person who is suffering. This results in the goal of sympathy to reduce the feelings of discomfort that the observer is feeling in response to the suffering individual (Sinclair et al., 2017). As an example, sympathy can be seen in health care settings due to the nature of the environment, in which someone is in a suffering position and others aim to aid this person. In a study conducted by Sinclair et al. (2017) the researchers collected statements from hospital patients who had experienced sympathy being shown from health care workers. The patients mentioned that the sympathy that was displayed from the workers was unwanted, “fake” and “shallow” (Sinclair et al., 2017, p. 443). The patients explained how they felt and that these acts of sympathy were solely displayed as a way of making the healthcare worker feel less uncomfortable that someone was suffering. Sympathy is unlikely to motivate one to engage in a prosocial behaviour. Previous research has come to suggest that sympathy is not as helpful nor successful in comparison to attributes such as empathy or compassion (Sinclair et al., 2017).

Compassion and empathy have considerable overlap with regards to the characteristics that these attributes uphold (Sinclair et al., 2017). They are often used to explain and define each other (Strauss et al., 2016). Compassion is feeling *for* another but not feeling *with* that individual (Singer & Klimecki, 2014). Compassion is similar to empathy in the sense that when someone is experiencing the feeling of empathy they are able to feel what another person is feeling but they recognize that they themselves are not the suffering individual (Singer & Klimecki, 2014). Compassion has three main elements that empathy does not include: recognizing suffering, relating to suffering, and reacting to the suffering (Sinclair et al., 2017). These three elements have been identified based on some of the personal attributes that it encompasses such as sensitivity, sympathy, motivation, caring and empathy (Strauss et al., 2016).

At surface level compassion and empathy may appear to be essentially the same. Although they are very similar, there are key differences. For an individual to feel compassion they must have experienced empathy initially (Sinclair et al., 2017; Strauss et al., 2016). Compassion possesses all the qualities of empathy while also being motivated and proactive to create a change (Sinclair et al., 2017). Compassion allows for an individual to feel touched by the suffering of another and have the desire to act in a way that helps them (Strauss et al., 2016).

Empathy can be thought of as the primary reaction in which compassion is one of the empathic responses that arises in response to suffering (Singer & Klimecki, 2014). Compassion is a great personal attribute to have; however, empathy needs to be achieved initially (Singer & Klimecki, 2014; Strauss et al., 2016). Additionally, there has been significant research that provides information and support for the measurement and manipulation of empathy when hoping to achieve a prosocial behavioural change (Chrysikou & Thompson, 2016; Miu & Balteş, 2012).

Empathy and Prosocial Health Behaviour

Research has shown that empathy promotes prosocial helping behaviours (Depow et al., 2021; Masten et al., 2011; Pfattheicher et al., 2020, 2022; Sassenrath et al., 2016; Singer & Klimecki, 2014). Empathy is the main motivator for explaining why humans engage in a prosocial behaviour (Ben-Ami Bartal et al., 2013; Kourmoussi et al., 2017). Prosocial behaviours can be thought of as actions that are performed with the goal of helping others, in particular those suffering (Masten et al., 2011). Regardless of what the actual behaviour is, researchers can confidently conclude that the positive increase is due to enhanced empathy (Sassenrath et al., 2016). A study conducted by Masten et al. (2011) observed the neural activity that occurs when individuals are experiencing feelings of empathy. Through the acquiring of the neural activity Masten et al. (2011) observed how these neural processes might relate to prosocial behaviours. The overall findings from this study suggest that empathy promotes prosocial treatment of those who are in need or have/are suffering. Enhanced feelings of empathy facilitate prosocial interactions (Masten et al., 2011). The researchers describe how an increased feeling of empathy was associated with a higher level of concern for others' welfare (Masten et al., 2011). Having research that has examined the neural activity provides an excellent base for subsequent research that will examine the ways in which empathy can be used to promote these prosocial behaviours in different domains.

Research has consistently found a connection between empathy and greater prosocial behaviour. For example, Sassenrath et al. (2016) conducted several studies that all showed that increases in empathy led to better hand hygiene with the goal of reducing the transmission of illness. For instance, their second study included an empathy manipulation in which participants were randomly assigned to an *empathy* group or *no-empathy* group. Participants assigned to the *empathy* group were told to read text that was written by someone diagnosed with human

immunodeficiency virus (HIV). They were instructed to focus on how this individual would feel and how this disease has affected their life. They were further instructed to feel what the infected person would experience and to focus on what they have gone through. In contrast, participants in the *no-empathy* group were instructed to “take an objective perspective” and focus on the facts, not how the individual would feel (Sassenrath et al., 2016, p. 211). Following the reading exercise, all the participants completed a series of food preparation tasks, ostensibly for a delivery to a retirement home. In support of their hypotheses, the researchers found that participants in the empathy condition had better hand hygiene during food preparation. Through the completion of the study, the researchers were able to conclude that though this study was focused on hand hygiene, the results can be generalized to other prosocial health behaviours (Sassenrath et al., 2016).

