Université de Montréal

Une exploration des perspectives d'étudiants-athlètes sur la préparation psychologique pour reprendre le sport après avoir subi une commotion cérébrale

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Ce mémoire intitulé

Une exploration des perspectives d'étudiants-athlètes sur la préparation psychologique pour reprendre le sport après avoir subi une commotion cérébrale

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A été évalué par un jury composé des personnes suivantes

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Résumé

Les athlètes qui reprennent le sport après avoir subi une commotion cérébrale sont considérés comme « prêts » lorsqu'ils ont complété un processus de six étapes qui augmente l'effort physique et cognitif. Cependant, ce processus néglige largement les facteurs psychosociaux impliqués dans le retour au sport après une commotion cérébrale. Cette étude qualitative a utilisé une méthodologie narrative et une position philosophique constructiviste pour explorer les perceptions de 12 (n = 6 femmes) étudiants-athlètes universitaires canadiens ayant subi une commotion dans la préparation psychologique pour reprendre le sport. Les participants étaient âgés de 18 à 25 ans au moment de leur commotion et ont été absents du sport pendant au moins un mois. Chaque athlète a participé à deux entrevues via Zoom (entrevue 1 : *M = 103 min* ; entrevue 2 : *M = 88 min*). Les données ont été analysées en utilisant la non-fiction créative. Six thèmes narratifs ont été interprétés à partir des données : confiance, peur, identité, soutien, pression et cas par cas. Deux récits composites ont été écrits pour illustrer les thèmes narratifs impliqués dans la préparation psychologique. L'histoire de Pierre-Olivier dépeint ses pensées, ses émotions et les interactions en tant que joueur de hockey universitaire masculin de deuxième année qui était prêt à retourner au sport et qui a connu des résultats positifs. L'histoire de Pierre-Olivier se concentre sur les jours précédant son retour au sport après avoir reçu l'autorisation médicale. L'histoire d'Andrea présente le portrait d'une capitaine d'une équipe féminine de rugby qui n'était pas prête à son retour et qui a connu des résultats négatifs. L'histoire d'Andrea est un retour sur son autorisation médicale lorsqu'elle parle avec son médecin, et ses interactions avec une ancienne co-équipière qui cherchent ses avis. Cette étude est l'une des premières à examiner la préparation psychologique des athlètes ayant subi une commotion cérébrale. Ces résultats indiquent la nécessité d'une évaluation plus globale des

athlètes ayant subi une commotion cérébrale afin d'aider à déterminer qui est (et qui n'est pas) prêt à reprendre le sport après une commotion cérébrale.

Mots-clés : commotion cérébrale liée au sport, réadaptation, préparation psychologique, la non-fiction créative, psychologie du sport

Abstract

Athletes returning to sport following a concussion are deemed 'ready' once they have completed a six-step process that increases in physical and cognitive exertion. However, this process largely overlooks psychosocial factors involved in returning to sport following a concussion. This qualitative study used a narrative methodology underpinned by a constructivist philosophical position to understand 12 (n = 6 females) formerly concussed Canadian university student-athletes' perceptions of the factors they believed were involved in feeling psychologically ready to return to sport. Participants were aged 18 to 25 years during their concussion and experienced a minimum of one-month absence from sports. Each athlete participated in two Zoom interviews (interview 1: *M = 103 min*; interview 2: *M = 88 min*). The data was analyzed using creative non-fiction. Six themes were interpreted from the data: confidence, fear, identity, pressure, support, and case-by-case. Two composite narratives were written to depict the themes involved in psychological readiness. Pierre-Olivier's story portrays the thoughts, emotions, and interactions of a second-year university men's ice hockey player who was ready to return to sport and experienced successful outcomes. Pierre-Olivier's story focuses on his growing readiness leading up to his first game following his medical clearance. Andrea's story portrays a women's rugby captain who was not ready to return to sport and experienced an unsuccessful return to sport. Andrea's story depicts a flashback to a conversation with her doctor during her medical clearance and her interactions with a former teammate seeking advice. This study is among the first to examine psychological readiness among concussed athletes. These results indicate a need for a more holistic assessment of concussed athletes to help identify who is (and who is not) ready to return to sport following a concussion.

Keywords: sport-related concussion, rehabilitation, psychological readiness, creative non-fiction, sport psychology

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List of signs and abbreviations

In the order that they appear in text:

CTE: Chronic Traumatic Encephalopathy

NFL: National Football League

NCAA: National Collegiate Athletic Association

CISG: Concussion in Sport Group

I-PRRS: Injury-Psychological Readiness to Return to Sport Scale

ACL-RSI: Anterior Cruciate Ligament-Return to Sport after Injury Scale

ACL: Anterior Cruciate Ligament

JASP: Journal of Applied Sport Psychology

JSEP: Journal of Sport and Exercise Psychology

TSP: The Sport Psychologist

ML: Matthew Lassman, 1st author

JC: Dr. Jeffrey Caron, 2nd author

CNF: Creative nonfiction

Dedications

This thesis is dedicated to my parents and sister. Thank you for always pushing me to reach higher, to dig deeper, and to keep going. I am grateful for your unconditional love, wisdom, and support.

I also dedicate this thesis to the loving memory of my maternal grandparents Fred and Libby. I know that you are with me through all of life's peaks and valleys.

Finally, this thesis is also dedicated to all athletes who have suffered a concussion. Thank you for sharing your stories with me. I hope that you feel seen and understood.

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Preface

This master's thesis consists of four chapters. Chapter one is a literature review of contemporary knowledge and understanding of sport-related concussion and psychological readiness to return to sport after an injury. The first chapter also outlines the objectives and research questions guiding this thesis. Chapter two outlines the methodology and methods used to carry out this study. Chapter three is an original manuscript on student-athletes' perceptions of psychological readiness to return to sport following a concussion. The third chapter highlights the findings of this thesis and discusses them in relation to existing research. Chapter four provides a summary of this thesis and offers some directions for future research.

Chapter 1

Introduction and Literature Review

Chapter 1 is divided into four sections, each with sub-sections: 1) sport-related concussions in the media, 2) sport-related concussion as a type of athletic injury, 3) the psychology of athletic injury, and 4) psychological readiness to return to sport following injury. First, sport-related concussions of sports stars are introduced as a highly publicized and controversial phenomenon. Then, media representations of sport-related concussions are discussed, its link with long-term neurodegenerative impairments such as Chronic Traumatic Encephalopathy, and how media representations could influence the public's perceptions of concussions, including athletes. Second, sport-related concussions are contextualized as a type of athletic injury, including a brief examination of the history of the Concussion in Sport Group, a multidisciplinary group of experts who have contributed to the current understanding of the injury (definition, incidence, symptoms, management, and return to sport). Third, the psychosocial factors associated with musculoskeletal injury are reviewed. Fourth, the concept of psychological readiness to return to sport following injury is explored, which has not yet received empirical attention with concussed athletes.

Sport-Related Concussions in the Media

Since the turn of the century, the topic of concussions in sports has received considerable attention in public discourse (Mannix et al., 2016). The emergence of concussions as a cultural phenomenon in North America can be largely attributed to increased media coverage, documentaries, and films that depict the struggles of high-profile athletes following hits to the head (McGannon et al., 2013; Ventresca, 2019). For example, the concussions of Sidney Crosby, who is widely regarded as one of the world's best male ice hockey players, and of star American

football quarterback Aaron Rodgers, were highly publicized in Canada and the United States, respectively. A media analysis of both Crosby's and Rodgers's concussions conveyed a growing cultural awareness of the potentially devastating effects of concussions on an athlete's physical and mental health (Anderson & Kian, 2012; McGannon et al., 2013). Indeed, both athletes' concussions sparked public debates that softened cultural norms of athletes in collision sports to put their bodies at risk in the name of athletic glory (Anderson & Kian, 2012; McGannon et al., 2013). The media reporting of prominent sports stars such as Crosby and Rodgers highlighted a gradual cultural transition in attention from bone-crushing hits in contact and collision sports to a consideration of athlete health and safety (Anderson & Kian, 2012; McGannon et al., 2013).

Extensive media coverage has centered on the link between concussions and long-term neurological impairments such as dementia and Chronic Traumatic Encephalopathy (CTE) (Ventresca, 2019). *Dementia* describes a group of diseases and conditions affecting the brain that is characterized by a decline in memory, language, problem-solving, and other cognitive skills that hinder a person's ability to perform daily life activities; whereas *Chronic Traumatic Encephalopathy (CTE)* is a progressive neurodegenerative condition in the brain and is associated with repetitive head trauma, which commonly occur in contact and collision sports (McKee et al., 2016; Mez et al., 2017). The media coverage of concussion and its link with CTE is owed, in part, to a 2017 study from Boston University where CTE was diagnosed in 110 out of the 111 brains researchers examined from the sample of former American football players who competed at a professional level (i.e., former National Football League (NFL) players) (Mez et al., 2017). Although there is a growing body of evidence that has demonstrated associations between concussions and CTE, researchers have yet to demonstrate a cause-and-effect relationship (Gavett et al., 2010; McCrory et al., 2017). However, researchers have noted that the

public's perception of sport-related concussions and of CTE is based more on highly publicized and emotionally charged headlines than on existing empirical data (Kuhn et al., 2017; Ventresca, 2019).

These findings are relevant to the present thesis because movies (e.g., *Concussion*), TV series (e.g., *The Mind of Aaron Hernandez*) (Gregory, 2020), documentaries and books (e.g., *League of Denial*) (Fainaru-Wada & Fainaru, 2014) that depict sport-related concussion and long-term neurodegenerative impairment are being viewed by current athletes of all ages, including university athletes. Results from Baugh et al. (2017) demonstrate how media portrayals might impact athletes' perceptions of concussions. Specifically, 734 National Collegiate Athletic Association (NCAA) Division 1 American football players were surveyed on their perceived susceptibility to concussion and concussion-related health consequences. Results of this study indicated that nearly 40% of the athletes surveyed strongly believed that they would suffer a concussion in the future that would cause them to miss games or end their season or career prematurely (Baugh et al., 2017). Moreover, approximately 10% of the same sample of athletes believed they'd suffer from dementia, Alzheimer's, or CTE in the future (Baugh et al., 2017). In sum, these findings suggest that athletes have concerns about the short- and long-term health implications that are being linked with concussions, which could stem from media discourse surrounding brain injuries in sport in North America.

Sport-Related Concussion as a Type of Athletic Injury

Since the beginning of the 21st century, there has been a proliferation of published peer-review articles (e.g., consensus statements on concussions in sport), conferences (e.g., *International Conference on Concussion in Sport*), and periodicals (e.g., *Journal of Concussion*) on sport-related concussions from diverse fields of expertise. Much of the exponential growth of

sport-related concussion research can be traced back to the Concussion in Sport Group (CISG). An examination of the history of the CISG is relevant because the consensus statements they have produced following their conferences are widely considered a 'gold standard' resource for researchers, clinicians, and sport leagues worldwide.

Concussion in Sport Group

A number of health organizations have published consensus statements on sport-related concussions, including the American College of Sports Medicine (Herring et al., 2011), the American Medical Society for Sports Medicine (Harmon et al., 2013), the American Academy of Neurology (Giza et al., 2013), and the National Athletic Trainers' Association (Broglio et al., 2014), to name a few. However, the most impactful has undoubtedly been the CISG, which can be evidenced by the fact that the most recent CISG consensus statement (McCrory et al., 2017) is already among the 99th percentile of research outputs ever tracked by *Altmetric*, which has measured the quality and quantity of online attention of over 18 million peer-reviewed articles as of July 2021. Moreover, the recommendations published in the 5th CISG consensus statement have been implemented by over a dozen professional and elite sport leagues and governing bodies, on both a national and international scale (Davis et al., 2020; Patricios et al., 2018).

The CISG was founded in 2001 with the goal of developing a greater understanding of sport-related concussions and to improve the health and safety of athletes who suffer a sports-related concussion (Aubry et al., 2002; Meeuwisse et al., 2017). The CISG is an assembly of international experts on the clinical and research aspects of sport-related concussions from areas of expertise such as neuropsychology, neurosurgery, and sports medicine, to name a few. To date, the CISG has held five meetings: 2001 in Vienna (Aubry et al., 2002), 2004 in Prague (McCrory et al., 2005), 2008 and 2012 in Zurich (McCrory et al., 2009; McCrory et al., 2013),

2016 in Berlin (McCrory et al., 2017); their 6th meeting was planned for October 2020 in Paris but has been postponed until October 2022 due to the COVID-19 pandemic. At the time of this writing, the most recent CISG consensus statement is derived from the 5th International Conference on Concussions in Sport, held in Berlin in 2016 (McCrory et al., 2017). In the remainder of this section, an overview of the findings and recommendations from the 5th CISG document is provided. Specifically, the definition, incidence, and symptoms of sport-related concussion are described. Then, the most up-to-date concussion management strategies and recovery recommendations are discussed because these are the most relevant for the purpose of this thesis.

Definition of Sport-Related Concussion

Although there are approximately 43 working definitions of concussion (Hainline & Ellenbogen, 2017), the CISG has defined *sport-related concussions* as a type of traumatic brain injury that occurs most often through participation in contact (e.g., soccer, basketball) and collision (e.g., ice hockey, American football) sports as a result of a direct or indirect blow to the head, face, neck, or body by another player, piece of equipment, or the playing surface (McCrory et al., 2017). On the spectrum of traumatic brain injury, concussions are considered "mild" because they are closed-head injuries that are typically non-life threatening despite their link to long-term adverse health and psychological consequences (Manley et al., 2017). Moreover, the CISG outlines that only a small number of concussions may involve a loss of consciousness or post-traumatic amnesia (Gasquoine, 2020; McCrory et al., 2017). A concussion causes a rapid onset of neurological impairments in the brain that typically improve spontaneously within 10 to 14 days in adults, and 30 days in children and adolescents (McCrory et al., 2017). However, 10-15% of concussed adults and 30% of concussed children and adolescents may experience

protracted concussion symptoms lasting over 1 month, which partly occur because of impaired cerebral blood flow due to autonomic nervous system dysfunction (Grubenhoff et al., 2016; McCrea et al., 2013). Additionally, the clinical signs of a concussion largely reflect a functional disturbance in the brain rather than a structural brain injury (Johnson et al., 2015). As a result, concussions are usually undetectable by standard neurological imaging (McCrory et al., 2017), although advanced neuroimaging techniques such as diffusion tensor imaging are able to detect changes in brain function, brain activation patterns, and axonal damage in the brain's white matter (Churchill et al., 2017; Makdissi et al., 2017; Polak et al., 2015). Though the CISG definition of sport-related concussion is multidimensional, some scholars perceive that the current CISG definition is incomplete. For instance, Hainline and Ellenbogen (2017) contend that none of the existing definitions of sport-related concussion provide any specific information on localized brain impairments, biomechanics of injury, or underlying pathophysiology. It is possible that the definition of concussion will continue to evolve following the 6th CISG conference currently planned for October 2022 in Paris.

Incidence of Sport-Related Concussion

Between 2008 and 2016, approximately 1.33 million concussions were diagnosed in the Canadian province of Ontario, for a mean incidence of 1153 per 100 000 residents in Ontario (Langer et al., 2020). Langer et al. (2020) determined that most of these concussions were diagnosed in adults (i.e., 18 years of age and older) and a significant number of these concussions occurred as a result of participation in sport and recreational activities. Indeed, sport injury surveillance data has shown that sport-related concussions occur frequently among student-athletes competing in university-level sports such as lacrosse, men's football, and women's soccer (Zuckerman et al., 2015). Athletes are more likely to suffer a concussion if they

participate in collision (e.g., ice hockey, rugby) or contact (e.g., basketball, soccer) sports compared to athletes who participate in non-contact sports (e.g., baseball) (Conway et al., 2020; Hume et al., 2017; Zuckerman et al., 2015). In their epidemiological review of sport-related concussions among university athletes competing in 25 different sports, Zuckerman et al. (2015) found that 1,670 concussions were reported during the 2009-2010 to 2013-2014 NCAA seasons, which accounted for 6.2% of all sport-related injuries. However, Zuckerman et al. (2015) acknowledged that the actual number and relative injury incidence of sport-related concussions that occurred in their sample was likely underestimated.

