

THE IMPACT OF SOCIAL PRESSURES ON THE REPORT
BEHAVIOR OF SPORTS-RELATED CONCUSSION

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Emily Machel Lund

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BEHAVIOR OF SPORTS-RELATED CONCUSSION

by

Emily Machelie Lund

Thesis Supervisor:

Carmen Westerberg, Ph.D.
Department of Psychology

Second Reader:

Krista Howard, Ph.D.
Department of Psychology

Approved:

Heather C. Galloway, Ph.D.
Dean, Honors College

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Abstract

Research with athletes suggests that failure to receive treatment for an injury or returning to play too soon after an injury can have significant negative consequences for long-term health. An important but often overlooked aspect of this research concerns how social pressures may influence the decision to report injuries. This study examined the effects of social influences and demographics on the report behavior of sports related concussion. It was hypothesized that social influences such as Perceived Teammate Closeness, Perceived Gender Biases, and Perceived Parental Influence would influence the number of unreported concussions; and that males would have a higher number of unreported concussions compared to females. This project was done using a sample of 94 college aged athletes (ages 18 to 25). A questionnaire was used to assess the injuries athletes have incurred, their readiness to return to play following injury, and personal history of concussions and concussion-like symptoms. Using a Chi Squared analysis to test relationships between different demographic variables such as gender, ethnicity and possession of insurance a significant difference was found. This indicated that those in possession of insurance are more likely to seek medical treatment for their concussion ($X^2(1)= 3.834, p=.050$). There was also a significant difference, such that males were more likely to have an unreported concussion compared to females ($X^2(1) =5.251, p<.05$). A series of analysis of variance (ANOVAs) were also run to test relationships between the different types of social influences. No significant differences were found for these factors (all p values > .08). Given the growing public concern for the long-term consequences of sports related head injury, studying how these injuries are reported to

health officials could ultimately allow coaches and doctors to more accurately assess the existence of and/or extent of an injury, leading to the proper medical treatment and better-informed return-to-play decisions.

I. INTRODUCTION

An estimated 300,000 sport-related traumatic brain injuries, predominantly concussions, occur annually in the United States (Sosin et. al, 1991). Statistics show that sports are second only to motor vehicle crashes as the leading cause of traumatic brain injury among people aged 15 to 24 years (Gessel et. al, 2007). In the 2013-2014 academic year, approximately 478,869 student-athletes participated in an NCAA competition sports team. Unfortunately, for every 1,000 of these collegiate athletes about 6 of them will experience an injury in an average season. For men's football, this number jumps to 9.5 for every 1,000 athletes (Kerr, 2015). With the large scale of college students participating in organized sports, the health and safety of these athletes on and off the field is a top priority of parents and coaches alike. Research with athletes suggests that failure to receive treatment for an injury or returning to play too soon after an injury can have significant negative consequences for long-term health (Podlog, 2011). Musculoskeletal injury is common in sports, and usually symptoms are easily identified at the time of injury by onsite medical professionals. However, concussions and other traumatic brain injuries can be far more ambiguous. The aim of this project is to investigate the ways in which social factors at play in a collegiate athlete's life can influence how they view their injuries, and what they do about them when the injury is received.

According to the National Collegiate Athletic Association, or NCAA, a concussion is a brain injury that may result from a blow to the head, face, neck, or

elsewhere on the body that causes an "impulsive" force transmission to the head. The Coaches Fact Sheet provided by the NCAA lists that symptoms of concussion can include light and noise sensitivity, confusion, "dazed look", headache, and nausea or loss of consciousness (NCAA, 2014). It is believed that repeated concussive incidents can lead to the development of Chronic Traumatic Encephalopathy, or CTE. This is a brain condition in which tangles of tau proteins develop and block normal processes from occurring. This brain degeneration is associated with memory loss, confusion, impaired judgment, paranoia, impulse control problems, aggression, depression, and, eventually, progressive dementia (McKee, 2009). A history of head injury and sports that involve chronic blows to the head, such as football, have both been linked to the development of CTE later in life (Stahl, 2013).

Since the discovery of CTE, sports concussions and musculoskeletal injury are under high levels of scrutiny from the scientific and medical communities, leading to advancements in technology and public awareness for traumatic sports injuries of all types. Despite all of the new attention paid to how these injuries occur, very few studies have examined factors that influence how these injuries are reported. An important but often overlooked aspect of concussions and other sports injuries is the factors that may influence an athlete's decision to report injuries. The results of this project aim to fill an important gap in the literature by providing new perspectives on factors that influence the reporting of sports-related injuries.