In an additional study, empathy was increased to promote the unnatural behavioural change of physical distancing and the wearing of face masks during the COVID-19 pandemic (Pfattheicher et al., 2020). Within this study, empathy was used in an attempt to motivate the participants of the study to perform multiple behaviours that were intended to protect and aid those who were most vulnerable (Pfattheicher et al., 2020). Participants in this study were randomly assigned to either an *information only* condition, *information and empathy* condition, or *control* condition. The *information only* condition was asked to read a short description regarding the pressure that COVID-19 had on hospitals. The reading section was mainly focused on the volume of patients that were being seen and the physical demand of the hospital itself (i.e., cost and space). Those in the *information and empathy* group read the same piece that the *information only* condition read and also watched a video of a vulnerable elderly man who was explaining the heart-wrenching effects of the pandemic (e.g., being alone and isolated from others and not being able to see his chronically ill wife; Pfattheicher et al., 2020). Lastly, those in the *control* condition did not read anything nor watch any video. The findings from this study revealed that when empathy was induced it led to an increased willingness to create a change (e.g., wearing of face masks, increased sanitization, hand washing and physical distancing) to help protect those who were at an increased risk of contracting COVID-19. The group that experienced empathy manipulation (*information and empathy* condition) had a significantly higher mean score in response to willingness to adhere to behaviours intended to reduce the spread of COVID-19, in comparison to the *control* condition. Also, the *information and empathy*

condition reported having a higher mean score to adherence of behaviours in comparison to the *information only* condition. The results that were collected in the study conducted by Pfattheicher et al. (2020) provides additional evidence that empathy can encourage individuals to engage in prosocial behaviours.

Traumatic Brain Injuries

Concussion Pathology

Concussions are frightening and can have life-long consequences that have the potential to drastically alter people's lives (Kontos et al., 2004). A concussion can be referred to as a "transient alteration in consciousness induced by external biomechanical forces transmitted directly or indirectly by the brain" (Ianof et al., 2014, p. 14). Common symptoms of a concussion can range from headaches, fatigue, drowsiness, confusion, to increased intra-cranial pressure, brain stem failure, or a coma (Ianof et al., 2014; Kontos et al., 2004; Yengo-Kahn et al., 2016). Due to such a wide range of severity of symptoms, the less severe symptoms are often minimized by the athlete in order to continue to play or for a faster return to play (Kontos et al., 2004). The nature of concussions does not allow for an objectively measurable method that is able to officially diagnose someone (Kontos et al., 2004). Over time without proper care and recovery, an athlete who obtains multiple concussions can suffer from permanent concussive symptoms (Kontos et al., 2004).

The nature of the neurological deficits and disruptions that accompany concussions are drastic and frightening. Repeated concussions or even sub-concussive blows to the head can lead to neurocognitive and neurodegenerative diseases. Athletes with a history of concussions are placing themselves at an increased risk for other injuries and heightening the risk for neurological diseases, the most common being Alzheimer's and Parkinson's disease (Barlow & Durand, 2017; Kontos et al., 2004). It is with each additional concussion that an athlete receives that the concussion risk increases as well as the severity of symptoms and neuropsychological sequelae (Kontos et al., 2004). Chronic traumatic encephalopathy (CTE) is described as being a neurodegenerative disease that is produced by repeated concussions as well as sub-concussive blows to the head (Baugh et al., 2012). There are key similarities between CTE and Alzheimer's Disease, such as the signs and symptoms. In comparison to Alzheimer's Disease, CTE can be prevented (Stone, 2011). Previous research has shown a positive correlation between CTE and repeated sport-related concussions (Stone, 2011). The consequences that have been shown to be

related to neurodegenerative diseases such as CTE are drastic and life altering. Suicide is a serious consequence that has been linked to repeated concussions (Stone, 2011). There has been an upsetting number of professional football players who have brought attention to these long-term consequences of repeated concussions that are not only taking their lives but also affecting the lives of loved ones who lose them. Concussions are therefore causing a great concern to not only sport itself but the lives of athletes and their families (Stone, 2011).

Concussion Rates

As previously mentioned, an estimated 1.7 to 3.8 million people experience sport-related concussions in the United States each year (Daneshvar et al., 2011). Of these people, 1.37 million will go to the emergency room, and 275,000 will require hospitalization (Daneshvar et al., 2011). The concern for the numerous concussions encountered in sport is not just relevant in the USA, it is here in Canada as well. Over 20,000 individuals are hospitalized for concussions per year in Canada (Boucher et al., 2020). This value does not include the number of individuals who endured a concussion but do not require hospitalization in Canada. Elaborating on the severity of the concussion concern, in Canada between the years of 2002 and 2016 there was an astounding 235,471 injury deaths identified to be caused by concussions (Boucher et al., 2020). The large quantitative value of concussions is only one reason as to why they are of great concern.

Concussions are especially prevalent in professional football (Powell, 2001). Between 2002-2007 there was an average of 0.38 concussions reported in each NFL game (Casson et al., 2010). Based on this average, it would mean that on average over five concussions were reported each week of the season. Each season it is common for an athlete to have suffered anywhere from 1,000-1,500 sub-concussive hits (Stone, 2011). These sub-concussive hits are equally as frightening as normal concussive hits, as they can result in the same severity of symptoms and life-altering conditions (Sheth et al., 2020). These figures are almost certainly low estimates given that previous research has concluded that concussions often go unreported as there can be a negative stereotype surrounding such injury (Daneshvar et al., 2011; Ianof et al., 2014; Kontos et al., 2004; Register-Mihalik et al., 2013). Terms such as getting your “bell rung” have been created as a way of trying to reduce the fear and severity associated with the injury (Register-Mihalik et al., 2013).