Researchers have estimated that about one-third to half of all concussions suffered in university sports are not reported (Asken et al., 2016; Davies & Bird, 2015; Kerr et al., 2016; Llewellyn et al., 2014; Sanderson et al., 2017), with some even suggesting that as many as three quarters of all concussions go unreported within this population (Delaney et al., 2015). In a study of 161 retired university athletes from diverse sports and institutions in the NCAA, Llewellyn et al. (2014) found that 33.5% of athletes reported suffering at least one concussion during their playing careers. However, previous concussion incidence increased to 49.7% when accounting for unreported and unrecognized concussions (Llewellyn et al., 2014). In another study of 469 Canadian university athletes, Delaney et al. (2015) found that 92 athletes reported having suffered a self-diagnosed concussion in the previous 12 months. Of these 92 athletes, 72 (78.3%) reported that they did not seek medical attention at least once and 44 (47.8%) never sought medical attention (Delaney et al., 2015). One of the most frequently cited reasons by the university athletes for not seeking medical attention for a suspected concussion was “Did not feel the concussion was serious/severe and felt [they] could still continue to play with little danger to [themselves]” (Delaney et al., 2015).

Another factor that has contributed to the underestimated incidence of concussion is 'sandbagging' behavior by athletes on neurocognitive assessments that are used to help detect a concussion (Erdal, 2012; Schatz et al., 2017). *Sandbagging* is when an athlete intentionally underperforms on baseline neurocognitive assessments so that in the event of a future concussion, the athlete's concussion-related decline in neurocognitive abilities are undetected, which enables the athlete to keep playing or return to sport earlier (Rabinowitz et al., 2015). For example, one study from Schatz et al. (2017) found that 23% (41/178) of athletes in their study reported that they gave less-than-maximal effort during baseline neurocognitive testing. In sum, the actual incidence of sport-related concussions is likely under-estimated because a considerable number of athletes either underreport or attempt to mask their concussion symptoms.

Symptoms of Sport-Related Concussion

Historically, concussion research has focused on the multifactorial physical symptoms that an athlete may endure. The physical symptoms of a concussion include somatic problems (e.g., headaches, dizziness, fatigue), sensitivity to sounds (Assi et al., 2018) and light (Mares et al., 2019), hormonal dysfunction (Anto-Ocrah et al., 2020), impaired cognitive function (e.g., poor memory and concentration) (Chin et al., 2016), balance and gait deficits (Finnoff et al., 2009), slower processing speed and reaction time (Broshek et al., 2015), cervical spine dysfunction (Streifer et al., 2019), visual/ocular and vestibular dysfunction (Anderson et al., 2019), and exercise intolerance (Leddy et al., 2016). Independently, the symptoms of concussion are non-specific (Iverson, 2019). For example, there is emerging evidence that athletes without a concussion and non-athletes may both report clinically significant levels of concussion-like symptoms in baseline assessments (Asken et al., 2017; Balasundaram et al., 2017). However, a

collection of symptoms can facilitate detection of a sport-related concussion if there is a mechanism of injury (Broglio et al., 2007; Resch et al., 2016).

Though physical symptoms remain a focus of empirical attention, the psychological aspects affecting an athlete's concussion recovery are increasingly recognized as an important domain in research and clinical practice (Kontos, 2019). A concussion has been described as an "invisible injury" because concussed athletes often appear normal to teammates, coaches, and others since they do not exhibit visible signs of injury, such as stitches or crutches (Bloom et al., 2004). Concussed athletes often report feeling misunderstood and psychologically distressed due to the outward perception of appearing healthy despite being injured (Bloom et al., 2004; Tjong et al., 2017). Beneath the physical symptoms of concussion, it is now recognized that an athlete with a concussion may endure a broad spectrum of cognitive (e.g., poor concentration and memory), affective (e.g., anxiety, stress), behavioral (e.g., aggressiveness), and psychological (e.g., reduced quality of life) symptoms that may adversely impact other areas of their life (Wiese-Bjornstal et al., 2015) .

Although the large majority of adult athletes recover, from a clinical perspective, within one month of suffering a concussion (McCrory et al., 2017), concussion symptoms may last weeks, months, and even years if untreated or improperly managed, which can negatively impact quality of life (André-Morin et al., 2017; Caron et al., 2013; Caron et al., 2017). Concussed athletes have reported challenges during recovery due to the non-definitive return-to-sport timeline (Henry et al., 2016; Tjong et al., 2017). Accordingly, there is an overlap of protracted concussion symptoms with the athlete's psychological responses to the injury that makes it difficult to disentangle the etiology of symptoms (Kontos, 2019; Kontos & Collins, 2018). For instance, athletes who experience protracted concussion symptoms may also exhibit social

isolation, frustration with a stagnant recovery, stress from drastic lifestyle changes, and grief associated with a loss of athletic identity (André-Morin et al., 2017; Caron et al., 2013; Caron et al., 2017; Covassin et al., 2014; Dean, 2019). Furthermore, athletes may experience internal (i.e., self-imposed) and external (i.e., appraised from others) pressures to return to competitive sport following a concussion that affect their emotional, psychological, and behavioral responses to the injury (Caron et al., 2021). There are several risk factors to identify athletes who are more likely to experience protracted concussion symptoms or adverse psychological responses to the injury. Some of the prognostic risk factors include pre-existing mood or psychiatric disorders (e.g., anxiety, depression) (Kontos et al., 2016; Yang et al., 2015), a learning disability (e.g., ADHD) (Alosco et al., 2014; Cook et al., 2020; Elbin et al., 2013), pre-concussion sleep difficulties (Bramley et al., 2017; Morse & Kothare, 2018; Sufrinko et al., 2015), a history of migraines or concussion (Iverson et al., 2015; Weber et al., 2018), female sex (Covassin et al., 2016), and developmental age (i.e., children and adolescents) (Davis et al., 2017). Athletes who experience protracted concussion symptoms are more likely to experience negative psychological outcomes which can impact their recovery and return to sport.

Implications of Sport-Related Concussion for University Athletes

University athletes who are diagnosed with a concussion and experience protracted symptoms are ideally withheld from competing in sports, which can have adverse physical (e.g., deconditioning), psychological (e.g., reactive depression) and emotional (e.g., social isolation) implications (Caron et al., 2017; DiFazio et al., 2016; Mainwaring et al., 2010; Silverberg & Iverson, 2013). Additionally, protracted concussion symptoms can have devastating implications for the academic progression of university athletes (André-Morin et al., 2017). In a qualitative study of five female university athletes, the athletes discussed how their protracted concussion

symptoms led to poor concentration and memory, and cognitive fatigue. As a result, the athletes were unable to study efficiently, missed classes, and experienced academic failures (i.e., poor grades, program drop-out, additional semesters required to complete their degree) (André-Morin et al., 2017). Moreover, university athletes often report that there are insufficient academic support resources for students who experience a concussion, which might hinder their recovery (André-Morin et al., 2017; Kasamatsu et al., 2017; Valovich McLeod et al., 2017). Therefore, several unique conditions exist for concussed university student-athletes—particularly those who suffer from protracted concussion symptoms—that could make their recovery and return to sport experience challenging.

Concussion Management Strategies

Since the first International Conference on Concussions in Sport (Aubry et al., 2002), significant progress has been made with respect to concussion evaluation and management strategies. First, an athlete with a suspected concussion should be immediately removed from play (McCrory et al., 2017) because researchers have found that there is a dose-response relationship for athletes who continue to play with a concussion and symptom severity and length of recovery (Charek et al., 2020). Additionally, athletes who continue to play while concussed are at greater risk of suffering another concussion or a musculoskeletal injury (Asken et al., 2016). Up until the 5th CISG consensus statement, health practitioners recommended "rest" (i.e., an athlete with a concussion should be asymptomatic at rest) before resuming participation in activities that require physical and cognitive exertion (McCrory et al., 2013). Though a cautious approach is intuitive, it has limited empirical support, especially for athletes who may experience protracted concussion symptoms (Makdissi et al., 2017; Schneider et al., 2017; Silverberg & Iverson, 2013). In fact, prescribed rest has been associated with deleterious

psychological (e.g., social isolation, reactive depression) and physical (e.g., deconditioning, sleep disturbances) effects post-concussion (DiFazio et al., 2016). Although the optimal length of time of the initial rest period following a concussion remains an area of further empirical investigation, best-practice guidelines now recommend that a concussed athlete should engage in symptom-limited activity (i.e., activity does not significantly worsen symptoms) following an initial 24 to 48 hour period of rest (McCrory et al., 2017).

Active rehabilitation strategies have demonstrated satisfactory safety and enhanced concussion recovery compared to prolonged rest (Chan et al., 2018; Dobney et al., 2016; Gagnon et al., 2009). One such active rehabilitation strategy is sub-symptomatic aerobic exercise (i.e., at an intensity below the threshold of symptom exacerbation) (Leddy et al., 2016; Makdissi et al., 2017; Schneider et al., 2017). There is emerging evidence that sub-symptomatic aerobic exercise may accelerate recovery by attenuating concussion-related autonomic nervous system dysregulation and restoring the neurological and cardiovascular physiological processes that regulate cerebral blood flow (Goldstein et al., 1998; Meier et al., 2015). Moreover, Baker et al. (2012) demonstrated that sub-symptomatic aerobic exercise mitigates physical deconditioning, improves autonomic function, reduces concussion symptoms, and is associated with faster concussion recovery and return to sport. In particular, the Buffalo Concussion Treadmill (or stationary bike) Test has been shown to be safe and reliable in establishing the sub-symptomatic aerobic exercise threshold in athletes with protracted concussion symptoms (Bezherano et al., 2020; Haider et al., 2019; Leddy et al., 2019; Leddy et al., 2010). Sub-symptomatic aerobic exercise is an integral part of the return to sport process for athletes following a concussion.

Graduated Return to Sport Following a Concussion

In line with the growing body of evidence supporting sub-symptomatic aerobic exercise in the management of sport-related concussion (Leddy et al., 2019; Schneider et al., 2017), the 5th CISG consensus statement recommends a six-step process to gradually increase the physical and cognitive exertional demands on the athlete recovering from a concussion (see Table 1 in Appendix C) (McCrory et al., 2017). The concussed athlete's progression through the graduated return to sport steps is monitored by a health professional responsible for managing their return to sport. A concussed athlete must wait at least 24 hours before progressing to the next return to sport step; if an athlete's symptoms worsen, they are recommended to return to the previous step and their recovery timeline is extended (McCrory et al., 2017). There is some support for an intensive physical exertion test (i.e., the Gapski-Goodman Test) or its modified version as the final step before medically clearing an athlete to return to sport after a concussion (Marshall et al., 2019). Athletes are deemed 'ready' to return to sport once they have successfully progressed through the six steps and received medical clearance by a health professional.

However, there are several issues with the return to sport steps as they are currently conceptualized. First, there is limited empirical evidence to support the graduated return to sport steps (Kemp et al., 2016; Wallace et al., 2018). Although certain aspects of the return to sport process have received empirical attention (e.g., symptom-limited exercise is beneficial for concussion recovery) (Langevin et al., 2020), the graduated return to sport steps as a whole are not evidence-based (Bloom et al., 2020). Second, the return to sport steps are reliant on symptom-limited exertion, however, as noted earlier in this chapter, athletes do not always report their symptoms honestly (Clark & Stanfill, 2019; Kerr et al., 2016; Milroy et al., 2020). Further, formerly concussed athletes may experience neuromuscular control and attentional deficits that persist despite receiving medical clearance and completing the graduated return to sport steps,

which has been linked to increased subsequent injury risk (Howell et al., 2018; McPherson et al., 2019). Third, and most relevant for the purpose of this thesis, the current return to sport steps were designed to ensure a concussed athlete's *physical* recovery, but overlook *psychological* variables involved in returning to sport beyond noting that the goals of Step 4 and 5 are "increased thinking" and "restore confidence", respectively. Indeed, there is evidence that physical and psychological aspects involved in returning to sport following musculoskeletal injury do not always coincide (Podlog & Eklund, 2006), which might extend to athletes recovering from a concussion (Caron et al., 2018). Researchers who study injured athletes returning to sport following musculoskeletal and concussive injuries have identified several psychosocial factors that athletes must contend with (Anderson et al., 2019; Clement et al., 2013; Forsdyke et al., 2016; Silverberg et al., 2017), however these variables are not comprehensively addressed in the current return to sport steps.

Psychology of Athletic Injuries

Athletes, coaches, clinicians, and researchers have long known that psychological factors play an important role in athletes' recovery and return to sport experiences (Wiese-Bjornstal et al., 1998). A systematic review of 25 peer-review articles found that there are emotion-related (e.g., performance-related anxiety and fear of re-injury), cognition-related (e.g., restoring sport-related self-efficacy), and behavior-related (e.g., adaptive coping strategies) psychosocial variables associated with musculoskeletal injury rehabilitation that influence athletes' recovery and return to sport outcomes (Forsdyke et al., 2016). These psychosocial factors involved in returning to sport are either debilitative or facilitative, and are largely reliant on the injured athlete's appraisal of them (Wiese-Bjornstal et al., 1998). A number of researchers have proposed stage-based or biopsychosocial models to illustrate the psychosocial factors involved in returning to sport following musculoskeletal injury (Iñigo et al., 2015; Podlog & Eklund, 2007;

Santi & Pietrantoni, 2013; Taylor & Taylor, 1997; Van der Poel & Nel, 2011; Wiese-Bjornstal et al., 1998). One of the more popular models is the integrated model of responses to sport injury and rehabilitation, which encompasses the emotional, cognitive, and behavioral psychosocial factors associated with an athlete's return to sport in an inter-related, dynamic, and recursive process (Wiese-Bjornstal et al., 1998). The model contains two stages: 1) preinjury factors and 2) psychological response to sport injury and rehabilitation. When an athlete is injured (i.e., second stage of the model), personal and situational factors influence the athlete's cognitive appraisal of the injury, which underpins their emotional and behavioral responses and recovery outcomes (Wiese-Bjornstal et al., 1998). The integrated model has also been adapted to illustrate the psychological responses specifically associated with sport-related concussion and the rehabilitation process (see Figure 1 in Wiese-Bjornstal et al., 2015). The integrated models illustrate some of the psychosocial factors that may be important in an athlete feeling 'ready' to return to sport following a musculoskeletal injury or a concussion.

Psychological Readiness to Return to Sport

Researchers have used the term *psychological readiness* to describe the psychological factors involved in the process of returning to sport following musculoskeletal injuries (e.g., ACL tears) (Ardern et al., 2014; Kunnen et al., 2019; Podlog et al., 2015). A number of measures have been developed to assess psychosocial variables that are believed to be involved in athletes' psychological readiness to resume sport participation following musculoskeletal injury (see Everhart et al. (2020) for a review). For instance, the Injury-Psychological Readiness to Return to Sport (I-PRRS) Scale ($\omega = 0.88$) is a 6-item scale that assesses athletes' confidence when returning to sport after an athletic injury (Glazer, 2009). Example of I-PRRS items include "Overall confidence to play", and "Confidence in skill level/ability". Another psychometric

measure is the 12-item Anterior Cruciate Ligament-Return to Sport after Injury (ACL-RSI) Scale ($\alpha = 0.95$) (Ardern et al., 2014; Webster et al., 2008), which has also been adapted for athletes with shoulder injuries (Gerometta et al., 2018). The ACL-RSI is composed of three domains: 1) emotions (e.g., "Are you nervous about playing your sport?"), 2) confidence (e.g., "Are you confident that you can perform at your previous level of sport participation?") , and 3) risk appraisal (e.g., "Do you think you are likely to re-injure your knee by participating in your sport?") (Webster et al., 2008). The I-PRRS and the ACL-RSI have been previously used to assess psychological readiness in athletes returning to sport following musculoskeletal injury.

A major limitation regarding the use of psychometric measures (i.e., I-PRRS, ACL-RSI) to study psychological readiness is that there is currently an incomplete understanding of what it means for an athlete to be "ready" or "not ready" to return to sport following musculoskeletal injury. In fact, only one study has explicitly sought to operationalize psychological readiness to return to sport following an injury (Podlog et al., 2015). Podlog et al. (2015) conducted a qualitative study of seven participants from diverse sports and competitive levels with varying musculoskeletal injuries and severities. Podlog et al. (2015) found psychological readiness to be composed of three general dimensions: 1) confidence in returning to sport, 2) realistic expectations of one's sporting capabilities, and 3) motivation to regain previous performance standards (Podlog et al., 2015). *Confidence in returning to sport* was underpinned by confidence in one's rehabilitation program and the perceived competence of the rehabilitation team, confidence in one's formerly injured body part (i.e., low fear of re-injury), and confidence in one's sport performance capabilities. *Realistic expectations of one's sporting abilities* was underpinned by the athlete accepting they've been injured, creating small realistic goals, and an awareness that they will not immediately be as good as they were before their injury. *Motivation*

to regain previous performance standards was underpinned by an athlete's motivation for their next training session, motivation to improve during rehabilitation, and motivation to work harder (Podlog et al., 2015). Based on their study, Podlog et al. (2015) proposed a definition of psychological readiness, which is a "dynamic psychosocial process which athletes may experience before, during, or after their transition from rehabilitation to returning to competitive sport".

