

**Establishing foundational data on the mental health functioning, stress,
mood, self-regulation capacity, and perceptions of coaching climate
of Canadian Interuniversity Sport (CIS) student-athletes**

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Table of Contents

Chapter 1 – Introduction.....	1
Background – Definition and Prevalence of Mental Health and Illness.....	1
Chapter 2 - Literature Review.....	4
Well-being and Mental Illness: Not the Same, but not Mutually Exclusive.....	4
Mental Health Landscape of University-Aged Populations.....	5
Demography of Poor Mental Health: Stress and Individual Differences.....	8
Student-Athlete Mental Health.....	10
Mood.....	13
Self-Regulation.....	15
Coaching Climate.....	19
Summary.....	21
Research Purpose and Questions.....	23
Chapter 3 - Methods.....	27
Participants.....	27
Procedures.....	28
Measures.....	29
Data Analysis.	34
Chapter 4 - Results.....	37
Article 1: Levels and Prevalence of Mental Health Functioning in Canadian Interuniversity Sport (CIS) Student-Athletes.....	38
Introduction.	40
Mental Health and Illness.....	40
Mental Health in University Students.....	42
University Student-Athletes.....	44
Methods.	48
Participants.....	48
Instruments.....	48
Procedures.....	50
Data Analysis and Results.....	50
Discussion.	54
Limitations.....	59
Conclusion and Practical Implications.....	60
References.....	62
Article 2: Investigating university student-athletes' mental health functioning in relation to their stress, mood, self-regulation capacity, and perceptions of coaching climate.....	75

Introduction.....	77
Mental Health and Mental Illness	77
Stress.	78
Mood.	79
Self-Regulation.....	79
Coaching Climate.....	80
Purpose of the Study and Hypotheses.	81
Methods.....	82
Participant Recruitment.....	82
Instruments.....	84
Data Analysis and Results.	86
Model Fit.....	88
Stress.	89
Mood States.....	89
Self-Regulation Capacity.....	89
Perceived Coaching Climate.....	90
Discussion.	90
Stress.....	91
Mood.....	92
Self-Regulation Capacity.....	93
Perceived Coaching Climate.....	94
Mental Health Functioning and Athletic Performance.....	94
Limitations.....	95
Concluding Remarks.....	96
References.	99
 Chapter 5 - General Discussion.....	 114
Towards a Preliminary Mental Health Profile of Canadian Student-Athletes.....	115
The “big picture”.....	116
Future Directions and Recommendations.....	118
 Chapter 6 - Conclusion.....	 122
 Chapter 7 – Statement of Contributions.....	 124
References and Appendices.....	125
Appendix A: Table 1: Summary of Sample Demographics.....	130
Appendix B: Recruitment text provided to Athletic Directors.....	132
Appendix C: CIS endorsement letter.....	134
Appendix D: Recruitment Text: SAMHI website.....	135
Appendix E: Recruitment Text: SAMHI social media platforms.....	136
Appendix F: Consent form: Time 1 (November, 2015, EN/FR).....	137
Appendix G: Invitation to Participate at Time 2 – Link to Questionnaire and Consent (EN/FR).....	147

Appendix H: Demographic Questionnaire (EN/FR).....	148
Appendix I: Adult Mental Health Continuum-Short Form (EN/FR).....	156
Appendix J: Student-Life Stress Inventory (EN/FR).....	158
Appendix K: Profile of Mood States – Short Form (EN/FR).....	162
Appendix L: Adolescent Self-Regulation Inventory (EN/FR).....	164
Appendix M: Sport Climate Questionnaire (EN/FR).....	167

List of Figures

Article 2

Figure 1. Significant Standardized Beta Weights for Path Analysis.....	113
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General Discussion

Figure 2. CIS Student-Athletes' Mood Profile Compared to Norms and NCAA Football Players.....	117
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List of Tables

Article 1

Table 1. Summary of Sample Demographics.....	69
Table 2. Internal Consistency Coefficients Grouped by Time and Questionnaire Language.....	71
Table 3. Level and Prevalence of MHF Across Time.....	72
Table 4. Level and Prevalence of MHF Based on Student-Athletes With and Without a Previous Mental Illness Diagnosis.....	73
Table 5. Summary of Main and Interaction Effects of Gender, Alcohol Use, Living Situation, Year of Study and Type of Sport on MHF for Five Separate RM-MANOVAs ...	74

Article 2

Table 1. Internal Consistency Coefficients Grouped by Time and Questionnaire Language.....	108
Table 2. Time 2 Correlations Between Scale Scores and Descriptive Statistics	109
Table 3. Beta Coefficients and Significance Testing for Initial Path Model.....	111

Abstract

Mental health has become increasingly important on post-secondary campuses across Canada, as the majority of university students represent the cohort of the Canadian populace that is most vulnerable to mental illness, substance abuse, and suicide. Evidence suggests that student-athletes, a visible and diverse sub-population of university students, are at equal risk of experiencing a mental illness (Reardon & Factor, 2010), but could be even more vulnerable to mental health challenges than their non-athlete peers (Neal et al., 2013; Watson & Kissinger, 2007), given the additional demands and pressures that they face. Problematic though, is that the culture of athletics and prevailing stigma surrounding mental illness can lead student-athletes to overreport their well-being and deny distress (Steiner, Denny, & Stemmle, 2010), as well as underutilize the mental health services available to them on campus (Lopez & Levy, 2013). Although researchers have investigated the mental health of American college students (e.g., Eklund, Dowdy, Jones, & Furlong, 2011) and attempted to understand the vulnerability of National Collegiate Athletics Association (NCAA) student-athletes to specific mental illnesses (e.g., eating disorders and substance abuse, Reardon & Factor, 2010), no study to date has investigated the mental health of student-athletes competing in Canadian Interuniversity Sport (CIS), particularly not using a holistic lens. As such, the overall purpose of the present study was to provide foundational data relating to Canadian student-athletes' mental health functioning and other relevant indices such as their stress levels, mood, capacity to self-regulate, and perceptions of coaching climate.

The first objective was to understand (a) the level and prevalence of mental health functioning (MHF) of student-athletes competing in the Canadian Interuniversity Sport (CIS) system at two different time points in their academic year (Fall = Time 1, Winter = Time 2) and

(b) whether significant differences existed in their levels of MHF (emotional, social, and psychological well-being) between Time 1 and Time 2 and based on gender, alcohol use, living situation, year of study, and type of sport. Results indicated that the student-athletes from 30 different Canadian universities experienced moderate to high levels of MHF at both time points, including those who reported a previous mental illness diagnosis. Furthermore, there was a higher prevalence of flourishing compared to languishing student-athletes at both time points. Repeated measures MANOVA tests indicated that student-athletes' MHF did not significantly differ across time based on their gender, alcohol use, living situation, year of study, and/or type of sport. However, when a 5-way MANOVA test was conducted with the larger sample Time 1 data to have more statistical power, results revealed a significant main effect of gender, suggesting that women had significantly lower levels of social well-being than men during the first part of the academic/athletic year (see Article 1).