Concussion Prevention

As a society we hold the potential to prevent concussions in sport. If we create change in sport, we can reduce the rates of concussions occurring thus decreasing the overall number of neurodegenerative diseases. The most effective approach to reducing concussions is via prevention (August & Torres, 2019; Schweizer & Baker, 2022). Huang et al. (2020) placed an emphasis on the importance of preventing concussions instead of relying solely on treatment. The prevention of concussions has the possibility to reduce the financial burden that is associated with them. Previous research has estimated that a concussion can cost on average \$800.10 USD/concussion (Yengo-Kahn et al., 2020). Preventing a concussion from occurring in the first place would eliminate this cost.

There is extensive research surrounding the pathology, mechanisms, consequences, managing, reporting and treating of concussions; although all of these domains are important, the main focus and goal should be the prevention of concussions (Demorest, 2012), as there is currently a large gap in the research on prevention. Over the past few years there has been more intentional focus and research surrounding concussions being the serious public health problem that they are (Cassidy et al., 2004). Chris Nowinski, a concussion prevention activist and former professional wrestler, states “we have no treatments that are going to be coming out of the pharmaceutical industry in the next five years, this is a long, long fight... but the short game is, hey we can prevent this. We can prevent this disease if we just stopped hitting people in the head so much” (Nowinski, 2018). This statement given by Nowinski (2018) provides brief insight into one tactical approach that could be made into reducing the harm caused by concussions.

The majority of researchers have focused on the different methods, techniques and education that could be implemented to help prevent concussions from occurring (Huang et al., 2020). The bulk of this research has focused on protective gear being the primary form of prevention (Emery et al., 2017; Schneider et al., 2017). A study conducted by Emery et al. (2017) observed the available literature that was focused on concussion prevention. Out of the 48 research articles that met their criteria, they concluded that 52.1% of the articles were focused on protective gear being the primary concussion prevention whereas only 27.1% of these articles focused on policy and rule changes. Having research that focuses on concussion prevention is a step in the right direction. At first glance, the thought of targeting protective equipment may seem like the optimal decision. However, previous research has concluded that there is extremely

limited evidence to support the fact that protective equipment (e.g., helmets) has a positive and considerable impact on preventing concussions (Graham et al., 2015).

The Value of Rule Changes

One technique to prevent concussions in sport is to implement intentional rule changes that make the game safer for players. Implementing rule changes and creating standards for safe play will aid in reducing the risk and rates of concussions in the NFL (Graham et al., 2015). Creating rule changes that are intentionally designed with the goal of protecting an athlete from enduring a concussive hit provides the opportunity to eliminate and prevent concussions. New rules and policies can be created and designed with the sole focus being concussion prevention. There has been previous literature that supports the perspective that rule changes can in fact positively reduce the rates of concussions (Graham et al., 2015). The NFL has recently implemented several rule changes with the goal of reducing concussion rates (e.g., kickoff procedures, tackling rules). A key obstacle in this prevention strategy, however, is obtaining fan support for rule changes. Some fans may balk at any changes to the game that they love, and sport organizations are likely more open to implement changes that are supported by the fans.

The Importance of Fan Support

Obtaining fan support for future rule changes is extremely important. Fans play a critical role in the sporting environment (Silva & Casas, 2017). They have the ability to create massive and impactful shifts in sport because of their enormous capacity to invest in a variety of domains related to sport (Ahmed, 2021). There are increased expectations from fans for them to have a say in the decisions being made in leagues and franchises (Silva & Casas, 2017). Over the past couple years fans have had a relatively impactful say and input on issues that have occurred (Ahmed, 2021). For example, fans were the ones that initiated the name change of the NFL team the Washington Redskins to now being the Washington Commanders (Silva & Casas, 2017). Additionally, fans have had a massive impact with regards to equal pay between male and female athletes. For example, at the 2019 World Cup Final, the fans demanded that there be equal pay between male and female athletes (Ahmed, 2021). The power that fans hold is continuing to rise, their voice is only growing over time (Ahmed, 2021; Oller & Cam, 2022; Silva & Casas, 2017). Based on this power held by fans, obtaining their support for rule changes could be extremely impactful.

Previous literature has identified fans as being the primary source of revenue for the NFL (DeSarbo & Madrigal, 2012; Silva & Casas, 2017). When aiming to create change within a sports league, ensuring that the top revenue source supports and is accepting of changes can assist the process of creating change. In 2012 the NFL was estimated to be a \$10 billion/year business (Quinn, 2012). Simply by observing the economic value that the NFL upholds provides brief insight into just how popular the sport of football really is. It is known to be the biggest enterprise in North American team sport leagues, with roughly 111 million Americans identifying to be NFL fans (Quinn, 2012). With the extensive number of fans who support this sport, having a small percentage of these fans who support rule changes can create a domino effect that could cause a larger change with regards to concussions in the sport. With that being said, the attitudes that sport fans obtain is influential to the decisions and alterations that can be made within the NFL (DeSarbo & Madrigal, 2012).

Empathy and Fan Support for Rule Changes

Having the ability to alter empathy allows for the opportunity to enhance the level of empathy an individual feels toward another. Research has shown that empathy can facilitate in creating the basis for a strong support for a change if the change aligns with someone's personal values (Selph et al., 2008). If NFL fans value the health and safety of the athletes there is a strong possibility that due to the attribute of empathy, individuals would support necessary changes. The way in which the topic of concern is messaged to individuals can affect the way fans relate to the issue (Batson et al., 2002). Identifying an overall goal of being able to increase and/or maintain NFL athletes' quality of life and their safety may be a massive motivator that aligns with fans morals. It has been suggested that if the goal aligns with an individual's personal values there will be an increased willingness to support changes (Batson et al., 2002; Grant & Hofmann, 2011) As previously stated, empathy is a personal attribute that can be taught (Lake, 1992). Through the process of enhancing empathy, it can facilitate an openness to change in a highly responsive manner (Grant & Hofmann, 2011; Min et al., 2015; Pfattheicher et al., 2022; Sassenrath et al., 2016). This study will aim to facilitate that willingness to support rule changes from NFL fans.