In another qualitative study of 21 soccer players, Kunnen et al. (2019) examined athletes' perceptions of psychological readiness to return to sport following ACL reconstructive surgery. Kunnen et al. (2019) found psychological readiness to be composed of two key themes: 1) having confidence, and 2) love of the game. Like Podlog et al. (2015), *having confidence* was composed of the athlete's progress throughout the rehabilitation program, their self-confidence in their physical abilities, their trust in the health professionals guiding their rehabilitation, and little fear of re-injury. *Love of the game* was composed of happiness and a sense of freedom when playing their sport, a sense of belonging to the team, and a stronger desire to return than the fear of re-injury (Kunnen et al., 2019). Although the qualitative studies by Podlog et al. (2015) and Kunnen et al. (2019) provide important evidence about the variables involved in psychological readiness, their findings demonstrate that existing quantitative measures (e.g., I-PRRS and ACL-RSI) do not capture all of the components of psychological readiness. As such, a qualitative approach (e.g., narrative methodology) seems appropriate to provide an initial understanding of the variables involved in psychological readiness.

Psychological readiness has yet to be explored within concussed athlete populations. Thus, it is not known if there are additional variables involved in feeling 'ready' to return to sport following a concussion when compared to other musculoskeletal injuries. For example,

there is evidence that athletes who suffer a concussion have different emotional responses compared to athletes who suffer musculoskeletal injuries such as ACL tears (Hutchison et al., 2009; Mainwaring et al., 2010), which may influence perceptions of psychological readiness in these populations. It was also noted earlier that athletes have expressed concerns about the short- and long-term health implications that are being linked with concussions (Baugh et al., 2017), which could result in some athletes feeling fearful about returning to sport following a concussion. A recent study by Anderson et al. (2019), who studied fear of re-injury in high school athletes following a concussion, found that many athletes report a high fear of suffering a future concussion at the time of medical clearance to return to sport. In addition to fear, other variables might be involved in psychological readiness following a concussion such as pressure (Caron et al., 2021), malingering (Covassin et al., 2017), kinesiophobia (Tjong et al., 2017), and resilience (Durish et al., 2019). However, it is currently unknown which variables are involved because there has not been any research on psychological readiness in athletes returning to sport from a concussion (Caron et al., 2018).

Objective

Therefore, this research aims to explore student-athletes' perceptions of the factors they believe are involved in feeling psychologically ready to return to sport following a concussion.

Research Questions

This research aims to answer two research questions: 1) How are the factors that are involved in psychological readiness to return to sport following a concussion related to a 'successful' return to sport? 2) How can an athlete develop their psychological readiness to return to sport following a concussion?

Chapter 2

Methods

In this chapter, the qualitative methods used in the present study to explore university student-athletes' perceptions of psychological readiness to return to sport following a concussion are reviewed. First, the origins of qualitative methods are examined and situated within the field of sport psychology. Second, the philosophical assumptions underpinning this qualitative study are discussed, and the role of the researchers in this study is elaborated. Third, the overarching methodology that will guide this inquiry is discussed. Fourth, the specific methods used in this research to purposefully recruit participants, collect and analyze data, and represent the findings are detailed. Fifth, the strategies that were used to ensure methodological rigor are discussed. Sixth and finally, ethical considerations and measures to protect participants are elaborated.

Qualitative Methods

Qualitative methods have their roots in the social sciences, humanities, and health sciences (Vidich & Lyman, 2000). Qualitative research has meant different things to different people at different historical periods (Sparkes & Smith, 2013). As dominant ideologies in a particular context change, so do the theoretical conceptions of the world and the associated methodological preferences for conducting research (Lincoln, 2010).

Qualitative inquiry within the field of sport psychology is growing in popularity (Culver et al., 2012; Culver et al., 2003; McGannon et al., 2019; Poucher et al., 2019). In a review of qualitative research published in three prominent sport psychology journals (i.e., *Journal of Applied Sport Psychology (JASP), Journal of Sport and Exercise Psychology (JSEP), and The Sport Psychologist (TSP)*) between the years 1990 and 1999, 17.3% of 485 data-based articles

were classified as qualitative (Culver et al., 2003). In a follow-up review from 2000 to 2009, 29% of data-based articles used qualitative methodologies, representing nearly a 68% decade-to-decade increase (Culver et al., 2012). Most recently, McGannon et al. (2019) reviewed methodological trends in qualitative sport psychology research published in six prominent peer-reviewed journals between 2010 and 2017. Of the six journals that were examined, 351 qualitative articles were identified among the 1914 published articles (18.3%), with an increasing trend in the second half of the decade (2015-2017 compared to 2010-2012). Descriptive reviews of prominent sport psychology journals indicate that the number of published qualitative articles is growing, as are the different philosophical positions that underpin the qualitative research, methodologies, and methods (McGannon et al., 2019; Poucher et al., 2019). Despite the growing popularity of qualitative methods in sport psychology, there is a dearth of qualitative research on concussions. A recent review of five databases identified 17 peer-review articles that studied concussions from a qualitative approach (Ferdinand Pennock et al., 2019). The lack of qualitative inquiry on concussions is unfortunate because qualitative methods are especially useful for exploring little-known phenomena (Creswell & Poth, 2016).

Philosophical Positioning

A philosophical position is a set of beliefs about fundamental aspects of reality and the universe that ground all of one's perceiving, thinking, knowing, and doing (Guba & Lincoln, 1994; Lincoln et al., 2011). The philosophical position is held by me, the researcher, and underpins every decision about the inquiry, including the research questions, the methods of participant recruitment, data collection and analysis, how to appropriately represent the findings, and the strategies used to ensure methodological rigor (Watt, 2007). An essential component of a philosophical position is the role of the researcher throughout the inquiry process. The spectrum

of researcher involvement can range from distant, objective, and bias-controlled (e.g., post-positivism) to actively involved in the construction of knowledge (e.g., constructivism, constructionism) and attached to personal experiences and perspectives that influence the research (Watt, 2007). Furthermore, the philosophical position is reflected in the word choice, sentence structure, and writing style. Each philosophical position and its associated assumptions about the universe and reality guide every methodological decision that is made throughout the research inquiry.

Philosophical positions are also known as *paradigms* or *worldviews*. In recent years, qualitative researchers have been urged to state their philosophical position and reference it to support their methodological decisions and study design (Culver et al., 2012; McGannon et al., 2019; Poucher et al., 2019). Each paradigm consists of interconnected beliefs about the nature of reality (i.e., ontology), the nature of knowledge including what 'counts' as knowledge (and to whom) and its relationship with the knowledge-seeker (i.e., epistemology), and the methods used to acquire and generate knowledge (Guba & Lincoln, 1994; Lincoln et al., 2011). In sum, a paradigm describes "the nature of the world, the individual's place in it, and the range of possible relationships to that world and its parts" (Guba & Lincoln, 1994, p. 107). Fundamentally, each paradigm develops unique knowledge and perspectives about the phenomenon being studied that result from differential methodological decisions.

Constructivism

Constructivism is a paradigm rooted in *relativist* ontology (i.e., reality is relative, thus multiple realities co-exist) and *subjectivist/transactional* epistemology (i.e., knowledge is subjective and is socially constructed through interactions between individuals) (Guba & Lincoln, 1994). Constructivism is among the most rapidly developing philosophical positions in

qualitative sport psychology research (Poucher et al., 2019). In a review of all the qualitative articles ever published in five prominent sport and exercise psychology journals (*JSEP, JASP, TSP, Psychology of Sport and Exercise, and Qualitative Research in Sport Exercise and Health*), 34% were positioned as constructivist and most of those were published since 2011. Constructivism is within the paradigmatic umbrella of *interpretivism*, which is concerned with understanding the world from the subjective experiences and perspectives of individuals at a particular moment in time. From a constructivist philosophical position, I am inherently involved in all phases of the research process. For example, as the researcher, I am the instrument used to collect and analyze data (Patton, 2002; Stewart, 2010). Researcher subjectivity is understood as a resource rather than a potential threat to knowledge production (Braun & Clarke, 2019). 'Truth' is co-constructed through dialogue, negotiated interpretations, and fair partnership between the participants and the researchers (Randall & Phoenix, 2009).

Methodology

In qualitative research, *methodology* refers to the overarching framework to conduct an inquiry, whereas *methods* refers to the specific tools, strategies, and techniques used to collect and analyze data (Ferdinand Pennock et al., 2019). One type of qualitative methodology is narrative, which is the oldest and most common way to share knowledge in human history (Papathomas, 2016). To borrow from MacIntyre (1981), humans are "conversational and storytelling animals" and narratives are an inherent part of our existence. As argued by Papathomas (2016), humans' capacity to situate the events in our lives into an overarching storied form to make meaning of our experiences is what differentiates us from other animals. As humans, we use stories to understand the world we live in; they offer a way of knowing oneself and others (Smith, 2010).

Narrative is a qualitative methodology that seeks to understand phenomena through stories of lived experiences (Sparkes & Smith, 2013). Though the terms *narrative* and *story* are often used interchangeably, they are not the same. *Narrative* is the template used to structure stories; narratives present characters and reveal their identities within a plot of connected events that unfold sequentially over time and space to depict an overarching explanation or consequence of a phenomenon (Smith & Sparkes, 2009). Narrative researchers seek ways to understand and authentically represent the real-life experiences of research participants as told through stories (Wang & Geale, 2015). Narrative researchers are interested in an individual's truth because each person's story illuminates the many versions of reality that co-exist (Papathomas, 2016). By using a narrative methodology, the qualitative researcher is able to access rich layers of data that facilitate an in-depth understanding of each participant's insights of, and experiences with a particular phenomenon (Wang & Geale, 2015)—in this case returning to sport following a concussion. Narrative methodology embraces the complexities of lived experiences to illuminate the subjective worlds of the research participants (Smith & Sparkes, 2009).

Sampling Procedures

A widely used technique in qualitative inquiry for participant recruitment is purposeful sampling (O'Reilly & Parker, 2013). Purposeful sampling is concerned with the identification, selection, and recruitment of individuals or groups of individuals who are especially knowledgeable about or experienced with a phenomenon of interest (Kuzel, 1992). In this study, we used two recruitment strategies: criterion-based and snowball sampling. Criterion-based purposive sampling involves identifying and selecting cases that meet pre-determined criteria, which was the primary sampling strategy used in this study. Snowball sampling was used as an auxiliary recruitment strategy. In snowball sampling, the researcher connects with potential

participants through contact information that is either provided by other participants in the study or by would-be participants (Noy, 2008).

To be eligible to participate in this study, participants had to meet five criteria. Specifically, they had to: (1) be emerging adults (18-25 years old; see Arnett, 2000), (2) be student-athletes whose team or organization was based in Canada at the time of the concussion, (3) competed in a sport with a high rate of concussion incidence, (4) have been diagnosed with a concussion and experienced protracted concussion symptoms (>1 month), and (5) have received medical clearance to return to sport or were no longer participating in competitive sport. Emerging adulthood is a distinct developmental period between the ages of 18 and 25 that is characterized by partial independence (e.g., moving from home to attend school), exploration of possible life directions (e.g., changing academic and career paths), and high rates of risky behavior (e.g., participating in contact and collision sports (Arnett, 2000).

After obtaining ethics approval from the Université de Montréal comité d'éthique de recherche clinique (Certificat #CERC-20-074-D), Dr. Caron (JC) and ML recruited participants through online social media posts (e.g., Facebook, LinkedIn, Twitter, Instagram) between September and December 2020 in English and in French. Among the advantages of an online recruitment strategy is expanded reach to potential participants by transcending barriers such as geographical boundaries, lack of time, financial, and logistical issues (Iacono et al., 2016). Potential participants were first sent an eligibility criteria form, and if eligible, an informed consent form. As part of snowball sampling, potential participants were invited to identify other potential participants who might meet the eligibility criteria and to send the online recruitment post to them.

Participants

Twelve (*n=12*) university student-athletes with an equal representation of male (*n=6*) and female (*n=6*) athletes met the eligibility criteria and provided their informed consent to participate in this study. The sample size was informed by previous qualitative studies on psychological readiness following musculoskeletal injuries that were underpinned by a constructivist paradigm, which recruited seven (Podlog et al., 2015) and 21 participants (Kunnen et al., 2019), respectively. Additionally, a sample size of 12 participants is in line with qualitative studies that used similar methods of data collection and analysis in sport and exercise psychology (Duncan et al., 2018; Ekengren et al., 2020; Erickson et al., 2016). The participants' characteristics are detailed in Table 2 in Appendix D.

Data Collection

Interviews

Data were gathered through interviews, which is one of the most widely used methods to collect qualitative data in sport and exercise psychology (Smith & Sparkes, 2016). By definition, an *interview* is a social activity where two or more people actively engage in embodied talk, jointly constructing knowledge about themselves and the social world as they interact with each other over time and in a certain place (Sparkes & Smith, 2013). The purpose of the interview is to create a conversation that invites participants to tell stories, accounts, reports, and descriptions about their perspectives, insights, experiences, feelings, and behaviors in relation to the phenomenon of interest (Smith & Sparkes, 2016).

Within qualitative interviewing, there are two broad categories of interviews, individual and focus group. This study used individual interviews to collect data. Interviews are typically classified along a spectrum of unstructured, semi-structured, or structured (Smith & Sparkes, 2016). Generally, unstructured interviews use open-ended questions to encourage participants to

tell personal stories and describe their experiences, perspectives, circumstances, and issues with a phenomenon (Smith & Sparkes, 2016). One type of unstructured interview*, narrative interviews* were used in the present study because they facilitate conversational storytelling and inductive knowledge (Chase, 1995). Narrative interviews are structurally dynamic, whereby the researcher's discussion points at the beginning of the interview are typically in a semi-structured format. However, as the participant begins to share stories about their lived experiences, the interview becomes progressively unstructured as the researcher adapts their discussion points to the stories that are being told by the participant (Hermanowicz, 2002).

The interviews in this research were conducted via Zoom videoconference software due to the COVID-19 pandemic. Some researchers have identified some issues collecting data using real-time virtual interviews, such as an unstable internet connection, participants having limited access to a device with video capabilities, difficulty building rapport or reading subtle non-verbal cues (Bundon, 2017). On the other hand, Rathwell et al. (2017) found no significant difference in the depth, vividness, nuance, or richness when comparing video-based and in-person interviews. There is growing support among researchers to embrace virtual interviews with confidence (Iacono et al., 2016). Considering COVID-19 restrictions, virtual interviews represented a safe, accessible, and effective medium to build rapport with participants and collect rich data for this study.

Multiple interviews are recommended in cases where the researcher is seeking a life story (i.e., narrative) (Atkinson, 1998). For instance, Ekengren et al. (2020) conducted one pilot interview to test their interview guide questions and procedures, and thereafter completed two interviews with each participant in their study to develop narratives of Swedish professional handball players' career paths. The two interviews allowed participants to speak broadly to their

sport experiences in handball and their life outside of the sport (interview 1), and to reflect and elaborate on other elements of their career path (interview 2).

This study implemented a similar approach to Ekengren et al. (2020). The two interview guides were each piloted once then edited before collecting. ML interviewed each participant on two occasions. The first interview with student-athletes lasted on average 103 minutes (range = 76 to 137 minutes). Interview 1 focused on understanding the participant's experience with a concussion and returning to sport, comparing their concussion to other types of injuries, the factors they believe are involved in feeling psychologically ready to return to sport, and their perceptions of successful (and unsuccessful) return to sport outcomes. See Appendix A for a full list of the discussion points comprising the first interview.

The second interview with the student-athletes lasted on average 88 minutes (range = 67 to 139 minutes) and took place one to two weeks following the first interview. The second interview began with ML summarizing what he learned from the previous interview, which participants were invited to clarify or elaborate upon. Then, the interview focused on the concussion's impact on the participant, the participants' reflections about knowledge they wish they (and others) knew about concussions and its recovery, and the advice they'd give to another athlete returning to sport after a concussion. See Appendix B for a full list of the discussion points comprising the second interview.