The second objective was to examine relationships between variables that could potentially influence the MHF of CIS student-athletes, namely, their stress, mood, self-regulation capacity, and perceptions of the coaching climate. A path analysis revealed that the student-athletes' MHF was significantly impacted by the frequency of their maladaptive reactions to stressors, mood states, capability to self-regulate, and the climate fostered by coaches. The third aim was to determine if changes in student-athletes' self-regulation capacity over the academic/athletic year were related to changes in the other variables of interest. A t-test was first run to establish whether there was a change in their self-regulation capacity from Time 1 to Time 2, however, their levels remained steady over these time points. A subsequent path analysis showed that change scores in self-regulation capacity were not significantly related to change scores in MHF, stress, mood, and perceptions of coaching climate (see Article 2). The hope is

that the results of this study may inform the strategic directions of mental health promotion and maintenance programming designed for CIS student-athletes in the future.

Keywords: student-athletes, mental health, well-being, stress, mood, self-regulation, coaching climate, university sport.

Chapter 1 - Introduction

Being a university student-athlete comes with complex pressures, extraneous of those of normal student life, that can impact well-being and performance (Humphrey, Bowden, & Yow, 2013; Neal et al., 2013). However, concern for the well-being of student-athletes has traditionally been restricted to their physical health and its influence on performance outcomes in sport and academia (Beauchemin, 2014). One potential explanation for this is the perception that student-athletes are exceptionally healthy (Etzel, Watson, Visek & Maniar, 2006) and therefore immune to mental health challenges and illnesses. Another is that mental health problems and illnesses have not been openly discussed within this population due to a prevailing stigma. Nonetheless, it has become apparent through a review of the literature that the conceptualization of student-athletes' health is shifting to become more holistic (Beauchemin, 2014; Watson & Kissinger, 2007) and encompass mental health functioning. What remains problematic, however, is that the mental health functioning of Canadian university student-athletes is unknown. As such, this was the focus of the current research.

Background - Definition and Prevalence of Mental Health and Mental Illness

Mental health has garnered growing international attention across a variety of domains over the past decade. The World Health Organization (WHO, 2005) defined *mental health* as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (p. 10). Similarly, Keyes (2002) defined mental health as a “syndrome of symptoms of positive feelings and positive functioning in life” (p. 604), which he operationalized as the sum of the following core components of subjective well-being: emotional well-being, psychological well-being, and social well-being (Westerhof & Keyes, 2010).

On the other hand, *mental illness* is defined as “persistent and substantial deviation from normal functioning that impairs an individual’s ability to execute [his/her] social roles, and generates emotional suffering” (Keyes, 2003, p. 293). Worldwide, mental illness is among the top five causes of lost life years due to disability and is a growing burden to healthcare systems and individuals (Keyes, 2007). Within the category of mental illness reside conditions such as anxiety disorders, major depressive episodes, and unipolar and bipolar depression (Keyes, 2007). Depression alone accounts for 43% of the global burden of disease (WHO, 2013).

Mental illnesses affect one in five Canadians annually (Smetanin, Stiff, Briante, Adair, Ahmad, & Khan, 2011) and one in four Canadians will suffer from a mental illness in their lifetime (Hanlon, 2012). Each year, 4000 Canadians, most of whom are experiencing mental health concerns, die by suicide (Mental Health Commission of Canada, 2012). It is projected that over the next 30 years, the life and economic consequences of mental illness will be magnified, and within a generation, 8.9 million Canadians will be living with a mental illness (Humphrey et al., 2013; Smetanin et al., 2011).

Mental illnesses most commonly present first in youth aged 15 to 24 years, making this the group most vulnerable to mental illnesses, substance dependencies, and suicide in Canadian society (Clapham, Jahchan, Medves, Tierney, & Walker, 2012; Hanlon, 2012; Peter, Roberts, & Dengate, 2011). By the age of 18, as many as 20% of youth have experienced a case of clinical depression (Keyes, 2007). Furthermore, suicide is the second leading cause of death in this age group (Clapham et al., 2012). Of note, the 15-24 year old cohort represents about 90% of students on Canadian university campuses, thus, based on the aforementioned statistics, it is not surprising that mental health has become a growing concern within the post-secondary community across the country. As post-secondary institutions are increasingly being recognized

as important settings for the promotion of mental health and well-being, we are fortunately beginning to see a shift in thinking in Canada to move beyond health care system reform and towards early detection and prevention (Clapham et al., 2012). David Turpin President of the University of Victoria from 2000 to 2013 predicted that, “by 2020, mental health issues are going to be the leading cause of disability at Canadian universities” (Hanlon, 2012, p. 1). It thus appears that mental health research and initiatives across Canadian university campuses should become a priority.

The present study was a first step in empirically examining mental health functioning and important related indices in Canadian university student-athletes, an identified diverse and visible sub-population of the traditional university student-body (Etzel et al., 2006; Gohn & Albin, 2006). It will become apparent in the literature review section that this sub-cohort faces the same risk of experiencing a mental illness (Reardon & Factor, 2010), and is potentially more vulnerable to mental health challenges, than the non-athlete cohort (Neal et al., 2013; Watson & Kissinger, 2007). Studies have shown that university students struggle with the overuse of drugs and alcohol (Adlaf, Demers, & Gillsman, 2004), and overwhelming stress, anxiety, and depression (American College Health Association [ACHA], 2009; Lunau, 2012; University of Alberta Wellness Services, 2011). Furthermore, National Collegiate Athletic Association (NCAA) athletes appear to be particularly susceptible to certain mental illnesses (e.g., eating disorders; Reardon & Factor, 2010). Nonetheless, very little research has focused on the mental health functioning of Canadian university athletes. As such, the current study was conducted in pursuit of garnering a baseline of indices of university student-athlete mental health, towards the eventual development of effective educational programs, counseling services, and policies to protect the mental health of Canadian university student-athletes.

Chapter 2 - Literature Review

Well-Being and Mental Illness: Not the Same, but not Mutually Exclusive

Mental health has long been understood as the absence of mental illnesses (e.g., depression, anxiety), however, this is a narrow conceptualization and outcome of psychosocial development over the lifespan (Westerhof & Keyes, 2010). Underlying this incapacious understanding of mental health is the assumption that increases in psychological distress automatically result in declines in well-being (Renshaw & Cohen, 2014). However, Keyes (2002) proposed a dual-continua model of mental health and illness to feature these two constructs as related but distinct phenomena that contribute to the overall positive functioning of individuals throughout the lifespan. Keyes (2002) postulated that subjective well-being is a key aspect of mental health that encompasses feelings of happiness and satisfaction with life, positive individual functioning, and positive societal functioning. Within this more comprehensive understanding of mental health, the presence of mental health in life is described as *flourishing*, while the absence of mental health is characterized as *languishing* (Keyes, 2005; Peter et al., 2011; Westerhof & Keyes, 2010).