The Current Research

The purpose of my research was to test the association between empathy and NFL fans' support for rules and policies intended to reduce rates of concussions in the NFL. Through conducting this research, rule changes were proposed and support for these rules were assessed. I hypothesized that NFL fans would be more willing to support changes aimed at reducing the incidence of concussions if they felt empathy toward athletes suffering from concussions. I tested this hypothesis with two studies.

First, Study 1 tested a correlational relationship between NFL fans' empathy levels and their support for proposed rule changes intended to reduce concussions in the NFL. Second, Study 2 explored the relationship between empathy and support for proposed rule changes deeper, to test if there was a causal relationship by using an empathy manipulation. Having two studies allowed me to test if the relationship between empathy and support for rule changes could be replicated. Additionally, the two studies tested if this relationship was detectable using two ways of assessing empathy: as a *measured* variable (Study 1) and as a *manipulated* variable (Study 2). Ethics approval for both studies was obtained from the University of Manitoba Research Ethics Board.

Study 1

Method

Participants

NFL fans were recruited via the participant recruitment platform, Prolific Academic (www.prolific.co). Prolific is a voluntary online platform that allows users from around the world to complete research studies in exchange for monetary payment. Participants were eligible to participate if they indicated on a pre-screening survey (upon initial registration with Prolific) that they regularly watch "American football/NFL". There are NFL fans world-wide that include a wide range of ethnicities, ages, and countries of residence. By ensuring that the only eligibility requirement be that participants identify to be NFL fans, this suggests that the participant pool represents the population of NFL fans.

The total number of participants required for Study 1 was determined via a power analysis using G*Power Software (Faul et al., 2009). The following parameters were entered: a one-tailed test, effect size of $r = .2$ (small-to-moderately sized), power = .80 and alpha = .05. This power analysis indicated that 158 participants were required for this study. A total of 160

NFL fans were therefore recruited for the study. Participants had a mean age of ($M = 30.49$, $SD = 9.77$), and they reported their years as fans ($M = 11.60$, $SD = 10.85$). A complete breakdown of participant characteristics (e.g., gender, ethnicity, country of residency) is reported in Table 1.

Table 1
Participant Demographics

Demographics	Study 1		Study 2	
	Frequency	Percentage	Frequency	Percentage
Gender				
Male	107	66.9	236	61.3
Female	51	31.9	133	34.4
Non-Binary	0	0	1	0.5
Missing	2	1.3	15	3.8
Ethnicity				
Aboriginal/First Nations	0	0	1	0.3
Arab/West Asian	2	1.3	1	0.3
Black	17	10.6	30	7.8
Chinese	5	3.1	5	1.3
Filipino	1	0.6	0	0
Japanese	0	0	1	0.3
Korean	0	0	3	0.8
Latin American	58	36.3	54	14.0
Métis	0	0	0	0
South Asian	5	3.1	7	1.8
Southeast Asian	3	1.9	1	0.3
White/European	68	42.5	261	67.8
Other	1	0.6	17	4.4
Missing	0	0	4	1.0
Country				
Canada	23	14.4	30	7.8
Europe	41	25.6	128	33.2
Mexico	50	31.1	33	8.6
South Africa	11	6.9	27	7.0
United States	29	18.1	161	41.8
Other	6	3.9	6	1.6

Note. $N = 160$ for Study 1. $N = 385$ for Study 2.

Procedure

Participants in this study completed an online questionnaire. The questionnaire was estimated to take six minutes to complete, in which participants answered questions measuring their level of empathy and their support and perceived effectiveness of potential rule changes in the NFL. The survey was created using Qualtrics (www.qualtrics.com). All participants provided informed consent before answering any survey questions.

Empathy. The Toronto Empathy Questionnaire (TEQ) was used to assess empathy (Spreng et al., 2009). There are a variety of measuring techniques and tools that can be used to measure empathy. The TEQ has shown to be a gold standard because it shows good internal consistency and good reliability (Kourmoussi et al., 2017; Spreng et al., 2009). The TEQ has been widely used in differing research designs, allowing for researchers to conclude that it is a valid and reliable measuring scale (Kourmoussi et al., 2017; Ursoniu et al., 2021). The TEQ measures empathy in a unidimensional manner, giving an overall empathy score (Spreng et al., 2009).

The TEQ's purpose is to obtain a single common measurement that is able to measure emotional processes and the accuracy of understanding how another may feel (Spreng et al., 2009). Spreng et al. (2009) conducted a study with the sole focus being to observe the TEQ and dive deeper into how it truly measures empathy. The study showed that the TEQ is a robust single-factor structure that shows high internal consistency, has convergent validity with previously existing self-reporting empathy scales, and incorporates behavioural measures of interpersonal skills that have high test-retest reliability.

The TEQ contains 16 items that are evaluated on a 5-point Likert scale from 1 (*never*) to 5 (*always*). Some examples of the questions include "When someone else is feeling excited, I tend to get excited too", "Other people's misfortunes do not disturb me a great deal" (reverse scored), and "I remain unaffected when someone close to me is happy" (reverse scored; Spreng et al., 2009). Empathy scores were created by averaging the scale items ($\alpha = .834$, $M = 3.61$, $SD = 0.47$).