Field Notes

Field notes are widely recommended in qualitative research as a means of documenting contextual information to supplement participant data, which, in this study, included ML's (Matthew Lassman; first author) own insights, interpretations, and reflections (Mayan, 2016; Phillippi & Lauderdale, 2018; Sparkes & Smith, 2013). Immediately following each interview, ML wrote field notes in a Word document on the participant's story (e.g., evolving and

contradictory participant perceptions of their concussion experience), ML's own interview performance (e.g., adapting non-verbal communication habits), critical reflections (e.g., refining discussion points for follow-up conversations), and preliminary analytical thoughts (Phillippi & Lauderdale, 2018). Field notes have a dual methodological purpose as both a source of collected data and as the first step in data analysis (Phillippi & Lauderdale, 2018).

Interviewer

Qualitative researchers do not enter projects naïvely or atheoretically. Rather, a strategy for high quality qualitative research is for the researcher to be transparent about their background so that the knowledge that is generated from the data (i.e., inductive approach) can be interpreted by the reader accordingly (Noble & Smith, 2015). I, Matthew Lassman, am a former athlete who competed in a high-performance contact and collision sport, and experienced several sport-related injuries, including multiple concussions with protracted symptoms. ML's supervisor, Dr. Jeffrey Caron (JC), is also a former high-performance athlete who competed in a contact and collision sport, experienced multiple concussions, and has a research program in sport-related concussions. ML conducted all correspondences and interviews with the participants. The questions in the interview guides were informed by the research questions, ML's and JC's research-based and experience-based knowledge of concussions, and by other studies exploring psychological readiness to return to sport following an injury.

Data Analysis

One method of narrative data analysis is creative nonfiction (CNF), which allows the researcher to co-construct narratives based on participants' authentic experiences using fiction-writing literary conventions (Carless & Douglas, 2016; Smith et al., 2015). Creative nonfiction was selected as an appropriate analytical method because it enables the researcher to depict empirically grounded and complex personal (i.e., intra-personal), social (i.e., inter-personal), and

situational factors involved in an athlete feeling 'ready' to return to sport following a concussion. Creative nonfiction has two objectives: 1) to understand participants' lived experiences in their own words, and 2) convey the underlying themes of the participants' experiences in an interesting, evocative, and informative way (Cheney, 2001). The result of CNF is a qualitative analysis that is grounded in empirical data involving real events and people that is easily understood, is emotionally evocative, and offers an opportunity for the reader to reflect on the stories and their response to them (Cheney, 2001).

There are three types of CNF writing: 1) portrait, 2) snapshot, and 3) composite. Specifically, *portrait* demonstrates an individual's character and voice through internal dialogue and decision-making told from a 1st person perspective at one point in time; *snapshot* provides a description of what was observed and experienced in a situation from a 3rd person perspective; *composite* combines the stories of multiple individuals into one (Blodgett et al., 2011; Cheney, 2001; Duncan et al., 2018; Erickson et al., 2016). In this study, ML used composite CNF to amalgamate the voices and experiences of various participants into one encompassing narrative (Spalding & Phillips, 2007). A composite approach was selected because of the thematic similarities in multiple participants' stories. One of the added benefits of a composite CNF approach is protecting participants' confidentiality and anonymity.

Creative nonfiction is intended to be a flexible analytical method (Duncan et al., 2018; Ekengren et al., 2020; Erickson et al., 2016). In CNF, data analysis may contain a *storyanalyst* phase (i.e., thinking about the story) and/or a *storyteller* phase (i.e., thinking with the story) (Frank, 2013; Smith, 2016). The storyanalyst phase focuses on the story content to derive themes from participants' experiences. Based on the themes, the researcher operates as a storyteller to

represent the findings by borrowing literary techniques from fiction writing (e.g., dialogue, character sketches, plot) (Smith et al., 2015).

In this study, CNF stories were created using a five-step initial storyanalyst phase, then subsequently a six-step storyteller phase to represent the findings (Smith, 2016; Smith et al., 2015). The overall analytic procedure was largely inspired by Ekengren et al. (2020), who followed the steps outlined by Smith (2016). Thematic narrative analysis was used during the storyanalyst phase to interpret the athletes' experiences and stories with a concussion (Smith, 2016). First, ML was immersed in the data through conducting the interviews, writing field notes, and listening to the interview recordings following each interview. Second, ML transcribed the interviews verbatim (i.e., word for word) using an online audio-to-text service (*Temi* for English interviews and *Amberscript* for French interviews). ML then re-listened to the interviews and made corrections to the auto-generated transcripts (Smith, 2016). The transcripts and the field notes were de-identified (e.g., participants names, names of people, and locations removed) to protect the participants anonymity.

Third, interview data and field notes were organized using NVivo12 qualitative software (Smith, 2016). To organize the data, ML generated codes from the data. A *code* is the most basic unit of the raw data that can be extracted in a meaningful way. Codes are generated by identifying and naming data extracts that appear meaningful, interesting, or novel to the researcher (Braun & Clarke, 2006). ML grouped similar codes together into broader categories and eliminated redundancies. For example, ML coded some data extracts as thematic (e.g., facilitative or debilitative factors involved in psychological readiness to return to sport), storylines (e.g., the concussion experience), characters (e.g., athletic style and role on the team),

and context (e.g., athlete relationships with coaches and teammates). Organizing and condensing the data required repeated readings of all the data (i.e., narrative indwelling) (Smith, 2016).

Fourth, ML identified narrative themes and thematic relationships from the data (Smith, 2016). A *theme* is a pattern of shared meaning across the dataset that is underpinned by central organizing concept (Braun & Clarke, 2019). Themes are analytic outputs actively created by the researcher at the intersection of the data, the analytic process, and the researcher's theoretical assumptions (Braun & Clarke, 2019). Fifth, ML named, described, and interpreted each theme in detail with support from participant quotations. Each theme was composed of descriptors (i.e., "what") and actions (i.e., "how"). ML also connected themes (e.g., psychological readiness is related to a successful return to sport) (Smith, 2016). JC recursively challenged ML's assumptions, analytical procedure, and interpretations of the data.

Switching to the storyteller phase, ML and JC identified two overarching narratives based on the themes and thematic relationships. One narrative focuses on an athlete feeling psychologically ready and experiences a successful return to sport. The other narrative focuses on an athlete is not psychologically ready and experiences an unsuccessful return to sport. Second, ML prioritized the descriptors and actions of each theme to fit within targeted word limits for each story. ML prioritized the thematic descriptors and actions in in three ways: 1) elements participants believed were the most impactful in their perceptions of psychological readiness, 2) elements ML identified as interesting, and 3) elements that were novel to the existing research literature. Third, ML divided the prioritized thematic elements into "ready and successful" and "not ready and unsuccessful" narratives. Fourth, ML outlined scenes that each highlighted one or multiple themes. Then, ML and JC edited the outlined scenes to remove thematic redundancies and to improve story coherence.

In the fifth step, ML drafted the CNF stories using literary techniques (e.g., setting, character sketches, dialogue, internal monologue) elaborated by Caulley (2008) and Smith et al. (2015) and weaved participant quotations throughout to write the CNF stories. The stories were written from a 1st person perspective because it allowed for a more vivid representation of participants' perspectives of their concussion experience, their interactions with others, and their beliefs about feeling ready to return to sport following a concussion. Sixth, ML discussed and edited the CNF stories with JC.

Ensuring Methodological Rigor

Qualitative researchers in sport and exercise psychology have recommended that high-quality research should be *rigorous* to reflect contemporary methodological thinking and to produce more trustworthy and innovative findings (Smith & McGannon, 2018). One approach for ensuring methodological rigor is a *relativist approach*, which is closely aligned with the ideas of ontological relativism (i.e., reality is multiple and relative) and epistemological constructivism (i.e., knowledge is socially constructed and subjective) (Burke, 2016). A relativist approach ensures that an evaluation of a study's rigor is open-ended (i.e., criteria are suggestive and can be added, subtracted, or modified), is dependent on the reader, and is tailored to the study's objectives, philosophical position, and methods of choice (Burke, 2016). For example, some relativist criteria that have been recommended for rigorous CNF are *substantive contribution* (i.e., Does the inquiry contribute to a deeper empirical, methodological, theoretical and/or practical understanding of social life?), *authenticity* (i.e., Does the inquiry involve participants in the co-construction of knowledge and embody their lived experiences?), *resonance* (i.e., Does the work affect or move the reader emotionally and/or intellectually through aesthetic and evocative findings?), *credibility* (e.g., Are the researcher's ethical and methodological decisions

transparent?), and *coherence* (i.e., Is there congruency between the inquiry's philosophical position and the methods used? Do the different parts of the interpretation create a complete and meaningful representation of the phenomenon of interest?) (Burke, 2016; Noble & Smith, 2015; Poucher et al., 2019; Smith & McGannon, 2018; Smith et al., 2015; Tracy, 2010).

Two strategies were used to ensure methodological rigor in this study. First, ML used multiple sources of data: interviews and field notes. Conducting two interviews with each participant allowed them to provide a detailed account of their experiences as well as clarify and elaborate on ML's preliminary interpretations of the data (i.e., from the first interview). Further, two interviews facilitated longer engagement with each participant and greater depth of data than one interview, which added to the rigor of this study. A second strategy involved *critical friends*, namely the research supervisor and the thesis committee. Critical friends had four roles throughout the inquiry: 1) to provide feedback on the interview discussion points, 2) to collaborate on data-driven themes, and 3) to provide feedback on the CNF stories (Noble & Smith, 2015; Smith & McGannon, 2018). Critical friends encouraged reflexivity and presented alternative ways to interpret the data (Mauthner & Doucet, 2003; Smith & McGannon, 2018; Watt, 2007).

Ethical Considerations

The interviews for this study were conducted online using the videoconference software Zoom, which has unique ethical considerations compared to in-person interviews (e.g., possible for a third-party to access the link to the discussion). Participants were supplied with a strong, random password for the Zoom link and were also asked to be in a quiet and private room to minimize the risk of others overhearing confidential information.

The Zoom recordings and interview transcriptions were stored on JC's and ML's private Université de Montréal One Drive folders in password-protected files. All collected information

remains confidential—only Matthew Lassman, Dr. Jeff Caron, and research assistants working in the lab have access to the data. In line with Université de Montréal's policy, both the original and de-identified data will be kept for a period of seven (7) years following the completion of the study. Afterwards, the data will be destroyed.

Finally, and in line with the perspective that participant consent is a process rather than a step, and knowing that interviews were conducted virtually, participants were sent an informed consent form beforehand, and their signature was obtained before scheduling the first interview. At the beginning of the first interview, ML reviewed key aspects of the consent form. ML re-obtained participant consent at the beginning of the second interview.

Chapter 3

Presentation of the Manuscript

Exploring Student-Athletes' Perceptions of Their Psychological Readiness to Return to Sport Following a Concussion

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Exploring Student-Athletes' Perceptions of Their Psychological Readiness to Return to Sport Following a Concussion

Since the beginning of the 21st century, the topic of concussions in sports has received considerable attention in non-academic spaces (Mannix et al., 2016). The emergence of sport-related concussions as a cultural interest in North America is largely attributed to increased media coverage, documentaries, and films that depict the struggles of high-profile athletes following hits to the head (Anderson & Kian, 2012; McGannon et al., 2013; Ventresca, 2019). In parallel, there has been a proliferation of sport-related concussion research from diverse fields of expertise.

The majority of concussion research has focused on the multifactorial physical symptoms a concussed individual may experience, including somatic problems (e.g., headaches, dizziness, fatigue), sensitivity to sounds (Assi et al., 2018) and light (Mares et al., 2019), hormonal dysfunction (Anto-Ocrah et al., 2020), impaired cognitive function (e.g., poor memory and concentration) (Chin et al., 2016), balance and gait deficits (Finnoff et al., 2009), slower processing speed and reaction time (Broshek et al., 2015), cervical spine dysfunction (Streifer et al., 2019), visual/ocular and vestibular dysfunction (Anderson et al., 2019), and exercise intolerance (Leddy et al., 2016). From a clinical perspective, concussion-related impairments typically improve spontaneously within 10 to 14 days in adults, and 30 days in children and adolescents (McCrory et al., 2017). However, physiological dysfunction may outlast current clinical measures of recovery (Kamins et al., 2017). Ten to 15% of concussed adults and about 30% of concussed children and adolescents experience protracted concussion symptoms lasting over 1 month (Grubenhoff et al., 2016; McCrea et al., 2013).

Though the physical and physiological aspects of concussion remain an area of empirical research, the psychological aspects affecting an athlete's concussion recovery are increasingly recognized as an important domain in research and clinical practice (Kontos, 2019). There is an overlap of protracted concussion symptoms with the athlete's psychological responses to the injury that makes it difficult to disentangle the etiology of symptoms (Kontos, 2019; Kontos & Collins, 2018). For example, athletes who experience protracted concussion symptoms may also exhibit social isolation, frustration with a stagnant recovery, stress from drastic lifestyle changes, and grief associated with a loss of athletic identity (André-Morin et al., 2017; Caron et al., 2013; Caron et al., 2017; Covassin et al., 2014; Dean, 2019).

Adverse psychological responses to the concussion may arise due to the nature of a concussion and its associated challenges. Concussed athletes have reported challenges during their recovery due to the non-definitive return-to-sport timeline and frequent setbacks (Henry et al., 2016; Tjong et al., 2017). Additionally, a concussion has been described as an "invisible injury" because concussed athletes often appear normal to others and do not exhibit visible signs of injury, such as stitches or crutches (Bloom et al., 2004). As a result, concussed athletes often report feeling inadequately supported, misunderstood by others, and psychologically distressed (Bloom et al., 2004; Tjong et al., 2017). Furthermore, athletes may experience internal (i.e., self-imposed) and external (i.e., appraised from others) pressures to return to competitive sport following a concussion that affect their emotional, psychological, and behavioral responses to the injury (Caron et al., 2021). It is now recognized that an athlete with a concussion may endure a broad spectrum of cognitive (e.g., poor concentration and memory), affective (e.g., anxiety, stress), behavioral (e.g., aggressiveness), and psychological (e.g., reduced quality of life) symptoms that may unfavorably impact many areas of their life (Wiese-Bjornstal et al., 2015).

A student-athlete's academic progression can be devastated by protracted concussion symptoms (André-Morin et al., 2017). In a qualitative study of five female university athletes, the athletes discussed how their protracted concussion symptoms led to poor concentration and memory, and cognitive fatigue. As a result, the student-athletes were unable to study efficiently, missed classes, and experienced academic failures (i.e., poor grades, program drop-out, additional semesters required to complete their degree) (André-Morin et al., 2017). Moreover, university student-athletes often reported that there are insufficient academic support resources for students who experience a concussion, which might hinder their recovery (André-Morin et al., 2017; Kasamatsu et al., 2017; Valovich McLeod et al., 2017). Therefore, a number of unique conditions exist for concussed university student-athletes—particularly those who suffer from protracted concussion symptoms—that could make their recovery and return to sport experience challenging.

Since the first Concussion in Sport Group (CISG) consensus statement (Aubry et al., 2002), significant progress has been made with respect to concussion management and recovery. A number of active rehabilitation strategies have demonstrated enhanced concussion recovery compared to prolonged rest. One such active rehabilitation strategy is sub-symptomatic aerobic exercise (i.e., at an intensity below the threshold of symptom exacerbation) (Leddy et al., 2016; Makdissi et al., 2017; Schneider et al., 2017). In line with the growing body of evidence supporting sub-symptomatic aerobic exercise in the management of sport-related concussion (Leddy et al., 2019; Schneider et al., 2017), the 5th CISG consensus statement recommends a six-step return to sport process to gradually increase the physical and cognitive exertional demands on the athlete recovering from a concussion (see Table 1 in Appendix C) (McCrory et al., 2017). The concussed athlete's progression through the graduated return to sport steps is monitored by a

health professional. A concussed athlete must wait at least 24 hours before progressing to the next return to sport step; if an athlete's symptoms worsen, they are recommended to return to the previous step and their recovery timeline is extended (McCrory et al., 2017). Athletes are deemed "ready" to return to sport once they have successfully progressed through the six steps and received medical clearance.

However, there are several issues with the return to sport steps as they are currently conceptualized. First, there is limited empirical evidence to support the graduated return to sport steps (Kemp et al., 2016; Wallace et al., 2018). Although certain aspects of the return to sport process have received empirical attention (e.g., symptom-limited exercise is beneficial for concussion recovery) (Langevin et al., 2020), the graduated return to sport steps as a whole are not evidence-based (Bloom et al., 2020). Second, the return to sport steps are reliant on an athlete's symptom-limited exertion, however athletes do not always report their symptoms honestly (Clark & Stanfill, 2019; Kerr et al., 2016; Milroy et al., 2020). Third, formerly concussed athletes may experience neuromuscular control and attentional deficits that persist despite receiving medical clearance and completing the graduated return to sport steps, which has been linked to subsequent injury risk (Howell et al., 2018; McPherson et al., 2019). Fourth, and most relevant for the purpose of this research, the current return to sport steps overlook *psychological* variables involved in returning to sport beyond noting that the goals of Step 4 and 5 are "increased thinking" and "restore confidence", respectively. There is evidence that physical and psychological aspects involved in returning to sport following a musculoskeletal injury do not always coincide (Podlog & Eklund, 2006), which might extend to athletes recovering from a concussion (Caron et al., 2018).