Other studies have supported the notion that indicators of psychological distress and well-being are related, yet distinct facets of overall mental health, some of which included American university/college students (Eklund et al., 2011; Low, 2011; Renshaw & Cohen, 2014) and Canadian university students (Durand-Bush, McNeil, Harding, & Dobransky, 2015; Peter et al., 2011). For example, a sample of Canadian undergraduates surveyed by Durand-Bush, McNeill, Harding, et al. (2015) reported high levels of psychological distress while simultaneously reporting moderate to high levels of psychological well-being. Similarly, a small proportion of American (12.8%, Low, 2011) and Canadian (1.7%, Peter et al., 2011) university students who

were classified as flourishing also reported experiencing symptoms of depression. These findings demonstrate that the presence of distress and mental illness in students' life does not mean that they cannot achieve a certain level of well-being (Canadian Mental Health Association [CMHA] Ontario Division, 2006), thereby supporting Keyes' dual-continua model.

Watson and Kissinger (2007) are other proponents of examining mental health from a holistic perspective, focusing on wellness as "a way of life oriented toward optimal health and well-being" (p. 154). They employed an evidenced-based multidimensional wellness model to explore the adjustment of student-athletes and non-athletes at a Division I institution and found that student-athletes reported lower levels of wellness than did non-athletes. Overall, excepting the aforementioned studies, the mental health of university students and student-athletes has seldom been operationalized and empirically investigated from a comprehensive, dual-continua perspective. Indeed, despite acknowledging the need to focus on promoting mental health (U.S. Department of Health and Human Services, 1995), rather than treating mental illness, the treatment of mental illness continues to be the primary focus of mental health research and practice (Tanner, 2015). Consequently, an aim of the current study was to satisfy an observed gap in the literature by examining the mental health of university student-athletes through a holistic lens, allowing for a better appreciation of some of the facets of this population's mental health.

Mental Health Landscape of University-Aged Populations

As previously mentioned, mental illnesses most commonly first present in youth aged 15 to 24 years, making this cohort the most vulnerable to mental illness, substance abuse, and suicide (Clapham et al., 2012; Hanlon, 2012; Peter et al., 2011). As this cohort sits between adolescence and adulthood, members of this demographic are considered "emerging adults"

(Arnett, 2000). This period of transition from adolescence to adulthood can be tumultuous as individuals grapple with their identity, experience instability, engage in self-focus, and entertain the possibilities of their adult life (Arnett, 2000). This could help explain why more than 40% of young adults aged 18 to 29 years, experience functional impairment significant enough to warrant the diagnosis of at least one psychiatric disorder during this age span - most commonly, anxiety, substance, or mood disorders (Kessler, Chiu, Demler, & Walters, 2005). Despite this increased risk of being met with a psychiatric disorder during emerging adulthood, as compared to the later stages of adulthood, young adults tend to utilize mental health services at a significantly lower rate than older adults (Kessler et al., 2005; Wang et al., 2007).

Shedding additional light on the mental health challenges of young adults, Adlaf, Demers, and Gilksman (2004) investigated indices of mental health of 6282 full-time undergraduate students enrolled at 40 Canadian universities, including their levels of psychological distress, alcohol and drug use, and gambling. Of this sample, approximately 29% reported four or more symptoms indicative of elevated distress, 15% were treated professionally for mental health problems, and 11% experienced suicidal thoughts. About one-third (32%) of the students relayed hazardous or harmful drinking patterns, with male students and students living on campus or off-campus without family being more likely than their peers to display these risky drinking patterns. Furthermore, 44% of the total sample experienced negative affect as a result of harmful drinking, and 32% related at least one indicator of dependent drinking (Adlaf et al., 2004).

Other researchers have underscored the negative influence of substance abuse, including drinking, as well. For example, excessive use of alcohol has been associated with deliberate self-harm (i.e., activities in which the intention was to cause harm to the self, even if the act did not

actually result in harm), depressive symptoms, suicidal ideation, and difficulties with emotional regulation (Goldstein, Flett, Wekerle, & Wall, 2009; Gratz, Conrad, & Roemer, 2002; Haavisto et al., 2005). One national study shed light on the prevalence of alcohol and drug abuse in CIS student-athletes 20 years ago, showing alcohol and pain killers to be the most prevalently used substances, and drinking habits not varying across gender and sport played (Gauvin & Spence, 1996). Startlingly, 38% of student-athletes reported having six or more drinks on the occasions that they did consume alcohol. Aside from this study, alcohol use has not been thoroughly investigated in the Canadian student-athlete population, and never in conjunction with their overall mental health. Consequently, this type of research is warranted.

According to Adlaf and colleagues (2004), the most common symptoms of poor mental health reported by the Canadian university students they surveyed were feeling constantly stressed, losing sleep over worry, and feeling unhappy or depressed. These results are similar to those of other studies conducted with Canadian university students (e.g., ACHA, 2009). Specifically, undergraduate respondents from six Ontario post-secondary institutions indicated the most common factors affecting their academic performance to be stress, sleep difficulties, and anxiety. A high number of them reported being so overwhelmed by feelings of anxiety (47%) and depression (30%) in the last 12 months that it was difficult for them to function (ACHA, 2009). A wellness report from the University of Alberta (University of Alberta Wellness Services, 2011) also indicated that over 50% of the sample of 5000 undergraduate and graduate students reported being unable to function due to excessive feelings of anxiety and depression. Moreover, 7% had seriously thought about suicide and 1% had actually attempted it. Evidently, the Canadian university student population is at serious risk of experiencing psychological difficulties that at the least, inhibit their day-to-day functioning, and at most put

their lives at risk. Understanding manifestations associated with this population's mental health will be imperative in designing effective programs and policies to protect their well-being.

Demography of Poor Mental Health: Stress and Individual Differences

Reports of increasing stress among North American college and university students over the past two decades have indeed called cause for concern. As previously mentioned, stress is an important contributor to poor mental health, especially for university-aged students. Furthermore, stress is highly individualized and typically occurs when individuals perceive that their demands exceed their resources and ability to cope (Mikolajczyk, Maxwell, Naydenova, Meier, & Ansari, 2008). When stress becomes excessive and is perceived negatively, it turns into psychological distress, and can lead to deficits in day-to-day functioning (Dohrenwend, Shrout, Egri, & Mendelsohn, 1980; Ridner, 2004), as well as depressive symptoms, negative emotional affect, and physical and mental illness (Campbell, Svenson, & Jarvis, 1992; Mikolajczyk et al., 2008; Misra & McKean, 2000). A study by Sax (1997) indicated that student stressors were either academic, financial, time, or health-related. Notably, according to Bradshaw and Wingrove (2012), the stress of exam period caused the number of emergency drop-ins per day at the McGill University mental health centre to quadruple, swamping the already overloaded clinic.