Attitudes Toward Rule Changes. After completing the TEQ, participants were shown a list of 13 potential rule changes that could be implemented in the NFL to prevent concussions. These rule changes are displayed in Table 2. The rule change list was generated based on previous literature that has suggested rule changes may be the optimal preventative tool when trying to reduce concussions in the NFL (Graham et al., 2015). Participants were shown each

rule change individually in a random order. After reading each rule change, participants were asked to respond to two questions. First, they reported the extent to which they would support the NFL implementing the rule change. This question was assessed on a Likert scale ranging from 1 (*not supportive at all*) to 7 (*totally supportive*). Overall levels of support for each rule change were aggregated to create an average support score for each participant ($\alpha = .904$, $M = 4.90$, $SD = 1.27$). Second, participants reported how effective they thought the rule would be in reducing concussions. This question was assessed on a Likert scale ranging from 1 (*not effective at all*) to 7 (*totally effective*). The purpose of asking this question was to identify rule changes that were perceived to be ineffective at preventing concussions.

Table 2
Rule Support and Effectiveness Scores

Rules	Study 1				Study 2	
	Rule Support		Effectiveness		Rule Support	
	Mean	SD	Mean	SD	Mean	SD
1. Any player suspected to have suffered a concussion during a game must be evaluated immediately off the field by a concussion specialist.	5.93	1.46	5.44	1.70	6.10	1.81
2. Any player who has suffered from a concussion is prohibited from participating in practices, team workouts, and games for a minimum of four weeks.	4.61	1.91	4.47	1.95	4.61	1.71
3. Any player who has suffered a concussion can only return after a four-week period if cleared by an independent concussion specialist.	5.08	1.76	4.86	1.91	5.04	1.70
4. Any player who initiates a helmet-to-helmet collision is automatically ejected from the game.	4.51	2.01	4.89	1.78	4.70	1.85
5. Any player who initiates a helmet-to-helmet collision is automatically suspended for two games.	4.24	2.02	4.63	1.81	4.18	1.95
6. Any player who initiates a helmet-to-helmet collision is automatically fined \$25,000.	4.41	2.05	4.47	1.85	4.22	2.02
7. All players must be in an upright position (both hands cannot be in contact with the ground) when lining up at the line of scrimmage.	4.24	2.02	3.40	1.65	3.22	1.78
8. Any player who commits a penalty with the intent of injuring a player is automatically ejected from the game.	5.96	1.39	5.61	1.61	6.01	1.41
9. Any player who is hospitalized due to a concussion is prohibited from returning to practices, team workouts, and games for a minimum of two-months.	4.55	1.89	4.52	1.96	4.47	1.87
10. Any player who is hospitalized due to a concussion can only return after a two-month period if cleared by an independent concussion specialist.	5.01	1.89	4.80	1.96	5.01	1.78
11. Any player whose helmet is inadvertently removed during gameplay must exit the game and undergo a brief concussion assessment before returning to play.	4.59	1.82	4.38	1.76	4.54	1.84
12. During halftime, each player who had been tackled by an opponent during the first half must complete a brief concussion assessment. Only players who pass this assessment will be permitted to continue to play.	4.48	1.96	4.63	1.87	4.01	1.99
13. Video assisted replay will be used during gameplay to identify players who may have suffered a concussion. Any player who may have suffered from a concussion will be immediately removed from the game and assessed by a concussion specialist.	5.39	1.59	5.24	1.66	5.05	1.62

Note. Rule 7 will be omitted from data analysis due to being perceived as being less than moderately effective. $N = 160$ for Study 1. $N = 385$ for Study 2.

Quality Control. At the end of the survey participants were asked if they had answered the questionnaire honestly by answering either “yes” or “no”. All participants reported to have answered honestly.

Results

I tested the hypothesis that there is a positive association between empathy and one’s support for rule changes in the NFL to reduce the rates of concussions. This was done by calculating the correlation between scores on empathy and support for rule changes. All data analysis was conducted using SPSS (version 27).

I began by inspecting the average ratings of the perceived effectiveness of each rule to determine if all rules were evaluated to be at least moderately effective. Rule 7 (“All players must be in an upright position (both hands cannot be in contact with the ground) when lining up at the line of scrimmage”) was rated to have an effectiveness that was below the mid-point of the scale ($M = 3.40$). This rule was therefore excluded from the computation of rule support scores. I then visually inspected the scatterplot of the relationship between empathy and rule support. One participant appeared to be an outlier and was therefore excluded from the correlation analysis. Finally, I tested the correlation between empathy and support for the rule changes. Results supported the hypothesis that there is a significant positive relationship between empathy and willingness to support rule changes $r = .332, p < .001, 95\% CI [.185, .463]$.

Study 2

Study 1 was able to conclude that higher levels of empathy were associated with higher levels of support for rule changes in the NFL using correlational analyses. However, this leaves a gap regarding a *causal* relationship between empathy and support for rule changes. The purpose for Study 2 was to test if there was a causal relationship between empathy and rule support by adopting an experimental research design. Previous researchers have completed studies with similar designs when studying empathy’s effect on prosocial behavioural changes (Pfattheicher et al., 2020, 2022; Sassenrath et al., 2016). Building upon the results found in Study 1, in Study 2 I tested if there was a causal relationship between empathy and support for rule changes intended to reduce concussions. I hypothesized that empathy would cause greater levels of support for the rule changes.