Researchers who study injured athletes returning to sport following musculoskeletal and concussive injuries have identified several psychosocial factors that athletes must contend with (Anderson et al., 2019; Clement et al., 2013; Forsdyke et al., 2016), however these variables are not comprehensively addressed in the current return to sport steps. Thus, athletes recovering from a concussion may be returning to the competitive arena before they are psychologically ready. Furthermore, the current return to sport process does not assess whether a formerly concussed athlete's return to sport was successful or unsuccessful. A rigorous return to sport process should ensure that formerly concussed athletes are both physically and psychologically ready to return to sport, and assess for successful return to sport outcomes.

Researchers have used the term *psychological readiness* to describe the psychological factors involved in the process of returning to sport following musculoskeletal injuries (e.g., ACL tears) (Ardern et al., 2014; Kunnen et al., 2019; Podlog et al., 2015). Currently, only one study has explicitly sought to operationalize psychological readiness to return to sport following an injury (Podlog et al., 2015). Podlog et al. (2015) conducted a qualitative study of seven participants from diverse sports and competitive levels with varying musculoskeletal injuries and severities. Podlog et al. (2015) found psychological readiness to be composed of three general dimensions: 1) confidence in returning to sport, 2) realistic expectations of one's sporting capabilities, and 3) motivation to regain previous performance standards (Podlog et al., 2015). Based on their study, Podlog et al. (2015) proposed a definition of psychological readiness, which is a "dynamic psychosocial process which athletes may experience before, during, or after their transition from rehabilitation to returning to competitive sport" (p.13). In another qualitative study of 21 soccer players, Kunnen et al. (2019) examined athletes' perceptions of psychological readiness to return to sport following ACL reconstructive surgery. Kunnen et al. (2019) found

psychological readiness to be composed of two key themes: 1) having confidence, and 2) love of the game. Psychological readiness to return to sport was found to be the factor most strongly associated with returning to the pre-injury activity levels following ACL reconstructive surgery (Ardern et al., 2014).

Podlog and Eklund (2009) interviewed twelve elite amateur and semi-professional athletes who sustained a musculoskeletal injury requiring at least a two month absence from sport-specific training and competition about their perceptions of a successful return to sport. A successful return to sport following musculoskeletal injury was characterized by 1) a return to pre-injury levels and attaining pre-injury goals, 2) staying on the 'right' path, 3) creating realistic expectations of post-injury performance, 4) a subjective feeling of self-satisfaction, 5) an absence of injury-related concerns and remaining uninjured, and 6) overcoming adversity.

Psychological readiness has not yet been explored in concussed athlete populations. Thus, it is not yet known if there are additional variables involved in feeling 'ready' to return to sport following a concussion when compared to other musculoskeletal injuries. For example, other variables such as fear (Anderson et al., 2019), pressure (Caron et al., 2021), malingering (Covassin et al., 2017), kinesiophobia (Tjong et al., 2017), and resilience (Durish et al., 2019) might be involved in psychological readiness following a concussion. However, it is not yet known which variables athletes believe are involved in psychological readiness because researchers have not studied athletes returning to sport following a concussion (Caron et al., 2018). Furthermore, it remains to be explored if student-athletes returning to sport following a concussion characterize a successful return to sport similar to athletes recovering from musculoskeletal injuries.

Objective and Research Questions

This study explored student-athletes' perceptions of the factors they believe are involved in feeling psychologically ready to return to sport following a concussion and its relation to a successful return to sport. This research attempts to answer the following research questions: How are the factors that are involved in psychological readiness to return to sport following a concussion related to a 'successful' return to sport? How can an athlete develop their psychological readiness to return to sport following a concussion?

Methodology and Methods

Qualitative methods were used in this study. Although researchers have noted a growing popularity of qualitative approaches in sport and exercise psychology research (Culver et al., 2012; Culver et al., 2003; McGannon et al., 2019), there remains a dearth of research that has used qualitative approaches to study concussions. One review identified only 17 peer-review articles that studied concussions from a qualitative approach (Ferdinand Pennock et al., 2019). The lack of qualitative inquiry on concussions is unfortunate because qualitative methods are especially useful for exploring little-known phenomena such as psychological readiness (Creswell & Poth, 2016).

Qualitative researchers have been urged to state their philosophical position so readers can better understand how knowledge was generated in the study and how best to interpret the study's findings (Culver et al., 2012; McGannon et al., 2019; Poucher et al., 2019). A philosophical position consists of interconnected beliefs about the nature of reality (i.e., ontology) and the nature of knowledge including what 'counts' as knowledge (and to whom) and its relationship with the knowledge-seeker (i.e., epistemology) (Guba & Lincoln, 1994; Lincoln et al., 2011). The philosophical position was held by us, the researchers of this study, and it underpinned every methodological aspect of this study. We adopted an interpretivist paradigm

rooted in *relativist* ontology (i.e., reality is relative, thus multiple realities co-exist) and *subjectivist/transactional* epistemology (i.e., knowledge is subjective, time-dependent, and is socially constructed through interactions between individuals) (Guba & Lincoln, 1994). Thus, in this study, knowledge was co-constructed through dialogue, negotiated interpretations, and partnership between the participants and us (Randall & Phoenix, 2009).

We used a narrative methodology to study athletes' perceptions of psychological readiness as told through stories of their lived concussion experience (Sparkes & Smith, 2013; Wang & Geale, 2015). Narrative researchers are interested in an individual's truth because each person's story illuminates the many versions of reality that co-exist (Papathomas, 2016). By using narrative methodology, we were able to access rich layers of data that facilitated an in-depth understanding of each participant's insights of, and experiences with a particular phenomenon (Wang & Geale, 2015)—in this case, returning to sport following a concussion.

Sampling and Participants

Following ethical approval from the Ethics Committee for Clinical Research at the University of Montreal, we purposefully recruited formerly concussed student-athletes through online social media posts on Facebook, Twitter, Instagram, and LinkedIn. Among the advantages of an online recruitment strategy was an expanded reach to potential participants by transcending barriers such as geographical boundaries, lack of time, financial, and logistical issues (Iacono et al., 2016).

We used criterion-based and snowball sampling recruitment strategies in this study (Emmel, 2013). Criterion-based purposive sampling involved identifying and selecting cases that met pre-determined criteria, which was the primary sampling strategy used in this study. Snowball sampling was also used in this study as an auxiliary recruitment strategy. In snowball

sampling, we connected with potential participants through contact information that was either provided by other participants or by would-be participants (Noy, 2008). To be eligible to participate in this study, participants had to meet five criteria. Specifically, they had to: (1) be emerging adults (i.e., 18-25 years old), (2) be student-athletes whose team or organization was based in Canada at the time of their concussion, (3) have competed in a sport with a high rate of concussion incidence, (4) have experienced protracted concussion symptoms, and (5) have received medical clearance to return to sport or were no longer participating in competitive sport. As part of snowball sampling, potential participants were invited to identify other potential participants who might have met the eligibility criteria and sent the online recruitment post to them.

Twelve (*n=12*) university student-athletes with an equal representation of male (*n=6*) and female (*n=6*) athletes met the eligibility criteria and provided their informed consent to participate in this study. See Table 2 in Appendix D for more information about participant characteristics.

The sample size was informed by previous qualitative studies on psychological readiness following musculoskeletal injuries that were underpinned by an interpretivist paradigm, which recruited seven (Podlog et al., 2015) and 21 participants (Kunnen et al., 2019), respectively. Additionally, a sample size of 12 participants was in line with qualitative studies that used similar methods of data collection and analysis in sport and exercise psychology (Duncan et al., 2018; Ekengren et al., 2020; Erickson et al., 2016).

Data Collection

We gathered data through interviews, which are one of the most widely used methods in sport and exercise psychology (Smith & Sparkes, 2016). The purpose of the interview was to

create a conversation that invited the participants to tell stories, accounts, reports, and descriptions about their perspectives, insights, experiences, feelings, and behaviors in relation to their concussion and perceptions of psychological readiness to return to sport (Smith & Sparkes, 2016). One type of interviewing method*, narrative interviews,* was used in the present study because it facilitated conversational storytelling and inductive knowledge (Chase, 1995). Narrative interviews were structurally dynamic, whereby the discussion points at the beginning of the interview were typically in a semi-structured format. However, as the participant begins to share stories about their lived experiences, the interview became progressively unstructured as the discussion points were adapted to the stories that were being told by the participant (Hermanowicz, 2002). Narrative interviews were conducted via Zoom videoconference software. Due to COVID-19 restrictions, virtual interviews represented a safe and effective medium to build rapport with participants and collect rich data for this study.

Two narrative interviews were conducted with each participant by the first author (ML). Multiple interviews are recommended in cases where the researcher is seeking a life story (i.e., narrative interview) (Atkinson, 1998). ML piloted the interview guides before interviewing participants in this study. The first interview with student-athletes lasted on average 103 minutes (range = 76 to 137 minutes). Interview 1 focused on understanding the participant's experience with a concussion and returning to sport, comparing their concussion to other types of athletic injuries, the factors they believed were involved in feeling psychologically ready to return to sport, and their perceptions of successful (and unsuccessful) return to sport outcomes (see Appendix A). The second interview lasted on average 88 minutes (range = 67 to 139 minutes) and took place one to two weeks following the first interview. The second interview began with ML providing a summary of what was learned from the previous interview, which participants

were invited to clarify or elaborate upon. Then, the discussion focused on the concussion's holistic impact on the participant, the participants' reflections about knowledge they wish they and others knew about concussions and its recovery, and the advice they'd give to another athlete returning to sport after a concussion (see Appendix B).

Immediately following each interview, ML wrote field notes in a Word document on the story (e.g., evolving and contradictory participant perceptions of their concussion experience), ML's own interview performance (e.g., adapting non-verbal communication habits), critical reflections (e.g., refining discussion points for follow-up conversations), and preliminary analytical thoughts (Phillippi & Lauderdale, 2018). Field notes served a dual methodological purpose as both a source of collected data and as the first step in data analysis (Phillippi & Lauderdale, 2018).

Data Analysis

One method of narrative data analysis is creative nonfiction (CNF), which allowed the researchers to co-construct narratives based on participants' authentic experiences using fiction-writing literary conventions (Carless & Douglas, 2016; Smith et al., 2015). Creative nonfiction was selected as an appropriate analytical method because it enabled the researchers to depict empirically-grounded and complex personal (i.e., intra-personal), social (i.e., inter-personal), and situational factors involved in an athlete feeling 'ready' to return to sport following a concussion. Creative nonfiction had two objectives: 1) to understand participants' lived experiences in their own words, and 2) to convey the underlying themes of the participants' experiences in an interesting, evocative, and informative way to the reader (Cheney, 2001). There are three types of CNF writing: 1) portrait, 2) snapshot, and 3) composite. *Composite* CNF amalgamates the voices and experiences of various participants into one encompassing narrative (Spalding &

Phillips, 2007). In this study, we used composite CNF because of the thematic similarities in multiple participants' stories.

Creative nonfiction is intended to be a flexible analytical method (Duncan et al., 2018; Ekengren et al., 2020; Erickson et al., 2016). In CNF, the analysis may contain a *storyanalyst* phase (i.e., thinking about the story) and/or a *storyteller* phase (i.e., thinking with the story) (Frank, 2013; Smith, 2016). In this study, we created composite CNF stories using an initial five-step storyanalyst phase, then an six-step storyteller phase to represent the findings (Smith, 2016; Smith et al., 2015). The overall analytic procedure in this study was inspired by Ekengren et al. (2020), who followed the steps outlined by Smith (2016).

Thematic narrative analysis was used during the storyanalyst phase to interpret the athletes' experiences and stories with a concussion (Smith, 2016). First, ML was immersed in the data by conducting the interviews, writing field notes, and listening to the interview recordings following each interview. Second, ML transcribed the interviews verbatim (i.e., word for word) using an online audio-to-text service (Temi for English interviews and Amberscript for French interviews). ML then re-listened to the interviews and made corrections to the auto-generated transcripts (Smith, 2016). The transcripts and the field notes were de-identified (e.g., participants names, names of people, teams, and locations removed) to protect the participants' confidentiality and anonymity.

Third, interview data and field notes were organized using NVivo12 qualitative software (Smith, 2016). ML generated codes to organize the data. A *code* is the most basic unit of the raw data that can be extracted in a meaningful way. Codes were generated by identifying and naming data extracts that appeared meaningful, interesting, or novel to us (Braun & Clarke, 2006). ML grouped similar codes together into broader categories and eliminated redundancies. For

example, some data extracts were coded as thematic (e.g., factors involved in psychological readiness to return to sport), storylines (e.g., the concussion experience), characters (e.g., athletic style and role on the team), and context (e.g., athlete relationships with coaches and teammates). Organizing and condensing the data required repeated readings of all the data (i.e., narrative indwelling) (Smith, 2016).

Fourth, ML identified narrative themes and thematic relationships from the data (Smith, 2016). A *theme* is a pattern of shared meaning across the dataset that is underpinned by central organizing concept, which was, in this case, psychological readiness to return to sport after a concussion (Braun & Clarke, 2019). Fifth, ML named, described, and interpreted each theme in detail supported by participant quotations as illustrated in Table 3 in Appendix E. Each theme was composed of descriptors (i.e., "what") and actions (i.e., "how"). ML also connected themes (e.g., psychological readiness is related to a successful return to sport) (Smith, 2016). The themes were discussed between ML and the second author, JC.

Specific to the storyteller phase, ML first identified two overarching narratives based on the themes and thematic relationships from the interview data: 1) an athlete who felt psychologically ready and experienced a successful return to sport and 2) an athlete who did not feel psychologically ready and experienced an unsuccessful return to sport. We have operationalized the term "successful return to sport" based on descriptions provided by participants' during the interviews. This included contributing to team success, playing with maximum effort, being productive at school/work, not worrying about one's head, restoring one's mental health and personality, and returning at the "right" time. An "unsuccessful" return to sport was described by participants as having almost the opposite characteristics of a successful return to sport. Specifically, we operationalized an unsuccessful return to sport in the

following ways: no longer being an effective player, losing passion for the game, unresolved concussion-related mental health or personality disturbances, and returning to sport prematurely or malingering.

Second, ML prioritized the descriptors and actions of each theme for each story. Thematic descriptors and actions were prioritized in in three ways: 1) elements that participants believed were the most impactful in their perceptions of psychological readiness, 2) elements that were novel to the existing research literature and 3) elements ML and JC identified as interesting and novel. Third, the prioritized thematic elements were divided into "ready and successful" and "not ready and unsuccessful" narratives. Fourth, ML outlined scenes that each highlighted one or several themes. Then, we edited the outlined scenes to remove thematic redundancies and to improve the story's coherence. Fifth, ML drafted the CNF stories using literary techniques (e.g., setting, character sketches, dialogue, internal monologue) elaborated by Caulley (2008) and Smith et al. (2015) and weaved participant quotations throughout to write the CNF stories.

The stories were written from a 1st person perspective because it allowed us to represent participants' perspectives of their concussion experience, their interactions with others, and their beliefs about feeling ready to return to sport following a concussion. Sixth, ML discussed and edited the CNF stories with JC.

Ensuring Methodological Rigor

High-quality research should be *rigorous* to reflect contemporary methodological thinking and to produce more trustworthy and innovative findings (Smith & McGannon, 2018). The term *rigor* does not have a fixed meaning as its definition depends on the perspective from which it is assessed. We interpreted rigor as the deliberate reasoning processes that underpin

methodological decisions and the findings we derived from the data (Harley & Cornelissen, 2020). A *relativist approach* was used to demonstrate rigor, which is closely aligned with an interpretivist philosophical position (Burke, 2016). From a relativist approach, evaluative criteria should be open-ended (i.e., criteria are suggestive and can be added, subtracted, or modified) and tailored to the study's philosophical position, objectives, and methods of choice (Burke, 2016). To evaluate this study, readers are invited to consider its *worthiness* (i.e., is the topic worthwhile of empirical research?), *substantive contribution* (i.e., does the study accomplish its objectives and answer its research questions? Does it contribute to a deeper empirical, theoretical, methodological, and/or practical understanding of the phenomenon and of social life?), *credibility* (i.e., were the methodological and ethical decisions transparent and well-rationalized? Are the findings trustworthy? Were participants given the opportunity to reflect on the data and findings?), *authenticity* (i.e., were participants involved in the co-construction of knowledge and did we accurately embody their lived experiences?), *resonance* (i.e., does the work affect the reader emotionally and/or intellectually? Does the work generate new questions?), and *coherence* (i.e., is there congruency between the study's philosophical position and the methods used? Do the different parts of the study create a complete and meaningful representation of the phenomenon?) (Burke, 2016; Noble & Smith, 2015; Poucher et al., 2019; Smith & McGannon, 2018; Smith et al., 2015; Tracy, 2010).