Current Strategies for Concussion and Injury Prevention

The NCAA has maintained the Injury Surveillance System (ISS) for intercollegiate athletics since 1982 (Lo, 2014). This was designed to monitor player

safety post-injury, help ensure that injuries were actively reported to medical professionals, and to provide data to aid in research on sports safety. Due to the aforementioned increase in public concern surrounding sports injury, revisions were made to these “return to play” guidelines in the 2009 edition of the Medicine Handbook used by collegiate coaches and physicians to determine return to play eligibility. The changes aimed to decrease re-injury by providing more detailed information to coaches in order to better facilitate return to play decisions for athletes who had recently received a head injury. The guidelines state that a student-athlete cannot return to play the same day of the injury after evidence of significant symptoms, and if the symptoms continue persistently the athlete should not participate until cleared by a physician (Neumann, 2012).

Technology has also influenced policy changes in how sports injuries are dealt with, as it allows more precision in the course of treatment. An example of this is ImPACT, a diagnostic program that provides computerized neurocognitive assessment tools and services through a baseline test and a post-injury test given to student athletes. The program is able to assist in mapping out the treatment course by comparing pre- and post-injury tests and interpreting the athlete’s contrasting responses to a series of online tests and questionnaires. The post-injury test is then given multiple times as the athlete recovers, and the resulting data can then be used by coaches, athletic trainers, doctors, and other health professionals to assist them in determining if an athlete is able to return to play after suffering a concussion (ImPACT, 2006). As is evident in the current literature, a large emphasis is placed on examining how these injuries happen. However, it can be argued that educating athletes, parents, and professionals on how severe the

effects of an unreported concussion can be is equally essential if we are to better treat this injury.

A recent review explored the degree to which our population would benefit from increasing education and research on concussion prevention strategies. It is evident that in order to develop an effective sport-related concussion prevention program, we must increase the knowledge of concussion rates, patterns, and risk factors of everyone involved in an athlete's success, from parents to coaches (Lo, 2014). It is now critical that our society make an educated change in its attitude towards athletes and shift our focus from the greater good of the team, to the health and wellbeing of the individual. It is also important to begin considering non-biological factors affecting this observed increase in injury likelihood, such as the potential social influences on the decisions to report or hide an injury.

Social Influences on Sports Injury Report Behavior

Why an athlete would put off reporting a sports injury, even with knowledge on the harmful effects a sports-related injury can have on the body if ignored, has long puzzled researchers and doctors alike. One study found that many athletes might be reluctant to report injury for fear that they may be letting down their teammates, coaches, and parents if they are removed from play (Register-Mahalik, 2013). However, it has yet to be examined in detail if the social pressures athletes feel, defined as the pressure felt from their teammates, their families, or by gender-based expectations, can alter willingness to report an injury. A recent study showed that after receiving a concussion, athletes showed a significant increase in enthusiasm for post-concussion ImPACT testing compared to participants who had not experienced a concussion (Rabinitz et. al, 2015).

This increase in enthusiasm in athletes who received injury highlights the motivation most feel to return to their teammates and their sport as quickly as possible after removal from play due to injury. However, the question of what makes them so eager to return still remains.

One reason an individual may return to play prematurely or ignore their injury could be the relationships the athlete shares with his or her teammates. Stander et. al (2015) described teammate relationships as the appreciation members of a team have for each other, being able to count on the support of other members of the team, and a general culture of acceptance and sustenance existing in a team of individuals. In other words, the closeness and strength of relationships between an athlete and their team has a significant anticipated impact on that player's confidence and consequential success on the field. It would not be difficult to perceive how this impact could linger off the field as well, and the social desire to remain close to these individuals could affect decision making in regards to a player's desire to return to play even in the absence of a doctor's consent.

Parents, especially in youth and adolescent populations, also share a significant stake in an athlete's career. Leff & Hoyle (1995) looked intently at how young tennis players perceived their parents' investment in their athletic career. They found that females perceived more support from their parents than males did, while males perceived more pressure, especially from their fathers. In another study, the less parental pressure perceived by young male and female basketball players, the more enjoyable they rated their experience playing a game (Brustad, 1998). Regardless of the sport, it is clear that their parents' opinion can significantly influence athletes' motivation to continue playing

their sport. However, parents and teammates may not be the only factors that influence these decisions. When trying to predict the likelihood of an athlete to report a sports injury, it could be important to consider how gender may influence this decision as well.

Gender and Sports Injury Report Behavior

Beliefs about gender differences in performance ability, and how our society perceives females in athletic roles, could contribute to report behaviors. A recent study revealed that women are more likely to report concussions than men, but it is admittedly unclear if this gender difference is related to biological differences or social influences (Ristolainen, 2009). It is very possible that societal perceptions of ability could differentially affect male and female athletes, and significantly affect a player's willingness to return to play and his or her attitude towards seeing a doctor after injury (Nixon, 1996). The commonly constructed idea is that a male athlete differs only biologically from a female athlete, without any attention paid to the psychosocial differences that may be at play. However, this conclusion may be premature (Theberge, 2015).