Psychological distress may significantly vary according to gender and year of study. For instance, a study of 457 Canadian undergraduate students showed that women, especially mature women aged 22 years or older, were more likely than men to report overwhelming stress levels (Campbell et al., 1992). Possible methods of stress reduction for students include time management, social support, positive re-appraisal, and engagement in leisure activities (Misra & McKean, 2000). However, Blake and Vandiver (1988) reported that university students often

attempt to control stress through avoidance, which can lead to adverse emotional and physical health. Similarly, Dyson and Renk (2006) found that female college freshman were more likely than their male counterparts to manage stress by engaging in emotional coping strategies (i.e., managing emotional responses to a problematic situation) rather than using problem-focused coping strategies. This emotional coping style has been associated with maladaptive functioning and strain, and often, higher levels of depressive symptoms (e.g., Terry, 1991), whereas problem-focused coping strategies have been associated with reduced levels of depression (e.g., McNamara, 2000).

The transition from high school to university is cited as particularly difficult, especially for those students living off campus without parents or family (Adlaf et al., 2004). This is in part due to the greater academic demands that are placed on students at the university level compared to that of high school. Furthermore, students must form new social networks and many face homesickness and loneliness (Park, Edmondson, & Lee, 2012). The research of Pritchard, Wilson, and Yamnitz (2008) showed declines in students' psychological and physical health over their first year of university, including an increased frequency of drinking and intoxication and prevalence of negative affect (e.g., depression, anxiety, and tension). Multiple studies have documented high levels of stress, anxiety, and depression in first year university students (Dyson & Renk, 2006; Sasaki & Yumasaki, 2007; Sher, Wood, & Gotham, 1996), calling attention to this particularly difficult time in the development of young adults.

In sum, evidence shows that college and university students are at risk of adverse reactions to stress and decreased mental health, especially if they do not have adequate coping skills and support. Furthermore, individual differences related to gender and year of study appear to predispose students to experiencing distress.

Student-Athlete Mental Health

Another important element that can influence college and university students' stress and mental health is whether or not they participate in sport. On the one hand, participation in competitive sport can have several merits. For example, Harris (1993) and Chu (1989) uncovered that sport participation helped American college athletes to develop a positive identity, strong character, a sense of responsibility and sociability, and self-acceptance. Also, the graduation rates of NCAA athletes have been found to be higher than those of non-athletes of the same demographic (i.e., sex and ethnicity, Watt, Moore, & Howard-Hamilton, 2001). Watt and colleagues (2001) also reported associations between athletic participation and the development of high self-esteem, self-discipline, leadership, teamwork, and networking skills.

On the other hand, playing an intercollegiate sport adds an unexpectedly complex layer to student life. Student-athletes are a distinct sub-group of students who face unique challenges that can be potentially distressing and lead to low well-being (Kimball & Freysinger, 2003; Humphrey et al., 2013; Miller & Kerr, 2002). For instance, in addition to managing many of the same academic, emotional, and personal goals and concerns as their non-athlete colleagues, student-athletes must cope with physical fatigue and injury, attempt to balance the often conflicting roles of student and athlete, manage an inflexible and demanding schedule, monitor their nutrition and body composition, and forge relationships outside of their sport network (Aries, McCarthy, Salovey, & Banaj, 2004; Martens & Lee, 1998; Watt & Moore, 2001).

Burnout due to overtraining is another risk of intercollegiate sport (Dubuc-Charbonneau, Durand-Bush, & Forneris, 2014; Kimball & Freysinger, 2003; Miller & Kerr, 2002; Wilson & Pritchard, 2005). For example, Dubuc-Charbonneau and colleagues (2014) examined the burnout levels of 145 student-athletes competing on CIS teams from two different Ontario universities.

Burnout, characterized by high levels of emotional and physical exhaustion, a reduced sense of accomplishment, and sport devaluation (Raedeke, 1997), was reported by less than 2% of the student-athletes, which is consistent with previous findings (Gustafsson, Kenttä, Hassmén, & Lundqvist, 2007). However, 17% of the student-athletes showed some signs of burnout as early as one month after the onset of the athletic and academic year, which is cause for concern. Furthermore, female athletes had significantly higher levels of emotional and physical exhaustion than their male counterparts. Lastly, swimmers and basketball players reported significantly higher levels of emotional and physical exhaustion than hockey players and fencers, and fencers had greater levels of sport devaluation than hockey and volleyball players. This suggests that gender and type of sport may be important variables to consider when studying the mental health and well-being of varsity student-athletes.

A number of researchers have endeavoured to understand the causes and consequences of stress and other related variables in American student-athlete populations. Kimball and Freysinger (2003) found that collegiate sport acted as both a buffer and a source of stress, depending on whether or not sport facilitated self-determination, self-control, and competence in student-athletes. Furthermore, while for some student-athletes, sport provided valued friendships, social support, and interaction, for others, it caused stress by constraining socializing with non-athlete peers. Kimball and Freysinger (2003) also revealed that some athletes experienced stress as a result of their controlling coaches who undermined their sense of autonomy.

In another study, Humphrey et al. (2013) found that NCAA athletes faced elevated sources of stress related to academic difficulties, athletic demands, time, interpersonal relationships, and finances, which resulted in a negative impact on their overall health and their athletic and academic performance. Neal and colleagues (2013) reported that from the mental

and physical demands of academics and athletics, to high expectations, isolation from the broader student population, pressure to train hard and perform in evaluative situations, chronic fatigue, and cultural expectations of athletes, the stressors of being a student-athlete can exacerbate an existing mental health condition or “trigger” a new psychological concern. It thus appears that this sub-cohort of the university student population may be even more vulnerable to mental health concerns than the regular student cohort.

Knowledge within the relatively new fields of sport psychiatry and clinical sport psychology is beginning to shed light on this, although empirical findings remain fairly limited. A few studies have focused on specific mental illnesses in American student-athletes, including substance abuse and eating disorders (McLester, Hardin, & Hoppe, 2014; Swoap & Murphy, 1995; Wilmore, 1991). Of particular interest, alcohol was the most widely used substance according to a sample of almost 14,000 NCAA student-athletes. Another sample of NCAA student-athletes identified alcohol as having the most apparent negative effect on their performance and health (Green, Uryasz, Petr, & Bray, 2001). Wechsler, Davenport, Dowdall, Grossman, and Zanakos (1997) and Nelson and Wechsler (2001) compared the frequency of heavy episodic drinking (i.e., consuming five or more drinks for males and four or more drinks for females, in one sitting) between athletes and non-athletes on American college campuses. In both studies, they found that more male and female athletes reported heavy episodic drinking than male and female non-athletes. As with non-athlete university populations, heavy episodic drinking has been strongly correlated with negative health and social-behavioural consequences in collegiate athlete populations (Leichliter, Meilman, Presley, & Cashin, 1998; Nelson & Wechsler, 2001; Wechsler et al., 1997; Wechsler, J. E. Lee, Kuo, & H. Lee, 2000).