Results

We interpreted six narrative themes from the initial storyanalyst phase: confidence, fear, identity, pressure, support, and case-by-case. A description of each theme, including sample quotations, is presented in Table 3 in Appendix E. Based on these narrative themes and thematic relationships, we drafted two composite creative nonfiction stories. The characters' names, locations, and storylines are fictitious to preserve participants' anonymity, though the stories are

grounded in participants' lived experiences. The first story, which details a successful return to sport outcome *("I finally feel like I am ready to get back on the ice after my concussion")*, features the following narrative themes: confidence, fear, restoring identity, support, and case-by-case. The first story recounts the thoughts, emotions, and experiences of a second-year university men's ice hockey player named Pierre-Olivier. The opening scene depicts Pierre-Olivier driving to the arena after receiving medical clearance. On the drive, he reflects on the challenges and triumphs he experienced during his concussion recovery and the support he received from his doctor, teammates, and coach. The next scene portrays Pierre-Olivier meeting with his coach to discuss his concerns returning to sport before his first contact practice. During the third scene, Pierre-Olivier competes in battle drills to conclude practice. The final scene depicts Pierre-Olivier's self-talk and interactions leading up to his first game post-concussion.

The second story, which details an unsuccessful return to sport outcome *("I know that I'm not ready to return to the pitch… but there's no way that I'm not playing"),* focuses on the narrative themes: fear, restoring identity, pressure, and case-by-case. The second story recounts the thoughts, emotions, and experiences of Andrea, a final year student-athlete and captain of her university's women's rugby team with aspirations to compete for the National Team. Andrea's story depicts the day before the start of playoffs. The opening scene focuses on some of the pressures that Andrea experiences as well as her relationship with her coach. She debates whether she is ready to return for her team's upcoming playoff match. The second scene is a flashback to a conversation that Andrea had with her doctor during her medical clearance. In the third scene, Andrea's flashback is interrupted and must decide about her availability for the upcoming match. In the final scene, a few months later, Andrea's former teammate suffers a concussion and seeks her advice on how to manage it.

Together, these stories illustrate what we believe encompasses a successful (i.e., psychologically ready) and unsuccessful (i.e., not psychologically ready) return to sport experiences following a concussion. Embedded within the stories are direct quotations (in *italics*) from the interviews with participants. Some quotes have been slightly modified to fit better with the story (e.g., past to present tense, grammatical adjustments).

Storying a successful return to sport: "I finally feel like I am ready to get back on the ice after my concussion"

I sink into the driver's seat of my 2002 blue Toyota Yaris and buckle my seatbelt. I know what you're thinking: Yes, my car and I are almost the same age. But, hey, I'm a broke university student, so don't judge. I bought Old Blue using my savings from working at Snipes & Dangles Hockey Camp the summer before my second year. It was the perfect job for a rink rat like me. I'm not exactly a league all-star, but *I'm intense*. And I'm always the hardest worker on the ice. I also have the best hockey hair you've ever seen (if you ask me!). My teammates would tell you that I love to joke around and pull pranks. I consider my teammates to be *like my brothers*. My positive energy earned me the nickname *spirit specialist*. I think it's fair to say that I transform into *a different person* on the ice. I'll do whatever it takes to win.

Things changed for me when I got my concussion midway through my second year. I couldn't shut off my on-ice persona. *Little things that never used to bother me made me upset*. My grades dropped by a full letter grade. *My brain would go to dark places. It was scary not to feel like myself* for two and a half months. A couple of weeks ago, I had what I think was a mini breakthrough. I started being able to balance school, relationships with my friends, and my mental health. The only thing left is to feel like I'm ready to get back out there with my teammates.

I just finished some concussion tests at the sports medicine clinic. And as I'm sitting here in Old Blue, I roll the doctor's note between my fingers. My fingertips are tracing those magic words I've been waiting to see for so long: MEDICAL CLEARANCE LETTER. I can *feel this ball of energy within me*. Every day leading up to this moment, *all I could think about was getting on back on the ice. Everyone wants to go back to being who they are,* right? This was my first lengthy concussion, so I didn't know what to expect. It was only a few weeks ago when I thought, *"Wow, I don't feel any concussion symptoms today. I'll be back on the ice in no time". And then, literally the next day, I felt horrible.*

Concussions are tricky, man. *It's a real battle of emotions. As athletes, we're always trying to recover faster and reach our goals.* When you're injured, *all you want is to find shortcuts to accelerate your recovery*. I learned the hard way that I had to slow down. Like, there is no cutting corners with a concussion, you just can't. It's weird. *Sometimes your mind is telling you you're fine, but your body is telling you something else.* It was tough for me to accept that my brain was going to limit me and make me pay for pushing too hard. But at the same time, it's not just about me. *I have a responsibility to be accountable to my team*. *I don't want to let them down by not taking care of myself.*

For the umpteenth time today, I do a quick self-assessment to figure out if I have any brain fog or a headache. "It's gone," I whisper to myself. I smile as I think about how my head finally feels normal again. It feels like it's been years since I've felt this good! *"I feel good enough to slowly start playing again,"* I think to myself.

I start up Old Blue and head off to the rink. *I can't wait to see my teammates and tell them* I got cleared! I'm grateful for them. My teammates are *amazing people. They always call to check in on me and hang out, which is really nice.* "I deserve this," I think to myself. Our team

captain Jordie had a concussion last season. When I got hurt, he told me that I should *closely follow my doctor's advice*, which I have. Well… for the most part. *I was so stubborn* at first*. I guess I just felt like my doctor was exaggerating* how serious concussions can be. But now I get it. The doctor told me a couple of stories about some of her other patients. I understand that it can be bad if you don't take your recovery seriously. I feel fortunate *that I have a professional that understands concussions* and how to talk to athletes*. It's reassuring that my doctor feels invested in my overall health—not just getting me back on the ice.*

I make a hard left towards the rink, and I'm nearly blinded by the sun reflecting off the car's hood. My shoulders start to tense up, and I feel a nervous knot building in my stomach—a familiar feeling that I usually only get before class presentations. I look up over the steering wheel and see a few of my teammates walking into the rink. "I can't believe that I'm going to be back on the ice with them today"*,* I say to myself. I inhale deeply, hold my breath for a few seconds, and puff my cheeks as I exhale loudly into the front windshield. I hold eye contact with my reflection in the rearview mirror. "Here we go," I say to myself with a reassuring nod. I swing Old Blue's driver-side door open.

As I pull open the old creaky front doors of the rink, my mind is racing through worst-case scenarios. I start thinking, *"One bad hit, and I could be starting that miserable process all over again." Are my coaches or teammates going to judge me if I need to take it a bit easy? Am I truly ready to go out and compete again?"* If I'm honest, *I feel* physically *ready, but I'm not so sure about mentally*. *One aspect feels ahead of the other* right now. I don't know how much passing the protocol really means that I'm good to go… but the doctor cleared me. So, I guess I'm ready?

I make my way through the hallways with my sticks in one hand and twirling the doctor's note in the other. The loud bangs of pucks hitting the glass and the bright lights that used to cause my head to spin were finally tolerable. "Progress," I confirm to myself. I hear Coach yell my name as I pass his office.

"Pierre-Olivier!"

"Coach!"

"How's your head feeling?"

I smirk as I hand him the doctor's note, which by now had been rolled into a scroll.

"Nice! It's awesome to have you back". Coach sticks out his hand to shake mine.

"I'm pumped to be back and *into my regular routine*," I say as I firmly shake his hand.

"We want you to know that it's okay for you to *take your time* to settle back in. *We're here to help you"*.

I feel my grip on my hockey sticks loosen and my shoulders relax. It *helps that Coach is familiar with the recovery process and is patient with me.* "I appreciate that," I reply.

"Just *let us know what we can do",* Coach answers back.

Coach has this way of bringing everyone together—even the injured guys. When I was away from the team, *Coach used to send video clips to our group chat.* You know, things I need to work on in, say, the defensive zone or whatever. *I'd watch the videos, take some notes, and text back and forth with him.* It's easy to lose your timing and in-game awareness when you're not playing. Coach's feedback helped me stay sharp.

"I'm excited to be back, but I'm worried that I might get a few weird looks," I answer to Coach as I glance towards the locker room where my teammates are getting changed. "I'm going

to speak with the team and make sure we're all on the same page to help you get back up to speed," Coach reassures me.

An hour later, Coach signals the final drill of practice. Typically, our practices end with battle drills in the corner or in front of the net. "So far, so good," I mutter to myself. The team forms two lines by the blue line. I glance over and notice that I'm lining up against Jordie. He practices the same way he plays; aggressive. I can feel some doubt starting to creep in. *This drill is similar to how I got my concussion*. *What's next if I get another one? I definitely wouldn't be able to play… and would my brain be permanently damaged?*

I hear Coach's whistle, which means that I'm up. He dumps the puck into the corner. I'm first to it, but Jordie quickly outmuscles me, takes the puck away and scores. "You're *hesitating. You're being too cautious"*, Jordie says to me as we take our places back in line. I knew he was right. "You've *got this, buddy. Push a little harder.* I'm going to be careful with you". Jordie's words of encouragement and caution towards me are great to hear and help lift some of the negative thoughts I'm carrying. We battle again, and this time I am more assertive. I make a quick turn, but I run into Jordie. It feels like I just slammed into a brick wall. (I bet Jordie would love it if I told him that!). I fall hard to the ice. Coach whistles then glides over to me. "You okay, Pierre-Olivier?". I stay on the ice for a few moments to *do a self-check. Everything feels fine. "I'm good,"* I laugh in relief. Practice ends, and Jordie pulls me over. "I'm speaking from my own concussion experience," Jordie starts. "*Once you get hit and nothing bad happens to you, your confidence will grow, and your fears will gradually go away."* I knew he was right. A few more practices and then I'll feel ready.

It's March 1st, 2021 and tonight is my first game back. *I'm so excited to play that I post about it on Instagram,* which is something I never do. I hear my phone ding in my pocket. It's a

text message from Jordie. "*Pierre-Olivier, you've improved so much over the past week!* The boys and I are *pumped to have you back. It's awesome having someone who does what you do for our team". The appreciation from my teammates who recognize that I can contribute to team success helps me feel ready.* Jordie's not usually the type of guy to share his emotions, so that message means even more to me. I respond with a heart emoji on the message because I don't know what to say. A few moments later, my phone dings again. This time, it's Coach.

"How are you feeling about your first game in a while?"

"*I have a gut feeling that I'm ready*," I reply. "But I don't think I'll know for certain until I get out there and take a hit."

"From what I've seen in practice, you should have *a hundred percent confidence in yourself that you're able to go out and be strong enough. You're smart enough. You're just as capable of being the same player you were before",* Coach replies.

"Thanks, Coach. *I know my confidence will build the more I play and the more hits I take*", I message back. I turn my phone off and leave my apartment.

I start up Old Blue and drive the familiar route towards the arena. I try to hype myself up. *I am confident that I'm not going to get concussed again.* I took a couple of hard hits and falls in practice, and I overcame those. I'm not scared anymore. Of course, *there's always the threat of a new concussion or new injury. But I can't live in fear of that. My concussion is in the past and is no longer haunting me.*

Looking back, it was important to have *control over my mindset*. *I didn't let the concussion define me. I always believed it was a bump in the road and that I would overcome it.* Don't get me wrong, the concussion sucked. *It was the most challenging injury I've had.* But I

also learned some valuable lessons. *I've improved my game awareness,* which will help my performance and hopefully avoid getting another concussion.

It's time for my comeback. I feel the cold arena air hit my face as I skate out onto the ice as the announcer introduces the starting lineup. *My teammates tap their sticks to acknowledge my return.* I skate out to the blue line and take my spot next to Jordie for the national anthem. "You ready?" he says with a wink. "*Some birds need to get kicked out of their nest to fly,"* I joke, with a healthy dose of nervous laughter.

Storying an unsuccessful return to sport: "I know that I'm not ready to return to the pitch… but there's no way that I'm not playing".

It's still dark out when I arrive at my university's athletics facility. I'm always the first one to show up for our pre-game morning meetings… even though I've been out for eight weeks with a concussion. I miss being in the trenches with my closest friends—my teammates. It's sad to think about all the *hard practices,* the long bus rides, and the inside jokes I've missed out on. *As captain, I want to be there encouraging the girls and providing guidance, especially since we have been under-performing lately.* I've started feeling isolated during my recovery. It weighs on me that I can't be the leader I want to be. When *my teammates tell me it's not the same without me* in the dressing room or on the pitch, *I feel honored,* and I know they're trying to support me, but *I also feel like I'm letting my team down.* I want to be by their side, working towards our goal of winning a championship.

It's my last year of [student-athlete] eligibility, so I have to make this season count. It's always been my goal to play rugby for Team Canada. Coach has connections to the National Team but… well… it hasn't worked out for me so far. I don't think Coach knows much about concussions and I know for sure that she doesn't think they're that serious. "Back when I

played…" I say to myself, imitating Coach's annoying tone, "… we just sucked it up. *It's nothing more than a headache*". Every time I see Coach, she asks me when I'm coming back to play. I always answer the same and try not to roll my eyes, "Coach, *I don't know when I'm going to be better".* One time, Coach looked at me disgusted and was like, *"Are you faking your concussion? Or are you not tough enough?"* That crushed me. It makes me upset thinking about it. Obviously, I want to get back as quickly as I can. Nothing else matters to me right now besides getting back out there on the pitch. *Without rugby, part of me is missing; I don't feel accomplished or fulfilled.*

Even though I've been cleared, I haven't decided yet if I'm going to play in the match tomorrow afternoon. Part of me wonders if I'm rushing my return. It helps that I've gone back to class full time, but I still don't know if I'm ready to play. It's not synchronized, and sometimes I feel judged for going to class but not playing. As I sit there alone in the front row and blow the steam off my coffee waiting for my teammates to arrive to the pre-game meeting, I start to tense up as I think back to my last visit with my doctor.

"How is your head feeling, Andrea?", the doctor asks me, as he fumbles around looking for my chart in his filing cabinet in the corner of the bland examination room. My doctor is a middle-aged family physician. As far as I can tell, he doesn't seem to have much experience with concussions or dealing with athletes. *I feel as though I am in control. What I told my doctor led him to diagnose me. Whenever I needed a note for my teachers, he gave me one. And if/when I want to return to sport, I feel like I'll determine his decision. He's listening to what I have to say.* I guess you could say *I feel like my own doctor*.

I mull over how to answer the doctor's question for what seems like hours. "*You play high-level sport. You're a competitor.* You want this, Andrea", I convince myself. "*You don't*

feel like yourself when you're not playing rugby. Just do it". "My head has been feeling good lately", I respond to the doctor.

As the doctor scribbles a note into my chart, I focus on how my head feels. "*Does my head feel foggy?"* The more I think about it, the more I start to feel some symptoms coming on. It's like a self-fulfilling prophecy. "I didn't feel this way a few minutes ago", I think to myself. I clench my jaw in frustration. Everyone tells you *to listen to your body, but maybe my body's lying to me?* It's tough to know if you're making progress.

The doctor pulls a rolling chair to his desk. He opens an email and mumbles, "I have an updated report from your head physiotherapist somewhere here". But before the doctor can share the report with me, I already know that the note recommends my return to sport. I've flirted with medical clearance for a while. *It's pretty easy to cheat the system if you really want to play.* Like, *I found the baseline neurocognitive testing too easy. My teammates and I scored near perfect. The margin of error became so slim that we intentionally tanked it so we could return sooner* [in the event we were diagnosed with a concussion in the future]. Returning sooner means everything to me and, I guess, any athlete. *When you only play a handful of games in a season, missing any amount of time can be seriously detrimental to the team's success.* Not to mention my personal chances of playing for the National team. Plus, I'm captain of this team! *My team needs me.*

I'm starting to get nervous that *everyone else is improving while I'm concussed*. How much time can I miss before it's too late for me to catch up to everyone? I'm falling behind and my goals feel like they are slipping out of reach. I have to make a decision. "*Other people wish they could be in my position. I also want to prove to everyone who supported me throughout my*

career that their sacrifices were worth it. If I can jump through the [return to sport] *hoops without the doctor or physiotherapist saying 'No', then I'm going to do it",* I decide.