Methods

Participants

A total of 378 NFL fans were required to participate in Study 2 based on a power analysis consistent with Study 1 parameters. Through participant recruitment via Prolific Academic (www.prolific.co), I was able to recruit 385 NFL fans to complete this study. Prolific users were eligible for this study if they indicated on a pre-screening survey that they regularly watched “American football/NFL”. Participants in Study 2 had a mean age of ($M = 33.50$, $SD = 12.11$) and reported their years as fans ($M = 14.70$, $SD = 12.33$). A full breakdown of participant demographics (e.g., gender, ethnicity, country of residency) can be found in Table 1.

Procedure

Study 2 tested the causal relationship between empathy and support for rule changes through an empathy manipulation. Study 2 was conducted using Qualtrics. The study was estimated to take six minutes to complete. After providing informed consent, participants were instructed to read an athlete concussion scenario while following one of four sets of instructions that corresponded to their respective assigned groups. After reading the scenario, they all answered questions relating to their support for concussion preventative rule changes that could be implemented in the NFL. The participants were randomly assigned into one of four groups: *empathy* condition, *objective* condition, *no instruction* condition, or *control* condition.

Athlete Concussion Scenario. Participants assigned to the *empathy*, *objective*, and *no instruction* conditions read a fictional scenario of an athlete who had suffered from a concussion (see Appendix A). The inspiration for this scenario was based off articles describing what individuals feel when suffering from concussions (Play, 2009; Skull et al., 2017).

Scenario Manipulation. Participants assigned to the *empathy* and *objective* condition were asked to read the athlete scenario in a specific manner. Participants randomly assigned to the *empathy* condition were instructed to read the athlete scenario while adhering to the following instructions: “Try to put yourself in the shoes of this athlete, focus on how they would feel, and the emotions felt by the athlete and their family and friends”. Previous research has used a similar approach to manipulate empathy in others (e.g., McAuliffe et al., 2020; Pfattheicher et al., 2020; Sassenrath et al., 2016). The aim of having participants assigned to the *empathy* condition read the athlete scenario in this way was to increase their level of empathy.

Participants randomly assigned to the *objective* condition were instructed to read the athlete scenario while adhering to the following instructions: “While reading the description below, try to focus on maintaining an objective perspective, focusing only on the information and facts that are included”. The purpose of including these instructions was to potentially rule out different levels of attention/engagement in reading the scenarios. The *empathy* condition was provided with instructions that would elicit the personal attribute of empathy; similar studies have provided participants with similar methods with the same goal of inducing empathy (Grant & Hofmann, 2011; Pfattheicher et al., 2020, 2022). Participants in the *objective* condition focused on the information regarding the concussion that was provided while avoiding any emotional attachment that could have the potential of increasing their empathy levels.

Those randomly assigned to the *no instructions* condition read the same scenario of the athlete suffering from a concussion; however, they did not receive any instructions with regards to how to read it. The goal of including the *no information* condition was to test if empathy was the driving factor that would potentially result in NFL fans increasing their willingness to support rule changes, or if the attainment of concussion information provides enough incentive to want to support rule changes aimed at reducing concussions.

The final group was the *control* condition. Participants randomly assigned to this group only reported their support for the rule changes, without reading any scenario of an athlete suffering from a concussion. This group was included to assess base levels of support for rule changes.

Support for Rule Changes. After reading the athlete scenario (for those assigned to the *empathy*, *objective*, and *no instructions* condition), all participants were shown the same list consisting of 13 potential rule that was shown to participants in Study 1 (displayed in Table 2). Like in Study 1, participants viewed each proposed rule change individually in a random order and rated their willingness to support each rule change on a Likert scale ranging from 1 (*not supportive at all*) to 7 (*totally supportive*). An overall support for rule change score was created for each participant ($M = 4.81$, $SD = 1.16$, $\alpha = .883$). Based on the results achieved in Study 1, Rule 7 was excluded from all Study 2 data analysis due to participants in Study 1 perceiving this rule as not being at least moderately effective.

Quality Control. There was an attention check to ensure that the participants who read the athlete scenario were attentive when reading it. Participants were asked three questions that

tested if they were paying attention to the information that was presented in the scenario: “Did the athlete meet with a sports psychologist?”, “Was the athlete a quarterback?”, “Did the athlete lose consciousness?”. Participants were excluded if they incorrectly answered two or more of these attention check questions ($N = 17$).

In addition to the attention check, at the end of the survey participants were asked if they had answered the questionnaire honestly by answering “yes” or “no”. All participants reported to have answered honestly.

Results

A one-way between groups analysis of variance (ANOVA) test was conducted to test for differences in support for concussion preventative rule changes between the four experimental conditions (*empathy, objective, no instruction, control*). The data analysis was completed using the specialized computer-based statistical program SPSS (version 27). Participants were excluded from data if they a) failed the attention check (incorrectly answered two or more of the attention-check questions, as described earlier: $N = 17$), or b) based on visual observations via a box plot graph, appeared to be outliers; $N = 2$). A total of 366 NFL fans were therefore included in the data analysis due to these exclusions.

There was no significant difference between the four groups in levels of support for the proposed rule changes: *control* condition ($M = 4.64, SD = 1.06$), *no instruction* condition ($M = 4.78, SD = 1.21$), *objective* condition ($M = 4.96, SD = 1.20$), *empathy* condition ($M = 4.94, SD = 1.08$), $F(3,362) = 1.68, p = .17, \eta^2 = .15$. The results did not support my hypothesis.