A recent review of gender ability in sports suggested that the sports industry dramatizes and celebrates bodily capacities and limitations. This industry has historically conveyed ideas about how males are athletically more capable, often synonymous with aggressive, compared to female athletes. Consequently, these differences are assumed to have an impact on an individual's athletic career (Theberge, 2015). According to the Expectancy-Value Model (Eccles et. al, 2000), the two most critical variables for determining a young individual's choices and behaviors are their expectations of success in that activity and the value that he/she places into it (Boiché et. al, 2014). An example

of an inferred difference in ability based on these perceptions of success and value having an effect on behavior is the opposing contact classifications for men and women's lacrosse that results in different requirements for protective gear. The male sport is assumed more aggressive in nature, so the rules allow for more contact and full shoulder pads, upper body pads, and helmets are worn. However, despite the rules not allowing contact, concussions continue to be reported at relatively high rates in women's lacrosse (Clark and Hoshizaki, 2016); supporting the need for a more expansive analysis on the causes of women's sports concussion.

This widely accepted imbalanced description of a woman's capability or aggressive behavior in comparison to a man's, highlights how our culture is reliant on sports to define gender. This understanding is crucial to psychological research into why an athlete may or may not report an injury. There are numerous publications compiled in a review that used self-report scales in order to indicate that women are more likely than men to sustain a sports-related injury (Dick, 2009). Nine of the fourteen sports teams reviewed in this paper showed that there was a higher absolute injury rate for female athletes compared to their male counterparts. It is important to recognize, however, that all 51 of the studies reviewed examined gender differences based on biological injury likelihood, but none of these studies examined other explanations for the higher rate of injuries in females compared with males.

This project aimed to fill this gap in previous literature, as it examined the ways in which social influences and gender could affect whether or not a student athlete reports a sports injury or concussion by administering a survey to former and current student athletes. The social influences included perceived parental support, and perceived

teammate closeness. There are many pressures that can alter the way an athlete may experience their injury, and many choose not to seek medical attention for their injuries due to these pressures. Identifying factors that influence an athlete's decision to report an injury could allow for better treatment and a better understanding of gender differences in the incidence of sports concussions and injury in collegiate athletes.

II. METHODS

Participants

We recruited 233 collegiate athletes to participate in an anonymous online survey. Participants were recruited through the Texas State University Department of Psychology research participant pool, social media outlets, and University mass emails. Data collected from students in the Department of Psychology participant pool were given extra credit for an introductory psychology class at Texas State University (n=54). All other participants were given the option to be entered into a raffle for one of twenty \$50.00 Amazon.com gift cards (n=123). Raffle winners were selected randomly using a number generator. It was required that participants be collegiate athletes, defined as ages 18 to 25, and have played previously or currently play on a University affiliated and recognized sports team (n=177).

Materials

The survey contained questions regarding demographics, socioeconomic status, sports affiliation and experience, and other questions pertaining to incidence and description of sports injury and concussion. The survey also included validated instruments such as the Rosenbaum Concussion Knowledge and Attitudes Survey

(RoCKAS) (Rosenbaum et. al, 2000) to assess concussion knowledge and in a separate portion of the survey the participant's concussion attitudes.

Questions regarding the influence of family were based on the Leff and Hoyle (1995) Perception of Family Support and Pressure index. Family Pressure scores, with questions such as "My family is very competitive and pushes me to succeed at my sport", were subtracted from Family Support scores, with questions such as "My family attends my sports events regularly", to create the Total Family Influence Score. A higher Total Family Influence Score will indicate a higher level of familial influence on the athlete.

Teammate Closeness was measured based on the Stander et. al (2015) modifications to the Questionnaire on Experience and Assessment of Work, known by its Dutch abbreviation of VBBA, developed by Van Veldhoven et al. (1997). Responses were measured on a 5-point Likert scale with questions such as "I spend most of my time outside of practice with my teammates" and "I am closer to my teammates than friends outside of my sport". The sum of the points for each question were totaled for the Teammate Closeness Score, with a higher score indicating an increase in social pressure from teammates due to social closeness.

Gender comparisons were made based on demographic questions. Additionally, measures created by Bonnot and Croizet (2007) were used with modifications made based on the study done by Boiché (et. al 2014) assessing the participants' perception of male and female competence in sports and their perceptions of male and female value in sports. Two stereotypes were assessed, Sport Competence: defined as the chances of success estimated in a given situation, and the assumed direct relationship to perceived ability. Questions included "Personally, I think that performance of boys in sport is

generally...”; “Personally, I think that performance of girls in sport is generally...”; with answers ranging from 1 (very poor) to 7 (very good), and Value: defined as relative importance accorded to do well in the activity, its perceived usefulness, the inherent interest, potential positive outcomes, and costs attached to engaging in it was also evaluated. Questions included “Personally, I think that for boys doing sport is...”; “Personally, I think that for girls doing sport is...”; with answers ranging from 1 (not important at all) to 7 (very important).