The doctor's voice catches my attention and snaps me back into focus. "Your physio wrote in their report that you were able to complete a full contact practice without any symptoms", the doctor continues. "That tells me that you're able to handle the physicality of playing rugby".

As I nod in agreement, my face reddens with a combination of frustration and embarrassment. You see, it's easy for *athletes to manipulate the return to sport process. I floated through a contact practice and felt fine. But in no way did I actually challenge myself or do anything resembling a game situation.* Not to mention that *my teammates all know that I'm coming back from a concussion. No one wanted to be the person to hit me hard*—like in a game. But to anyone watching, *they would conclude that I completed the final step and had no symptoms.* Does checking all of the boxes and passing the return to sport steps mean that I'm actually ready to compete?

I debate whether it might actually be in my best interest to sabotage my medical clearance. "*I don't know if I'm ready to be one step away from playing",* I think to myself as the doctor performs his physical exam. If I get the go-ahead from the doctor, but my teammates or Coach find out that I'm the one holding myself out, *then it'll look like I'm "milking it" or faking it.* "*What kind of captain does that?",* I asked myself rhetorically. "*Pulling myself out for the betterment of my health feels like quitting. And I'm not a quitter",* I concluded.

"I also see that this is your fourth diagnosed concussion", the doctor observes from my medical chart.

"Yes, I've had a few", I reply a little sheepishly. Each concussion took longer to recover than the previous one. I reflect on a conversation I had with my dad after my most recent concussion. We were on the road, and *I was lying in bed at the team hotel* while the rest of the team went out for dinner. *My head felt like it was going to explode*. I called my dad to let him know what happened. *My dad,* who is a no-nonsense guy*, said to me, "Maybe you should think about not continuing rugby?"* The memory makes me cringe. I consider the health of my brain. "*This could be a lot bigger than sports",* I say to myself. I'm someone who does well in school, *I play piano*. I speak four languages. I make sure to take care of my mental health. Yet, I no longer feel like an invincible athlete. Of people, this shouldn't happen to me. *Thinking about the possibility that I might have brain damage for the rest of my life makes me feel sick to my stomach.*

"You know, Andrea", the doctor starts, removing his glasses so he can look me in my eyes, "*if you were my daughter, I wouldn't let you play rugby again"*. I can vividly picture my dad speaking those same words to me. "But you're not my child, and you've passed the return to sport steps. So, if you want to play, I'm going to clear you to play. But I'm warning you, y*ou cannot get another concussion"*, the doctor emphasizes.

The doctor's words *were like a slap to the face.* I think we've all heard the stories in the media about former football and hockey players who have problems years after their playing careers. *I know I probably shouldn't take what's in the media as scientific fact, but it certainly got into my head.* What would the next concussion mean for me and my future? *I might have concussion-related problems for the next five, ten years, who knows?*

As I left the doctor's office with the medical clearance letter in my hands, I question whether I made the right decision. My doctor's warning was intended to protect me, but

ironically, I feel more fearful than ever. "*I don't want my career to be over. I love this game so much. Let me be so careful not to get another concussion",* I think to myself. I fold the medical clearance letter into a square and put it in my pocket, unsure if or when I would share it with Coach.

The door slams behind Coach as she enters the video room. I didn't even realize that my teammates had already filed in and were sitting in their seats. "Hey Andrea! Are you playing tomorrow?", Coach calls out. I hate that question. I wish someone would ask me *about my headspace and the challenges I'm facing instead. I feel very distant from the team*, like *nobody understands what I'm going through*. But… I push that isolating feeling aside because that's not how a captain is supposed to think, right?

Should I disclose my clearance to Coach? Or maybe I should wait a little bit? "*Are you ready to go back out on the field and be the same athlete again?",* I ask myself. I try to visualize myself making a tackle and hesitating. Intuitively, I know I'm *still hesitant because I'm scared of getting hurt again.* I can already imagine Coach berating me for playing 'soft'. "*Screw it*", I decide. "*If the doctor says I'm ready to go, then I'm ready to go.* It's their decision, they're the expert…they wouldn't clear me if I wasn't ready*",* I convince myself. "I got my clearance. I'm 100% ready", I say aloud to everyone in the room in the steadiest voice I can muster.

It's the fall now. Six months have passed since the end of my rugby season. I've graduated university and I started my first grown-up job. I work at a big accounting firm downtown. This was my backup plan when I didn't get the call for the National Team. I've started to move on and *recreate myself*, but I'd be lying if I said it was easy. *It was kind of that realization of, I'm not a rugby player anymore. Who am I?* I've managed to stay in touch with a few of the girls.

Elise, one of the girls I played with, texts me and asks if we can grab coffee later today downtown. Her message catches me off-guard. Based on my experience, the team is typically on the pitch for practice or in the gym around this time. Why is she skipping training? I agree to meet with her.

"Andrea! What's up, girl? You look professional! Long time no see".

"Hey Elise! Same here. What's up with you? Aren't you supposed to be at practice or in the gym?"

"Yeah… no. Not really. I don't know, man, it's confusing. Doc cleared me last week from my concussion…but I don't know…*something feels "off".* Like, *for some reason, I feel awful on bus rides. Maybe it's just because I haven't played in a long time…* I told Coach "*I need some more time. I don't know if it's for a couple of days or…"* I really need to figure it out. What was it like for you when you came back last year?"

"To be honest, I didn't feel like myself even after I returned last year. *I was in a dark place. I just pretended to be confident and happy".*

"Whoa, I had no idea. You seemed like normal *you* when you came back?"

"I had this *"fake it 'til I make it" mindset.* As captain, I guess I thought that everyone was looking at me to be a leader. *If I showed weakness, I felt the team would have less energy and be less confident. So when I came back, I tried to compensate by playing overly aggressive. Now looking back on it, that was a really risky thing to do.* I was convincing myself that *I felt 'good enough'.* Like, you were there when I got hurt again in my second game back, remember?"

"Yeah, I remember that".

"It was such a standard play, fighting for the ball in the scrum. Like, *I shouldn't have gotten hurt on that play. I knew I was done playing rugby after that.* Like, that sucked. I should have trusted my gut and been more patient.

"Jeez, that must have been rough. That sucks, Andrea. I'm kind of the opposite. I feel quieter in the dressing room. *I'm not playing as hard I used to.* Like, last game I told one of the girls *"You take the ball and I'll support".* And you know the way I play—I'm a beast. Like, *before the concussion, I was always ball hungry.* And, as you'd expect, Coach is going crazy. She's all over me about playing "soft". Like, Coach showed me game footage and I was like dang…*I look slow and uncoordinated* …", Elise trails off.

"Andrea, can I tell you something? But you gotta promise to keep it a secret".

"I got you. What's up?"

"I haven't told anyone this… But I'm starting to have second thoughts about rugby. *I'm scared to get hurt again.* And *I don't have the same passion for the sport as I used to.* Like, I'm not happy with my role on the team. I don't really vibe with the other girls. *I find I have more time for school and friends.* People judge, you know? *Everyone thinks I'm just dragging on my recovery. It's not like I want to be injured".*

*"*I've been there. Can I give you some advice that I wish I got"?

"Yes, I need it. What do you got for me?"

"Be true to yourself about how you're feeling, physically and psychologically. That's the best way to get back healthy".

"I appreciate you sharing that".

When our conversation ends, I pay for the coffees and give Elise a big hug and wish her well. "I'll let you know how it goes", Elise says through a forced smile.

Discussion

We interviewed 12 student-athletes and explored their perceptions of psychological readiness to return to sport following a concussion. Based on the thematic narrative analysis, we found that feeling psychologically ready to return to sport following a concussion was comprised of at least six factors: confidence, fear, identity, pressure, support, and case-by-case. Based on those themes, we wrote two creative non-fiction stories that depicted characters who were psychologically ready (Pierre-Olivier) and not ready (Andrea) to return to sport following a concussion. The discussion focuses on the six factors identified in the thematic narrative analysis.

For Pierre-Olivier, feeling *confident* (in his brain health, physical fitness, balancing his academic, athletic, and social roles, and the care he received from his doctor) was important in feeling psychologically ready to return to sport. The Concussion in Sport Group (CISG) has previously noted that confidence plays a role in the return to sport decision-making process (McCrory et al., 2017). Specifically, the CISG noted that restoring confidence is the goal of step 5 of the graduated return to sport steps in their most recent consensus statement (McCrory et al., 2017). Despite this, nowhere in the CISG consensus statement is confidence explicitly defined, and there is no specific explanation regarding how confidence should be developed when returning to sport following a concussion. In a systematic review of the psychosocial factors involved in musculoskeletal injury rehabilitation, confidence was described as an athlete's belief that 1) they can compete at their pre-injury performance levels (e.g., level of competition, fitness), and 2) their injury is completely healed (e.g., the injury site feels 'strong') (Forsdyke et al., 2016). Researchers have also developed quantitative measures that focus on confidence as a key factor when assessing athletes' psychological readiness following injury (Glazer, 2009;

Webster et al., 2008), and qualitative studies from Podlog et al. (2015) and Kunnen et al. (2019) found that injured athletes expressed confidence in their rehabilitation progress, the competence of their rehab professionals, their physical ability, and low fear of re-injury. Results from the present study indicate that, in addition to the factors identified by Podlog et al. (2015) and Kunnen et al. (2019), formerly concussed athletes also derived confidence from non-sport areas of their life, such as balancing their academic, social, and athletic responsibilities. These results appear to be aligned with Wiese-Bjornstal et al. (2015)'s integrated model of psychological responses to the sport concussion injury and the rehabilitation process, where it has been hypothesized that a concussion affects an athlete's cognitive abilities, emotions, thoughts, and behaviors beyond the sport context. Taken together, the results of the present study offer insight into the multidimensional nature of confidence when returning to sport following a concussion. Future CISG consensus statements should consider providing a more comprehensive description of confidence, as well as practical suggestions to develop athletes' confidence during the return to sport steps.

Andrea's story exemplifies the *fear* (of re-injury, of a setback, of potential long-term effects, and of others' judgements) she experienced when deciding if she was ready to return to rugby after her concussion. Fear is a concept that has been found to be a part of the musculoskeletal injury (Kunnen et al., 2019; Podlog et al., 2015) and concussion (Anderson et al., 2019; Cairncross et al., 2021; Silverberg et al., 2017) return to sport experience. Specific to concussions, a study of 41 high school athletes revealed that 59% (24/41) of athletes experienced high levels of fear at the time of an initial clinical visit, and 10% of the same sample of athletes continued to report a high fear of re-injury despite receiving medical clearance to return to sport (Anderson et al., 2019). Athletes in the present study were also fearful of the potential long-term

effects of a concussion when returning to sport (e.g., Andrea noted that "… the possibility that I might have brain damage for the rest of my life makes me feel a little sick"). There has been preliminary but growing evidence linking multiple concussions with a greater risk of long-term neurobiological, cognitive, and mental health deficits (Manley et al., 2017); evidence that has received considerable attention in the media and public discourse (Ventresca, 2019). Eight out of 12 participants interviewed for the present study said they experienced more than one concussion, which might have contributed to their fears about their long-term brain health. Our findings support previous research and suggest that fear (of potential long-term effects) is also involved in athletes' perceptions of their psychological readiness. In line with the growing interest in the concept of fear among concussion researchers (Anderson et al., 2019; Cairncross et al., 2021), our results suggest there is a need for more research to better understand the etiology of fear among athletes' returning to sport following a concussion, as well as how to best support athletes to minimize their fears during this process.

Andrea and Pierre-Olivier both spoke about how their concussion greatly disrupted their *identity*. Restoring identity was mentioned by 9/12 participants in this study as being an important aspect of feeling ready to return to sport following a concussion. However, the stories of Andrea and Pierre-Olivier offer some insights into the complexity of identity in relation to psychological readiness. That is, it appears that identity can be equally facilitative or debilitative for athletes who are returning to sport. Andrea's story is closely related to previous research that has found that athletes who strongly identify with their athletic identity are more likely to engage in unsafe concussion behaviors (Kroshus, Kubzansky, et al., 2015), such as playing through pain and injury, and attempting to expedite the rehabilitation process (Renton et al., 2021). One of the outcomes associated with strong athletic identity (compared to low and moderate ratings)

following an injury is an increased risk for sustaining a subsequent injury (McKay et al., 2013). Andrea's willingness to compromise her health playing the sport she loves and in pursuit of athletic achievement is part of a larger cultural phenomenon that has traditionally overlooked athlete health and safety (Anderson & Kian, 2012; McGannon et al., 2013). On the other hand, Pierre-Olivier's experience depicts how restoring one's identity and feeling excited to play can be a helpful contribution to feeling ready to return to sport after suffering a concussion. Researchers have identified restoring one's identity as an important part of recovery following injury (Forsdyke et al., 2016) and concussion (O'Rourke et al., 2017). Indeed, athletes' have noted that their love of the game, sense of belonging to their team, and happiness playing their sport to have facilitated their psychological readiness when returning to soccer after ACL reconstruction surgery (Kunnen et al., 2019). Taken together, this study suggests that identity can be either facilitative or debilitative towards psychological readiness to return to sport following concussion. It appears necessary to educate athletes, coaches, and health professionals about the role of identity in facilitating a safe return to sport among formerly concussed athletes.

One of the main plot points in Andrea's story was the external (i.e., other-imposed) and internal (i.e., self-imposed) *pressures* that she felt affected her readiness to return to sport after her concussion. Pressure on athletes is a topic that has received attention in the sport concussion literature (Bloom et al., 2020; Caron et al., 2021; Kroshus, Baugh, et al., 2015; Kroshus, Garnett, et al., 2015; Tjong et al., 2017). Elements of Andrea's story were similar to patterns of external pressure exhibited by coaches and teammates in a recent qualitative study that examined three athlete-teammate-coach triads (Caron et al., 2021). One triad explored the case of Jess, a pseudonym used to describe a first-string goaltender for a university women's soccer team who experienced a sport-related concussion. One of Jess's teammates spoke about "how everyone

was thinking… of the future of the team, with Jess being hurt, that was a huge blow", and her coach mentioned he would "… downplay the concussion a little bit…to allow [the player] to heal quicker" (Caron et al., 2021). Examining the previous quotes, the authors concluded that external pressures perceived by concussed athletes were often subtle, and did not necessarily stem from outright comments made by teammates or coaches (Caron et al., 2021). In Andrea's story in the present study, her coaches and teammates were skeptical of her recovery progress and her "toughness", leading Andrea to feel pressured to return to her sport before she was psychologically ready. Additionally, Andrea was a victim of self-induced pressures (i.e., role as team captain, pursuit of competitive goals, feeling guilty being away from her team), a finding that has previously been reported among athletes attempting to return to competition (Podlog & Dionigi, 2010). Evidently, there is a need to create strategies to help formerly concussed athletes manage the overt and subtle external and internal pressures they may experience while returning to sport following a concussion. Our results support previous calls to integrate the expertise of sport psychology professionals to facilitate psychosocial interventions with individuals and groups to better support concussed athletes who are returning to sport (Bloom et al., 2020).

In Pierre-Olivier's story, his coach and his teammate Jordie were sources of *support* that helped him to feel psychologically ready to return to ice hockey. Social support can be conceptualized as an athlete's social bonds with others and their perceptions of received support from their social network (Bianco & Eklund, 2001), which may encompass several dimensions such as emotional (listening and caring), tangible (financial and personal assistance with tasks of daily living), and informational (advice, knowledge) support, to name a few (Bianco & Eklund, 2001; Richman et al., 1993). Concussion researchers have also been interested in the topic of social support (André-Morin et al., 2017; Covassin et al., 2014; Kita et al., 2020). One of these

studies in particular recently investigated the social support influences acting on female high school athletes during their concussion recovery (Kita et al., 2020). Results from Kita et al. (2020) indicated that close friends provided emotional support to the athlete through inclusive social gatherings and understanding the limitations caused by the concussion, teachers and school administrators provided tangible support to the athlete in the form of schoolwork accommodations (e.g., extended deadlines, printed worksheets), and peers with a history of concussion provided informational support to the athlete by providing guidance to the athlete. If we interpret previous findings alongside the types of social support described in Pierre-Olivier story, he received emotional support from his peers who regularly checked in with him, tangible support in the form of video clips sent by his coach, and informational support from his doctor regarding appropriate concussion management. Researchers have previously noted that injured athletes must receive the right type of support from the right source at the right time (based on the athlete's personal preferences) to gain the most benefits (Kita et al., 2020; Yang et al., 2010). There appears to be a need for researchers to investigate the nature of social support with concussed athletes—specifically how socially supportive messages (e.g., text messages, conversations) are communicated to and interpreted by concussed athletes—for a more complete understanding of the role of social support with this population.