A meta-analysis of the diagnosis and treatment of mental illnesses in athletes has revealed that there are large gaps that have yet to be addressed (Reardon & Factor, 2010). The assumption by athletes and support staff members is that there is a low prevalence of mental illness in athletes. However, limited epidemiological research suggests that athletes experience psychiatric disorders, including mood disorders, at the same rate as the general population, but that managing these disorders may be complicated by athletic participation. For instance, Reardon and Factor (2010) suggested three possible relationships between athletics and psychiatric disorders: (a) athletes may reach high levels of success despite a coexistent primary psychiatric disorder; (b) athletes may have chosen athletics as a means of coping with a disorder; or (c) athletes may have a psychiatric illness precipitated or worsened by participation in sport. Although some studies have examined the prevalence and causes of specific psychiatric disorders in athletics such as eating disorders and substance abuse, these studies are confined to American athletes, including female elite and intercollegiate athletes (McLester et al., 2014; Swoap & Murphy, 1995; Wilmore, 1991; Yang et al., 2007). For example, Yang and colleagues (2007) studied 257 Division I NCAA athletes and found that they showed the same frequency of depressive symptoms as did a comparison group of non-athletes. Furthermore, trends in mental health have mirrored those in the general university population, that is, athletes who were female, freshman, or were experiencing pain were more likely to report depressive symptoms. Antecedents of depression in athletes include overtraining, injury, competitive failure, aging, retirement from sport, as well as the same stressors that affect the general population (Puffer & McShane, 1991).

Mood

Mood disturbance is of particular concern for adolescents and young adults, as this cohort's risk of suicidality is already three times that of the general population (Sabo, Miller, Melnick et al., 2005). Mood has been varyingly defined in the literature, however, Lane and Terry (2000) defined it as an omnipresent set of feelings that vary in intensity and duration, and usually involve multiple emotions. Researchers suggest that mood and emotions play an adaptive role and influence the mobilization of personal resources to cope with the demands of everyday tasks (Batson, Shaw, & Oleson, 1992), which for athletes, pertain to several sport-related activities.

Mood also affects athletic performance (Beedie, Terry, & Lane, 2000). For example, positive mood states such as vigor (feelings of energy, arousal, and alertness) are said to facilitate performance because athletes with high vigor put forth greater effort towards successfully attaining performance goals (Lane & Terry, 2000). On the other hand, negative mood states, such as depression (feelings of hopelessness and worthlessness), fatigue (feelings of mental and physical over-exertion), confusion (feelings of bewilderment and uncertainty), anger (feelings of annoyance, aggravation, fury, and rage), and tension (feelings of nervousness, apprehension, and anxiety) have been associated with debilitated performance (Beedie et al., 2000). Not only can mood disturbances impede performance, they can also lead to an increased risk of injury (Nippert & Smith, 2008; Petrie, 1993; Yang et al., 2014), and impair the recovery process following an injury as well (Nippert & Smith, 2008). As an example, in a sample of 330 American collegiate football players at two universities, one-fifth of them experienced depressive symptoms at the time of their enrollment in freshman year. That same one-fifth were 10% more likely to sustain an injury by their second year compared to players who did not report

symptoms of depression at enrollment (Yang et al., 2014). One explanation for this association is that depressive symptoms can result in physiological and attentional changes (i.e., increased muscle tension and/or distractibility) that can lead to errors and subsequent injuries (Williams & Andersen, 1998). However, athletes who engage in self-regulatory behavior (e.g., consciously recognize the intensity of their mood and anticipate its impact on their behavior) may more effectively deal with the intense mood states that impair performance (Thayer, Newman, & McClain, 1994) and put them at risk of injury. Mood states have not been explicitly examined in Canadian student-athletes and linked to their mental health functioning. Consequently, research is warranted to determine the type and strength of relationship between these two variables.

Self-Regulation

A skill that has the potential to positively impact the mental health of university student-athletes and is worthy of investigation is self-regulation (Durand-Bush, McNeill, Harding, et al., 2015). Self-regulation reflects individuals' capacity to proactively plan, control, evaluate, and adapt their thoughts, feelings and actions in an attempt to achieve goals in an ever-changing environment (Zimmerman, 2000). Self-regulatory skills are an important contributor to good psychological health and adjustment, as a sense of control over one's behavior, feelings, and environment is essential to happiness and well-being (Maddux & Gosselin, 2003). Interestingly, self-regulation capacity was found to significantly predict university students' levels of stress, psychological well-being, and mental health functioning in two recent studies with 469 and 647 Canadian undergraduate students (Durand-Bush, McNeill, Harding, et al., 2015). While the students reported moderate to high levels of stress and low levels of mental health functioning, they also exhibited moderate levels of self-regulation capacity and moderately high levels of psychological well-being. The comparable results across the two studies suggest that although

the students experienced distress, this did not negatively influence their perceived psychological well-being and ability to function. Durand-Bush, McNeill, Harding, and colleagues (2015) concluded:

It is possible that this competency [self-regulation] may have acted as a buffer and helped them to maintain higher levels of well-being in spite of their perceived stress and impaired mental health functioning. Providing ongoing self-regulation training to students through counselling and formal courses may be one way to help them remain healthy and successful while completing their studies and when entering the workforce. (p. 26)

Other studies conducted in university settings suggest that students who develop and maintain effective self-regulation skills in their transition from high school to university (e.g., Guiffrida, 2009) and throughout their post-secondary studies (e.g., Park et al., 2012) are more likely to thrive and have a stronger sense of identity (Hofer, Busch, & Kärtner, 2011) than those with less effective self-regulation skills. They also appear to have greater psychological adjustment (Park et al., 2012; Tangney, Baumeister, & Boone, 2004) and mental health (e.g., fewer depressive symptoms, lower anxiety, and higher indices of well-being, Sher et al., 1996) than their less self-regulated counterparts. Park and colleagues (2012) examined the relationship between the development of three self-regulation skills (constructive thinking, emotional regulation, and mastery) and stress, anxiety, and depression across first year college students at a large public Northeastern college in the United States. Analyses revealed that increases in all three self-regulation skills predicted better individual adjustment over the first year of college. Conversely, a diminished capacity to self-regulate has been identified as a risk factor for college

students categorized as “heavy drinkers” to experience negative alcohol-related consequences (Hustad, Carey, Carey, & Maisto, 2009).