III. RESULTS

Demographics

Analysis for this study were restricted to only individuals who reported having a concussion (n=95). Those who had not received any concussion were removed (n=82). Whether the participant had a concussion that was unreported to a medical professional or not placed them into one of the two categories examined, Any Unreported (n=51) and Diagnosed Only (n=44). The sample included predominantly females (n=71) in comparison to males (n=23).

I first looked at demographics to see if any of these factors affect concussion report behavior. I did a series of Chi Squared tests on ethnicity (White, Black/African American, Hispanic/Latinx, and Other) sports with helmets vs. non-helmets, and contact vs. non-contact sports, to examine their affects on report behavior. None of the comparisons reached significance (all p values > .08). There was a significant difference for insurance, such that possession of insurance showed a greater number of reported concussions $\chi^2(1)= 3.834, p=.050$. These findings indicate that those in possession of medical insurance are more likely to seek medical treatment for their concussion.

Another Chi Squared test was used to determine if there was a significant difference in the proportion of males in comparison to females that had an unreported concussion. There was a significant difference, such that males were more likely to have an unreported concussion compared to females $\chi^2(1) = 5.251, p < .05$. These findings indicate that men are more likely to have an unreported concussion than women, and women are more likely to have a diagnosed concussion.

Social Influences

Several One Way ANOVAs were conducted to see if there was a difference in Gender Competence, Gender Value, Team Closeness, and Family Influence/Closeness based on whether the individual had only a professional diagnosis of concussion or any unreported concussion. None of these comparisons were significant (all $p > .05$).

IV. DISCUSSION

The purpose of this study was to determine if there was a significant relationship between social influences such as gender, teammate closeness, and perceived family pressure and concussion report behaviors. My first hypothesis, that the number of unreported concussions would differ for males versus females, was supported. My second hypothesis was that social influences such as Perceived Teammate Closeness, Perceived Gender Biases, and Perceived Parental Influence would influence the rate of unreported concussions. However, this hypothesis was not supported by the current data.

The significance found in my first hypothesis testing the relationship between a person's gender and their number of unreported concussions is supported by most research done comparing men and women with self-report scales (Dick, 2009, Ristolainen, 2009). In these studies however, whether or not there was a significant

difference in diagnosed and undiagnosed concussion prevalence between genders was not examined as a potential explanation for these differences. Significance was also found between an athlete who has insurance and their lack of an undiagnosed concussion. Information regarding the potential predictors of sports-related injuries such as gender differences and insurance possession, may ultimately allow coaches and doctors to better identify sports injuries in these populations. This could lead to better accuracy in medical treatment and better-informed return-to-play decisions.

This study did not find that social factors influenced reporting behavior. Limited research examining social influences on report behavior has been done. However, several studies have found incidence of significance for social influences on injury report behavior (Nixon, 1996, Register-Mahalik, 2013, & Brustad, 1998). The lack of significant findings in the present study could be attributed to one of the limitations described below.

Some limitations to this project include the time of year the data set was collected. Due to the month of May being a difficult time to contact collegiate athletes as a large majority of students are not taking classes, and no sport teams meet regularly. The recruitment methods required a lot of effort for a much smaller response rate than would be expected in mid-semester/season, leading to lower participant numbers than expected. This also led to the issue of sampling bias. The present study had predominantly females and a large portion of lacrosse players in comparison to the other sports. A more diverse sample of the collegiate athlete population would be expected with a recruitment period during an academic semester; when entire sports teams can be reached at once and the

Texas State University Psychology Department student research pool can contribute a larger number of students.

V. CONCLUSION

In conclusion, the main goal of this project was to examine the potential influences of an athlete's gender, demographics, perceived familial influence, or perceived teammate closeness on the individual's willingness to identify and seek medical treatment for their sports concussion. The primary findings indicate significance in two areas. Individuals without insurance may be more likely to avoid reporting a sports concussion. Additionally, male athletes are more likely than female athletes to have an unreported sports concussion. The results of this study contribute additional information to a rapidly growing field of research on potential predictors for unreported concussions, and allow for additional research to be done on the social factors that may influence statistics on sports concussion by affecting a player's report behavior.

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Figures and Tables

Table 1: Chi Square Analysis of Demographics

	Professionally Diagnosed Concussion	Any Unreported Concussion	P value
Gender % Male	73.9%	26.1%	.022
Ethnicity			.872
African American	50%	50%	
Hispanic/Latinx	50%	50%	
White	52.3%	47.1%	
Other	75.0%	25%	
Insurance % with Insurance	56.5%	43.5%	.050
Type of Sport % with Contact	48.1%	51.9%	.326
Helmet Used % with Helmet	43.9%	56.1%	.112