Pierre-Olivier's exchanges with his coach via text message (e.g., "I have a gut feeling that I'm ready, but I won't know for certain until I get out there") is demonstrative of the case-by-case (i.e., subjective) nature of psychological readiness following a concussion. Researchers agree that concussion is a heterogenous brain injury characterized by a variety of non-specific symptoms, clinical presentations, and recovery trajectories that complicate concussion management (Lumba-Brown et al., 2020). Further, athletes with a concussion do not present

observable signs of injury (Bloom et al., 2004), or structural abnormalities on standard neuroimaging such as CT scans (Churchill et al., 2017)**,** which makes concussion detection challenging. Researchers have also found that neurological and physiological recovery may exceed clinical recovery (Churchill et al., 2017; Di Battista et al., 2018), indicating that athletes may receive medical clearance to return to sport before the concussion is completely resolved or before they feel psychologically ready to return to sport. There is a need for objective measures to guide diagnosis and recovery, such as biomarkers, but this is a novel research area and is are not yet recommended for clinical use (Di Battista et al., 2018). Results from the present study highlight that completing the return to sport steps and receiving medical clearance are not necessarily synonymous with feeling psychologically ready to return to sport after a concussion. The findings and existing concussion literature point to a need for health professionals to individualize an athlete's return to sport. Athletes and health professionals should work together to develop a flexible return to sport plan following the athlete's medical clearance to account for the case-by-case nature of concussion.

Strengths and Limitations

A key strength of this study is that it is among the first to specifically study the psychological factors involved in returning to sport following concussion, which could eventually have implications for more comprehensively accounting for psychological variables in the CISG return to sport guidelines (Poucher et al., 2020). Additionally, two interviews were conducted with each participant, which strengthens the detail and richness of the collected data (Atkinson, 1998).

We identified a few limitations to the research that we believe are important to consider when interpreting these findings. First, the results of this study may have limited transferability

to professional and elite amateur sport contexts. *Transferability*, which is grounded in relativist ontology and subjectivist epistemology, refers to the extent to which findings in one context are intuitively transferred and applied to other settings (Smith, 2018). Although creative nonfiction promotes transferability (Smith, 2018), athletes who compete in sport as their career (e.g., professional, elite amateur athletes) may identify additional factors involved in psychological readiness to return to following from a concussion. Second and related to the first limitation, this study only explored the psychological factors involved in readiness, which means that we did not explore contextual or sociological factors (e.g., race, disability) that may be involved in an athlete's perception of their readiness. Third, we did not gather insights from other important social actors who may influence athletes' readiness (e.g., family members, peers, coaches, health professionals). Thus, this initial conceptualization of psychological readiness following a concussion is limited to athletes' perspectives. Fourth and finally, due to the qualitative approach, we were unable to provide a relative contribution of each factor (i.e., confidence, fear, identity, pressure, support, case-by-case) towards psychological readiness. At this time, we cannot determine with any certainty which factor(s) should be prioritized by researchers and practitioners to better understand ways to facilitate athletes' psychological readiness.

Chapter 4

Conclusions

This study explored the factors that 12 student-athletes believed were involved in their perceptions of feeling psychologically ready to return to their sport following a concussion. Our findings suggest that, among formerly concussed student-athletes included in this study, psychological readiness is composed of six factors: confidence, fear, identity, pressure, support, and case-by-case. Psychological readiness seems to include intra-personal factors (e.g., identity), inter-personal factors (e.g., support), and factors that combine elements of both (e.g., pressure). In Pierre-Olivier's story of a successful return to ice hockey, he gradually develops his confidence, reduces his fears, and receives support from his coach and teammate that help him feel ready. In Andrea's unsuccessful return to rugby story, she experiences low confidence, high levels of fear and pressure, and inadequate support, leading her to return before she felt ready. Pierre-Olivier's and Andrea's story portray both the facilitative and debilitative characteristics of psychological readiness.

The present study contributes to knowledge in the fields of sport-related concussion and sport psychology. For instance, psychological readiness has not yet been explored among concussed athletes. As such, the present study has provided some insights about the factors that concussed athletes believe are involved in feeling psychologically ready to return to sport. Additionally, creative nonfiction is a methodology that has not previously been used in the study of sport-related concussions. It is our hope that creative nonfiction provided preliminary insights about this phenomenon for athletes (e.g., self-assessing one's own readiness), coaches (e.g., effectively supporting an athlete who suffers a concussion), allied sport medicine professionals

(e.g., accounting for psychological factors involved in return to sport decisions), and/or sport injury management policy makers (e.g., modifications to return to sport guidelines). Finally, the results of the thematic narrative analysis suggest there may be a need for a more holistic assessment of concussed athletes' readiness to help identify who is (and who is not) ready to return to sport. Based on this initial work, future iterations of the CISG return to sport steps should consider biological *and* psychological factors involved in an athlete's readiness throughout their recovery and return to sport, in line with a biopsychosocial perspective of health.

There are many possible directions for future research based on this study that would provide a more complete understanding of psychological readiness to return to sport following a concussion. First, although the stated aim of step 5 is to "restore confidence", it is not clear how athletes (and coaches, health professionals, etc.) can develop confidence among formerly concussed athletes. As such, further research is required to specifically explore confidence returning to sport after a concussion. Second, participants in this study spoke of adopting a resilient mindset to help overcome their concussion and feel ready returning to their sport. Previous empirical studies have found that those who have a resilient mindset recover more quickly from concussion symptoms than those who do not and experience better outcomes (Durish et al., 2019; Sullivan et al., 2016). Future applied research could investigate developing resilience in athletes who suffer a concussion, which may facilitate their psychological readiness.

Third, our findings with student-athletes suggest that psychological readiness to return to sport following a concussion is composed of six factors (i.e., confidence, fear, identity, pressure, support, case-by-case). Future research should gain insights from others such as parents, coaches, peers, teammates, and sport medicine professionals to gather a more comprehensive

understanding of the factors involved in psychological readiness. Fourth and finally, two of the twelve participants in this study were instructed by their doctor not to return to competitive sport. Athletes who are forced to retire from competitive sport might identify unique considerations involved in psychological readiness to lead a 'normal' or active lifestyle, which were not featured in the two creative nonfiction stories. Future research is warranted to explore the experiences and perspectives of athletes who were forced to retire from sport on their psychological readiness during their post-career transition.

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Appendix A: Interview Guide #1

Pre-interview #1

- Introduction
- Information and consent form

Interview #1 questions

- Tell me your date of birth, your educational background, and the sports you've played competitively.
- Describe your playing style as an athlete.
    - How do you think your teammates and coaches would describe you on and off the field?
- Tell me about your injury history (including concussions).
    - How would you compare concussions with other injuries you have had?
- Describe your return to sport process.
    - What role did you have in making the decision to return to sport?
- What were your thoughts and emotions when you received medical clearance to return to sport?
    - Describe your first few practices and games after receiving medical clearance.
- How did you know when you were ready (or not ready) to return to sport after your concussion?
    - What factors are involved in feeling ready – from a psychological standpoint—to return to sport following a concussion?
    - How would you describe the relationship between feeling physically ready and feeling psychologically ready to return to sport after a concussion?
    - How can an athlete work on their readiness to return to sport (on and off the field)?
- What does a successful (and unsuccessful) return to sport look like?
- Would you like to add anything else related to our conversation?

Post-interview #1

- Thank the participant and schedule the follow-up interview #2.
- Briefly introduce the topics that will be discussed.

Appendix B: Interview Guide #2

Pre-interview #2

- "We've had some time to reflect since our last conversation. Was there anything that you were thinking about over that time?"
    - Provide participant with a summary of what I learned about their concussion, return to sport experience, and perceptions of psychological readiness based on Interview #1.
    - Participant is encouraged to clarify and/or expand on initial summary

Interview #2 questions

- Talk about the impact of your concussion on you as an athlete and as a person.
    - How did your role as a student-athlete affect your experience with a concussion?
    - Do you think there are positives that can come from athletes living through a concussion?
- If you could go back in time, what do you wish you would have known after you were diagnosed with a concussion?
    - What advice would you give to an athlete who is about to return to their first practice or game following their medical clearance?
- What type of information do most people in the sport environment (teammates, coaches, health professionals, policy makers) still not understand (and need to know) about concussions?
    - What can parents, coaches, teammates and health care professionals do to help an athlete who suffered a concussion feel ready—from a psychological standpoint--during the return to sport transition?
- Thinking about what you went through with a concussion, is there anything that you would change about your return to sport?
- Would you like to add anything else related to our conversation?

Post-interview #2

- Thank the participant and advise them on the next steps of their involvement.

Appendix C: 5th CISG Graduated Return to Sport Steps

Table 1

Graduated Return to Sport Steps Following a Concussion

Step	Aim	Goal
1	Symptom-limited activity	Gradually re-introduce work/school activities
2	Light aerobic exercise	Increase heart rate
3	Sport-specific exercise	Add sport-related movement
4	Non-contact training drills	Exercise, coordination, **increased thinking**
5	Full contact practice	**Restore confidence** and sport capabilities
6	Return to sport	

Note. Adapted from "Consensus Statement on Concussion in Sport-The 5(th) International Conference on Concussion in Sport held in Berlin, October 2016," by McCrory et al., 2017, British Journal of Sports Medicine, 51(11), p. 840 (https://doi.org/10.1136/bjsports-2017-097699). Copyright 2017 by Paul McCrory.

Appendix D: Participant Characteristics

Table 2

Participant characteristics

Athlete	Sex (M/F)	Sport	Age (years)	Number of Diagnosed Concussions	Concussion Duration (weeks)	Return to Sport Outcome
1	F	Ringuette	19	1	6	Same season
2	F	Basketball	19	2	9	Next season
3	M	American Football	19	5	104	Forced retirement
4	M	Ice hockey	23	3	30	Next season
5	M	Basketball	18	2	16	Next season
6	M	Ice hockey	18	4	6	Same season
7	F	Cycling	24	1	104 (ongoing)	Forced retirement
8	M	Swimming	18	7	8	Same season
9	M	Ice hockey	25	5	14	Same season
10	F	Synchronized skating	24	1	6	Same season
11	F	Artistic swimming	21	2	8	Same season
12	F	Sailing	25	1	30	Next season

Appendix E: Narrative Themes

Table 3

Narrative themes related to psychological readiness to return to sport following concussion

Narrative Theme	Description of theme	Exemplar quotes
Confidence (12/12)	Athletes noted that they were confident returning to sport when they felt like they were the same person and athlete as they were before their concussion. Based on the athletes' comments, we interpreted confidence as comprising the following elements: (a) able to balance their social, academic, and athletic roles, (b) no longer experiencing concussion-related symptoms or dysfunctions, (c) a belief that they will not hurt again (d) able handle the strains of sport, and (e) re-achieving their sport-related skills, fitness, and attributes.	*Athlete 3:* "You have a hundred percent confidence in yourself in the way that you play, that you're able to go out and be strong enough. You're able to be smart enough. You're just as good as you were, or you're just as healthy as you were, just as capable as you were". *Athlete 5:* "My confidence came from "I think I'm healthy enough that I'm not going to get concussed again". There's still a possibility to get another one, but as for the concussion I got, I'm over that one. That is in the past, that is no longer haunting me".
Fear (12/12)	Athletes detailed their fears about returning to sport after receiving medical clearance, which hindered their readiness. Specifically, athletes expressed fears of (a) getting hurt again, (b) experiencing a setback, (c) their long-term brain health, (d) the judgments of others.	*Athlete 8:* "I think it's the fear of "this concussion happened in the swim environment. I'm back in this environment, will I get another concussion?" What if I don't feel well and end up going backwards where we have to start at day zero again?" *Athlete 2:* "I remember I had this feeling of being a little bit sick and nervous about the health of my brain. I was really scared that my brain was damaged for the rest of my life. That possibility was inconceivable to me-- I was an elite athlete. I played piano for seven years. I'm involved in academia—the fact that I was having these difficulties…"
Restoring Identity (9/12)	Athletes' spoke about how their concussion greatly disrupted their identity. Athletes felt that restoring their	*Athlete 9:* "I remember the first practice after Christmas. Like just being out on the ice with my

	identity was a goal during their recovery and an important aspect in feeling ready to return to sport. Athletes felt that restoring identity included (a) feeling joy and excitement returning to their sport, (b) restoring their mental health and body image, (c) restoring social ties to their team, and (d) a willingness to risk their health playing the sport they love.	teammates. I was just so excited, so happy that I'd finally gotten my mind to the point where I was back in the lineup and playing for the first time in almost 3 months. That feeling told me I was getting close to being ready". *Athlete 1 :* **"**Yeah, for me I would say [my identity] played probably the biggest role. I considered being an athlete a huge part of who I was and the reasons I chose to do things and how I went about my life. Every day all I thought about was getting on back on the ice. Everyone wants to go back to being who they are".
Pressure (9/12)	Many athletes spoke about internal (i.e., self-imposed) and external (i.e., other-imposed) pressures when they were returning to their sport. Athletes noted that others likely did not intend to put pressure on them, but it was perceived as pressure. The athletes spoke about several types of pressure, including feeling (a) they are recovering too slowly, (b) they are letting others down, (c) their absence is hurting their teammates, (e) trapped by academic norms (f), overcoming others' social biases.	*Athlete 10:* "I remember the last practice, one of my coaches asked me, "When are you getting back on"? And I was like, "I don't know. I'll have to do my treadmill test first". And she was like, "Well, you know, take your time". But just like having that question asked made me feel like they're already thinking that it's taking too long. And I already tend to be really hard on myself. You kind of feel like, "Am I dragging this on too long"? Do others think I'm milking it"? *Athlete 3: "*You're just so in-the-moment, it's that competitor's drive. You're so narrow sighted, so tunnel vision-focused on winning or your personal goals that you're willing to look past your own personal health for the betterment of the team and feel like you're ready before you actually are".
Support (10/12)	Athletes felt that support from others, especially teammates and coaches, helped them feel ready to return to sport. Other important supporters were friends, rehab professionals, mentors, and academic staff. Athletes felt others demonstrated support by (a) a genuine concern for their health and wellbeing, (b) providing constructive feedback, advice, or encouragement about their return to sport, (c) keeping the athlete involved with the team, (d)	*Athlete 9:* "I remember I had a couple of really good games to start off and my teammates would come to me and be like, "Oh my goodness, it's so good to have you back, to have someone who does what you do". The appreciation for my teammates who recognized that I was contributing in a big way definitely helped me feel ready". *Athlete 5:* "Having other people like your coach, your therapist, your teammates giving their feedback on your skills and your athleticism is important. It helps to make

	tailoring the sport and school environment to their needs, and (e) instilling a team culture of accountability.	sure your skills are coming back, and it keeps you accountable and honest with yourself, which can help you return".
Case-By-Case (11/12)	Athletes often mentioned that only they know for certain when they are mentally ready to return. Athlete felt that readiness varied athlete-to-athlete, and concussion-to-concussion, and can be influenced by situational factors (ex: timing of the season). Athletes (a) had a 'gut' feeling they were ready and (b) learned from previous concussion experience. Interestingly, most athletes expressed frustration that (c) passing the return to sport protocol and receiving medical clearance did not mean the athlete was ready—from a mental standpoint—to return. Several athletes felt that (d) it was difficult to know if they were ready until they were in game situations.	*Athlete 3:* "At one point you get medical clearance and you're supposedly good to go. You can go play sports again. But at the same time, I had this thing in my mind where I was like, "Am I clear to go? I mean, I can run and can do other activities, but am I really ready to go out and compete again?" *Athlete 8:* "I really think an athlete knows they're ready when they know. It's like one of those things that everybody knows their own body. It's really personal. And I think it depends on the concussion. I've had some concussions where it's like "I'm fine, I feel normal, it doesn't really impact me that much". And other concussions I've had are a lot more serious. So your readiness doesn't just change person-to-person, but also concussion-to-concussion".

Note. The number of participants who discussed each theme (out of 12) are noted in the leftmost column below the name of each theme.