In the sport setting, self-regulation is important for individual and team performance (Durand-Bush, McNeill, & Collins, 2015) as well as cohesion (Collins & Durand-Bush, 2010). Although elite athletes have mastered the physical skills required to compete at a high level, they must also exercise an ability to manage psychological and social processes occurring in and out of competition in order to be successful (Brassington, 2004; Durand-Bush, McNeill, et al., 2015). For instance, athletes must practice emotional activation (e.g., get “amped up” before a competition) but also adequately harness these emotions to remain within their ideal range for optimal performance (Steiner et al., 2010). In stressful and threatening situations, they must also manage their anxiety and can use different strategies such as self-talk and breathing techniques to prevent over-arousal (Collins & Durand-Bush, 2010).

While automatic regulation is quick and effortless, deliberate and focused self-regulation involves active effort, particularly in the face of challenges and stress, which may deplete cognitive and emotional resources and impede performance (Collins & Durand-Bush, 2010; Steiner et al., 2010). Therefore, it reasons to follow that athletes who are better able to effectively self-regulate, and do this automatically as a result of mastering the skill, may also be more successful in sport. For example, Steiner and colleagues (2010) found that student-athletes (n=461) reported lower levels of distress and higher levels of restraint in comparison to a non-athlete age and gender-matched control group (n=61). The authors suggested that elevated levels of well-being reported in the study may have been due to automatic regulation learned over a long period of time, as most athletes begin competing in their chosen sport from a young age and become accustomed to, and perhaps unaware of, the immense pressures they face (Steiner et al.,

2010). Although automatic regulation is arguably more desirable than deliberate self-regulation given that athletes want to conserve energy to channel it in their performances, Steiner et al. warn that over-learned automaticity of suppression could place athletes at a high risk of engaging in unhealthy coping mechanisms, and may lead to mental health problems such as substance abuse, eating disorders, affective disorders, and physical self-harm.

In team sport settings, self-regulation was associated with enhanced teamwork and performance (Bell, 2007; Callary & Durand-Bush, 2008; Collins & Durand-Bush, 2010). For example, Collins and Durand-Bush (2010) studied an elite curling team comprised of four athletes and one coach, taking them through a 24-week self-regulation intervention focused on planning, self-observation and self-control, and self-reflection. The athletes and coaches unanimously reported that gaining these self-regulation skills led to greater team cohesion and elevated performance. Notwithstanding this, not everyone has a high capacity to self-regulate (Zimmerman, 2000); mood, age, and gender are some of the factors that may influence the self-regulation process (Dyson & Renk, 2006; Heatherton & Wagner, 2011; Park et al., 2012). Although it is possible to increase one's capacity to self-regulate through self-awareness and deliberate practice (Durand-Bush, McNeill, et al., 2015; Zimmerman, 2000), mental illness can be another barrier to self-regulation that is often out of an individual's control (Heatherton & Wagner, 2011). For example, mood disturbances impede self-regulation (Marlatt & Gordon, 1985; Sinha, 2009). Furthermore, Ward and Mann (2000) reported that negative affect diminishes the cognitive resources available to inhibit behavior or control impulses, which is a key aspect of self-regulation. In fact, individuals with mood and major depressive disorders experience low or negative mood for prolonged periods of time and have difficulty regulating their emotions (Johnstone, Reekum, Urry, Kalin, & Davidson, 2007; Kim & Whalen, 2009;

Wager, Davidson, Hughes, Lindquist, & Ochsner, 2008). In other words, the capacity of individuals with these types of disorders to manage their reactions to everyday stressors is impaired more often and for longer periods of time than those without disorders.

Given the aforementioned findings, one can surmise that self-regulation capacity is worthy of further investigation and may be an important competency for university student-athletes to refine in order to protect their mental health. However, one must also consider the possibility that self-regulation may be difficult to enact if they have a mental illness.

Coaching Climate

Another variable that has the potential to affect university student-athletes' mental health is their perceptions of the coach-created climate. As previously mentioned, sport participation can lead to negative consequences, especially when individuals feel excessive pressure from significant others in their social environment (Kimball & Freysinger, 2003; Reinboth & Duda, 2006). Coaches exert considerable influence over athletes of any age, and therefore have a substantial impact on their performance and well-being (Adie, Duda, & Ntoumanis, 2012). Research has shown that athletes attach importance to the climate under which they perform (Pensgaard & Roberts, 2002) and coaches are the primary architects of it (Ames, 1992). Coaches who develop healthy and successful relationships with their athletes foster reciprocal respect, trust, and communication (Jowett & Cockerill, 2003; Gillet, Vallerand, Amoura, & Baldes, 2010). Conversely, coaches whose relationship with their athletes is characterized by mistrust, dominance, and disrespect are perceived to decrease effectiveness and well-being (Blanchard, Amiot, Perreault, Vallerand, & Provencher, 2009; Jowett, 2003).

In similar words, the climate established by coaches can vary based on their autonomy-supportive (Pelletier, Fortier, Vallerand, & Brière, 2002) or autonomy-depleting behaviours

(Deci & Ryan, 1985). Studies examining the relationship between coach-created autonomy-supportive environments and athlete well-being at youth (e.g., Adie et al., 2012), university (e.g., Reinboth & Duda, 2006), and elite (e.g., Quested & Duda, 2007) levels, generally show that an autonomy-supportive social climate satisfying athletes' basic needs (i.e., autonomy, competence, and relatedness, Deci & Ryan, 1985) predicts positive outcomes of subjective vitality and emotional affect. Autonomy-supportive coaching has also been positively linked with athletes' intrinsic motivation (Amorose & Anderson-Butcher, 2007; Mageau & Vallerand, 2003; Pelletier et al., 2002). For example, Pelletier and colleagues (2002) examined competitive swimmers' (N=369) motivation (i.e., amotivation, external, introjected, identified, and intrinsic motivation) and persistence, as well as their perceptions of coaches' interpersonal behaviors. Results supported earlier work (e.g., Deci & Ryan 1985), in that autonomy-supportive social contexts were linked to greater levels of self-determined motivation, and intrinsic types of motivation resulted in more positive psychological and social athlete outcomes.

Other work on coaching climate assumes that athletes measure their competence using either a task-orientation (e.g., master self-referenced) or an ego-orientation (e.g., competence in relation to others, record breaking, statistics; Gearity & Murray, 2011). Similar to the conceptualization of an autonomy-supportive environment, which allows for individuality as athletes work towards a common goal, individuals perceive a task-oriented climate as one in which their best efforts are encouraged and recognized, cooperation is fostered and everyone on the team plays an important role. Sport research at the youth (Omumundsen et al., 2007; Ntoumanis, Taylor, & Thøgersen-Ntoumani, 2012), elite (Pensgaard & Roberts, 2000; Pensgaard & Roberts, 2002) and intercollegiate (Gearity & Murray, 2011) levels has found that athlete perceptions of a task-oriented climate are more conducive to an overall positive experience and

well-being. Other researchers corroborated this by showing that a task-oriented climate was associated with higher enjoyment and lower anxiety in sport (Duda & Ntoumanis, 2005; Smith, Smoll, & Cumming, 2007).