Despite there being no statistically significant difference between the groups, the mean levels of support between each group suggested that levels of support may be higher among those who read the athlete scenario (i.e., the *empathy, objective, and no instruction* condition) compared to those who did not read the scenario (i.e., the *control* condition). I therefore ran an exploratory contrast test to test if rule support scores were statistically significantly different between the *control* condition and the other three conditions. The exploratory contrast test revealed that participants who read the scenario (i.e., those in the *empathy, objective, and no instruction* condition) were more supportive of the rule changes compared to those who did not read the scenario (i.e., those in the *control* condition), $t(362) = 1.92, p = .06, d = .68$. Although these results do not surpass the standard statistical significance threshold of .05, this analysis suggests that reading the athlete scenario had the effect of increasing support for the rule

changes. Additionally, results from this exploratory contrast test show that there was a medium effect size.

Discussion

The overall purpose of my research was to test if NFL fans were more supportive of concussion preventive rule changes if they felt more empathy toward football players who suffer from concussions. The purpose of this study originated due to the high concern and severity that is associated with concussions in sport, with football being the highest risk sport (Ianof et al., 2014; Powell, 2001; Stone, 2011). In addition, there is a large gap with regards to current research that is focused on how to prevent concussions from occurring in the sport of football (August & Torres, 2019; Cassidy et al., 2004; Demorest, 2012; Huang et al., 2020). I aimed to further examine the suggestions that have been made by concussion researchers that rule changes seem to be the optimal path to take when intending to prevent concussions from occurring (Graham et al., 2015; Schneider et al., 2017; Sheth et al., 2020). Through previous research, empathy appeared to be an ideal factor to target when trying to create support for rule changes (Pfattheicher et al., 2020; Selph et al., 2008).

I was able to achieve the purpose of this research by conducting two studies. Study 1 was designed to be a correlational study, measuring the relationship between individuals' empathy levels and their reported willingness to support potential rule changes aimed at preventing concussions. The results obtained through Study 1 supported previous research that had concluded that empathy is a main motivator when it comes to supporting prosocial behaviours (Masten et al., 2011; Miu & Balteş, 2012). The results of Study 1 were able to support the hypothesis that there is a positive relationship between empathy levels and support for proposed rule changes intended to reduce concussion risks in the NFL.

The results observed in Study 1 suggest that NFL fans are willing to support rule change that are aimed at preventing concussions. Since Study 1 had no manipulation, it was focused on individual's trait empathy levels. The benefit from having a study that includes trait personal attributes is that it allows for this to be easily replicated due to the simplicity of the measurement. The TEQ is a highly valued and reliable instrument for empathy assessment (Kourmoussi et al., 2017; Spreng et al., 2009). It can easily be administered to a wide population, as well as it has wide generalizability to extend to a multitude of research focuses that have empathy as a variable. In addition, it shows that people who are generally empathic will also support rule

changes. The results collected show that there is an association between empathy and support for rule changes.

Study 2 aligned with the main purpose of this research by testing if an empathy manipulation would be associated with higher levels of support for rule change. Previous research had concluded that through empathy manipulation there was higher reported levels of support for prosocial behaviour change (Pfattheicher et al., 2020; Sassenrath et al., 2016). However, this was not what was found in Study 2. The a priori analysis in Study 2 showed that the four experimental groups did not differ in levels of rule support for concussion prevention. Study 2 did not show that empathy levels were causally related to having higher reported support for prosocial behavioural changes. It is unknown in Study 2 whether (a) empathy does not cause greater support or (b) the manipulation was ineffective at increasing empathy. There is the potential that this manipulation was simply not effective, or it was not strong enough to result in empathy manipulation. There has been previous research with similar study designs regarding empathy manipulation that have been able to successfully achieve statistically significant results (McAuliffe et al., 2020; Pfattheicher et al., 2020; Sassenrath et al., 2016). This suggests that the lack of support for my hypothesis was unlikely to be due to manipulation itself. One possibility is that reading the scenario itself was enough to increase empathy levels in all these participants, and that the additional instructions each group was given were not needed. The assumption that comes with this reasoning is that empathy mediates the effect; all participants who read the scenario may have felt more empathy, which led them to have an increased willingness to support rule changes. Results of the exploratory contrast test support this explanation, but additional research is needed to test if the group differences can be explained by increased empathy.

Study 2 showed that reading a concussion scenario created more support for NFL rule changes than *not* reading the scenario. These results were collected through conducting an exploratory contrast test, which allowed for me to conclude that providing people with any form of content regarding a concussion is enough to increase their willingness to support. These results allow for more extensive research opportunities with regards to study design replication. It is much more feasible to present a large population with content regarding the prosocial behaviour that needs change, in comparison to having to enhance empathy through differing instructional methods. This increases the feasibility of real-world applications. For example, this

design could be replicated to a much more expansive population such as a real-life NFL game. There would be the possibility to simply provide all audience members with content regarding a concussion scenario similar to the scenario I provided to the participants. Concussion advocacy groups could share a story from an athlete's point of view of what it is like to suffer from a concussion. As my research suggests, because providing information surrounding the effects felt by an athlete may naturally increase empathy levels, there would be no need to further ask the population to adopt an "empathic" viewpoint. This concussion story from an athlete could be dispersed potentially through gameday booklets or emails that are typically distributed at every game or even through announcements or visuals on the screens throughout the stadium. This would allow for a relatively simple and cost-effective method to engage in a large population to gain support for creating rule changes. Doing this at an in-person NFL game would also potentially allow for the messages to target the most fervent fans.