Akin to an autonomy-depleting sport environment, ego-oriented climates encourage a singular way of behaving and performing. These types of climates are perceived by individuals as only recognizing and valuing participants with superior ability, while drawing negative attention to those who make mistakes (Newton, Duda, & Yin, 2000; Nicholls et al., 1989). Ego-oriented climates in sport have been associated with negative outcomes and ill-being, including greater perceptions of peer conflict, less social support and positive feedback, more punishment-oriented feedback, higher anxiety, and performance-related worry (Gearity & Murry, 2011; Ommundsen, Roberts, Lemyre, & Miller, 2007; Pensgaard & Roberts, 2002). The work of Pensgaard & Roberts (2000) with Norwegian elite athletes participating in the 1994 Olympics indicated that an ego-oriented climate was a significant predictor of high distress, while athletes' perceptions of a mastery climate were negatively associated with the coach as a source of distress.

Overall, these findings suggest that the climate provided by coaches can facilitate or hinder athletes' performance and well-being, and it may be valuable to examine this variable in relation to the mental health functioning of university student-athletes. Providing insight into student-athletes' perceptions of the coaching climate at the university level will help shape the recommendations put forth to optimize the mental health and performance of this sub-cohort.

Summary

In a NCAA document entitled "Inter-Association Recommendations in Developing a Plan for Recognition and Referral of Student-Athletes with Psychological Concerns at the

Collegiate Level: A Consensus Statement”, a growing concern for the mental health of American college students was expressed (Neal et al., 2013). Neal and colleagues (2013) acknowledged the unique circumstances of student-athletes and the corresponding stressors placed upon them. The document also highlighted that athletic trainers are typically the first responders to athlete distress and a source of support for student-athletes. Consequently, the development of a triage plan for athletes with psychological concerns that trainers and other practitioners could use was recommended.

In Canada, research in the last 10 years has demonstrated a growing concern for the mental health and well-being of students on Canadian university campuses (Adlaf et al., 2004; Durand-Bush, McNeill, Harding, et al., 2015; University of Alberta Wellness Services, 2011). More university students are seeking psychological counseling and treatment, causing on-campus health care services to be overwhelmed (Bradshaw & Wingrove, 2012; Lunau, 2012; MacKean, 2011). Student-athletes are a sub-cohort of the university student population equally, if not more, at risk of mental health challenges given the additional demands and stressors they face (Neal et al., 2013). The NCAA in the U.S. is taking groundbreaking steps towards increasing awareness and supporting college athletes with psychological concerns, through NCAA-funded initiatives and the identification of evidence-based best practices.

The sociopolitical stage for acknowledging and supporting mental health in sport has been set in Canada by pioneers like Clara Hughes, and the Canadian Olympic Committee initiative Game Plan. As such, it is timely for Canadian university and sport governing bodies to follow their lead. In 2013, the CIS endorsed the creation of a policy that will protect and promote the mental health of student-athletes, but this policy has yet to be determined due to insufficient evidence. To date, no research has been carried out in Canada to assess the mental health

functioning of university student-athletes. Furthermore, Keyes' (2002) dual-continua model has seldom been used in this setting to provide a comprehensive view of this population's functioning. Consequently, the aim of this study was to provide foundational data on the mental health functioning of CIS student-athletes using Keyes (2002) comprehensive model in order to help steer the creation of mental health policies and important standards of practice.

Research Purpose and Questions

The purpose of this study was to investigate the mental health functioning of CIS student-athletes and determine if their stress levels, mood states, capacity to self-regulate, and perceptions of the coaching climate influence their levels of mental health functioning. Although there are various levels of post-secondary student-athletes in Canada (i.e., college, club, and varsity), this study focused on the highest level of competition [i.e., interuniversity athletes who competed in a CIS conference (Canada-West University Athletics Association [CW], Ontario University Athletics [OUA], Réseau du Sport Étudiant du Québec [RSEQ], and Atlantic University Sport [AUS]). The following specific research questions were addressed:

- 1. What is the level and prevalence of mental health functioning of student-athletes competing in CIS sport at two different time points in their academic year (Fall = Time 1, Winter = Time 2)?** Given that student-athletes are vulnerable to high levels of stress (Kimball & Freysinger, 2003), burnout (Dubuc-Charbonneau et al., 2014), and diminished levels of well-being (Neal et al., 2013; Watson & Kissinger, 2007), it was hypothesized that student-athletes would exhibit moderate to low levels of mental health functioning, and there would be a lower prevalence of student-athletes flourishing compared to those languishing.
- 1.1. Are there significant differences in CIS student-athletes' level of mental health functioning between Time 1 and Time 2 and based on gender, alcohol use, living**

situation, year of study, and type of sport?

- (a) Time: We hypothesized that student-athletes would exhibit significantly diminished mental health functioning at Time 2 in comparison to their Time 1 scores. This hypothesis was made under the presumption that student-athletes would be at the greatest risk of ill-being (e.g., distress, burnout) by the end of the Winter semester due to the prolonged experience of stressors such as academic and athletic demands (e.g., assignments, exams, playoffs), and fatigue (Dubuc-Charbonneau et al., 2014).
- (b) Gender: Given that female university students reported overwhelming stress levels (Campbell et al., 1992) and maladaptive coping methods (Dyson & Renk, 2006) in comparison to their male peers, and since female student-athletes experienced burnout symptoms at significantly higher rates than male student-athletes (Dubuc-Charboneau, 2014), we hypothesized that female student-athletes would exhibit significantly lower mental health functioning scores than male student-athletes.
- (c) Alcohol use: Since alcohol is widely used by collegiate athletes and has a negative effect on their health (Adlaf et al., 2004; Goldstein et al., 2009; Gratz et al., 2002), we hypothesized that student-athletes exhibiting hazardous drinking patterns (i.e., “frequent bingeing”, Nelson & Wechsler, 2001), would also exhibit significantly lower mental health functioning compared to their peers who did not.
- (d) Living situation: Similarly, since the transition from high school to university has been documented as particularly difficult, especially for those living off campus without parents or family (Adlaf et al., 2004), we hypothesized that student-athletes living off-campus without family would report significantly lower levels of mental health functioning than students living on campus or off-campus with family.