Previous research has concluded fans are a critical factor when creating change, as their support is imperative (Ahmed, 2021). Fans are the primary source of revenue in sports, meaning that having their support is essential for change to occur (Quinn, 2012). Fans who are spending their hard-earned money and their time at a football game may be the ideal targeted audience with regards to support that football organizations need for change to occur. Based on the results collected, if these NFL fans were presented with concussion content at these games, they would have increased support for rule changes. The conclusions made from Study 2 create a multitude of opportunities for ways in which to expand this content to gain the needed support for these necessary rule changes to be implemented.

Although not the primary focus of this research, the results obtained from both Study 1 and Study 2 regarding the support for rule changes provide insight for football leagues and organizations as to the types of rule changes NFL fans would be willing to support. This study measured the support of each curated rule change which could allow for organizations to further examine if there are key similarities in the rule changes that were reported to be the most supported rules. For example, Rule 8 ("Any player who commits a penalty with the intent of injuring a player is automatically ejected from the game"; $M = 5.96$) and Rule 1 ("Any player suspected to have suffered a concussion during a game must be evaluated immediately off the field by a concussion specialist"; $M = 5.92$) were reported as being the highest supported rule changes. Research could be conducted to test what key similarities are in these two highly

supported rule changes. The benefit that would arise from this research would be to provide football organizations with results as to what the main similarities are within rule changes that allow for NFL fans to highly support them. Additionally, the results collected in this study allow for football organizations to potentially look at what rules were reported as being most supported and simply implementing them into the game. Since Study 1 also included perceived effectiveness of each rule, this further supports the fact that NFL fans not only support these curated rule changes but that they also deem them to be effective in preventing concussions.

Limitations

Following the discussion of the findings of both Study 1 and Study 2, I do want to acknowledge some of the limitations present within this study while also providing direction for further research. The first limitation was that all participants were recruited via the recruitment platform Prolific (www.prolific.co). Due to this recruitment method being a platform for individuals to participate for academic research purposes there could be a bias because Prolific users may have been exposed to similar studies/manipulations in the past. A potential way for this bias to be removed is to replicate this study at a football stadium and get fans who are physically showing up and supporting teams in person. Conducting an in-person study at a stadium has the potential to recruit a larger sample size as well.

Second, I want to acknowledge that the rule changes that were proposed to the participants was curated by myself and my advisor (Dr. Benjamin Schellenberg). Although these rules were curated based on previous research (Graham et al., 2015), there is an extensive amount of rules that could be implemented in the NFL that could prevent concussions.

Another limitation I want to address is that the methods used in this study were self-reported questionnaires. There is the potential that participants did not answer questions honestly. Additionally, there is the potential that some participants misread, or misunderstood questions being asked which could affect the answers provided. The steps that I took to try to reduce this limitation was by having an honesty check question in both studies, as well as an attention check in Study 2.

Conclusion

Concussions are extremely prevalent in sports such as football (Clark et al., 2017; Ianof et al., 2014; Yengo-Kahn et al., 2016). The severity and consequences associated with

concussions are drastic, disheartening, and relentless (Rapp, 2012; Stone, 2011; Watanabe et al., 2020). The purpose of this research was to test if NFL fans would be more supportive of rule changes made with the intention of reducing the risk of concussions if they felt more empathy toward athletes suffering from concussions. The results of Study 1 showed a positive association between NFL fans' empathy levels and their willingness to support such rule changes. The results of Study 2 suggest that fans who had read a scenario describing an athlete's struggles with a concussion were more supportive of concussion-preventative rule changes than those who had not. Overall, this research provides insight into ways in which the NFL and advocacy groups can create actionable changes to prevent concussions.

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Appendix

Appendix A

Athlete Concussion Description

I am a starting linebacker with tremendous passion for the sport of football. I suffered my second concussion of the season during our last game. I hit the other team's all-star running-back so hard that my eyes went cross-eyed. It was a helmet-on-helmet contact. This was one of those games where every play is just collision, after collision, after collision. After the hit I was immediately knocked out. I don't remember much but I know my trainer was asking me questions such as "What is your name?" "How old are you?" and "Where are you?". Apparently, I wasn't able to answer any of the questions. I was in a daze. After I regained consciousness, I was taken out of the game and sent to the hospital. I was told I would have to go to a concussion clinic in the morning for more tests. In the morning I woke up and felt the common symptoms, confusion, dizziness, sensitivity to light and sound. Once I got to the clinic I did the typical concussion tests, the doctor confirmed my concussion and told me to sit out for a couple weeks.

Those couple weeks never ended; it's been over a year now. I never returned to the game I love. After many follow ups with my trainer, I was never cleared to return to play. I continue to suffer from my symptoms (e.g., headaches, confusion, dazed). I was ready to deal with the symptoms if I was able to play again, but they've got progressively worse. My brain is so overwhelmed that I can only go to school for 3 days a week. Because of all this, I am behind in school which makes me anxious, and I'm lonely because I can't even see my friends because it's too overwhelming. And on top of it all I miss football. I was referred to a sport psychologist to help me cope with the lack of football, who diagnosed me with anxiety and depression. I never imagined all this could happen because of a couple concussions.