- (e) Year of study: We hypothesized that first year undergraduate students would exhibit significantly lower mental health functioning than students in their second year of undergraduate studies and beyond, as research indicates that it is not uncommon for students' psychological and physical health to deteriorate over their first year of university due to the challenging transition between high school and university (Park et al., 2012; Pritchard et al., 2008).
- (f) Type of sport: Dubuc-Charbonneau and colleagues (2014) found that the type of sport can impact emotional and physical exhaustion in student-athletes. Consequently, we expected to see differences in mental health functioning scores based on sport type (i.e., individual versus team sport).

2. **What is the relationship between CIS student-athletes' mental health functioning, stress, mood states, self-regulation capacity, and perceived coaching climate at Time 2, when it is presumed that student-athletes will be most fatigued from their academic year / athletic season and at risk of ill-being?** Based on existing research regarding university students' mental health functioning, stress levels and self-regulation capacity (Durand-Bush, McNeill, Harding, et al., 2015), their mood states (Batson et al., 1992; Beedie et al., 2000), and perceptions of coaching climate (Amorose et al, 2007; Reinboth & Duda, 2006), it was hypothesized that there would be a significant relationship between all of the variables. Specifically, we anticipated observing a positive association between mental health functioning, positive mood states (i.e., vigor), self-regulation capacity, and perceptions of coaching climate (high mean score indicative of autonomy-supportive coaching), as well as a negative association between these three variables and stress and negative mood states (i.e.,

tension, depression, anger, confusion; high mean score for the two latter variables indicative of depleting states).

3. **Are changes in total self-regulation capacity from Time 1 to Time 2 associated with changes in student-athletes' mental health functioning, stress, mood states, and perceptions of coaching climate?** Park and colleagues (2012) found that changes in self-regulation capacity over time significantly correlated to changes in adjustment of students during first year of university. Furthermore, Durand-Bush, Collins, and McNeill (2012) reported that changes in self-regulation effectiveness (i.e., towards less effective regulation) were perceived to be associated with changes (i.e., increases) in stress, exhaustion, and ill-being in sport. As such, it was hypothesized that changes in student-athletes' self-regulation capacity over time would be related to changes in their mental health functioning, stress, mood states, and perceptions of coaching climate.

Chapter 3 - Methods

A short-term prospective quantitative design was used to answer the aforementioned research questions. Specifically, given that it was expected that the variables under investigation could vary depending on the demands that participants faced during the semester and the resources they had at their disposal to meet these demands, data were collected at two different time points within the same academic year. This allowed for the detection of changes between the Fall (Time 1) and Winter (Time 2) semesters and provided a more comprehensive and realistic representation of student-athletes' mental health functioning, stress, mood states, self-regulation capacity, and perceptions of the coaching climate.

Participants

Approximately 12,000 student-athletes compete in the CIS each year in 11 women's and 10 men's sports (Vallée & Bloom, 2007). There are four regional divisions within the CIS, each of which were targeted for recruitment: (a) Canada-West University Athletics Association (CW, 17 universities), (b) Ontario University Athletics (OUA, 20 universities), (c) Réseau du Sport Étudiant du Québec (RSEQ, 8 universities), and (d) Atlantic University Sport (AUS, 11 universities). However, ethics approval was obtained from 23 (of 56) CIS-member institutions. Consequently, participants were directly recruited from these universities. Participants from seven additional universities were also recruited via the Student Athlete Mental Health Initiative (SAMHI), a grassroots organization advocating for the mental health of Canadian university student-athletes.

The following selection criteria were used to recruit the student-athletes: (a) had to be competing in the CIS during the calendar year in which they completed the survey (2015-2016 season), (b) had to be academically eligible to compete in university sport (i.e., in accordance

with CIS Eligibility Policy 40.10) while pursuing any level, year, or program of study, and (c), had to be attending all practices and team functions to participate in the study if they were not competing due to an injury. These criteria were explicitly stated in both the recruitment text and consent form, thus there was reliance on the integrity of participants to respond only if they were eligible to do so.

Overall, the student-athletes (age 17-26, $M = 20$ years; $SD = 1.96$) competed in recognized CIS sport at 30 Canadian universities: CW ($n = 61$), OUA ($n = 118$), RSEQ ($n = 84$), and AUS ($n = 125$). See Table 1 in Appendix A for a summary of participants' demographics.

Procedures

Following ethics approval from the University of Ottawa and all other consenting CIS universities, participants were recruited through purposive convenience sampling (Baumgartner, Strong, & Hensley, 2002). Recruitment took place via two separate platforms. The first was through CIS Athletic Directors (AD). Given the organizational structure of post-secondary institutions in Canada, individual universities are operated fairly autonomously, including their Athletic Departments. As such, individual ADs were contacted via an email that explained the objectives, importance, benefits, risks, and procedures of the study and asked that they email an invitation to participate (recruitment text was provided in this email) to their student-athletes through available channels (coaches). The recruitment text (see Appendix B) was accompanied by a letter of support from the CIS, endorsing the study (see Appendix C). The second platform through which participants were recruited was SAMHI. A call for participants was made through SAMHI's website (see Appendix D) and social media platforms (e.g. Twitter, Facebook, see Appendix E) where procedures to participate were clearly identified.

In the email invitation they received, potential participants were invited to complete an online survey at Time 1 (November, 2015) to collect demographic data and evaluate their mental health functioning, stress, mood states, self-regulation capacity, and perceptions of coaching climate. They had a four-week window to do this and the ADs were asked to send a reminder email two weeks after sending the initial email to them. Participants provided their consent online in order to be able to access the survey (see Appendix F) and were invited to leave their email at the end of the survey if they wanted to receive an invite to participate at Time 2 (March 2016). In March 2016, respondents who had left their email were sent a link by the lead researcher to provide their consent (see Appendix G) and complete the same survey (minus the demographic questions). The survey was available in both English and French and took 20-25 minutes to complete at both time points.

Measures

Demographics. The demographic questions were designed based on those used in previous studies (e.g., Adlaf et al., 2004). These questions served to gather valuable information to describe the sample (e.g., age, ethnicity, relationship status, number of dependent children, year of athletic eligibility, program of study, coach's gender, incidence of previously diagnosed mental illness, see Appendix H). In addition, some of the information (i.e., gender, alcohol use, living situation, year of study, and type of sport), which was identified in the literature as potentially influencing mental health functioning, was utilized to answer RQ1.1. For example, student-athletes' drinking habits were assessed using items taken from a study by Wechsler, Davenport, Dowdall, Grossman, and Zanakos (1997) and Nelson and Wechsler (2001), which compared drinking patterns between athletes and non-athletes on American college campuses. Respondents who had never drunk alcohol, or had not done so in the last year were categorized

as “non-drinkers”. Respondents who had consumed alcohol in the past year, but who had never binged (i.e. consumed five or more drinks [males] or four or more drinks [females], in one sitting) in the past 30 days were classified as “non-binge drinkers”. Respondents who had consumed alcohol over the last year but reported bingeing only once or twice over the past 30 days were categorized as “infrequent bingers”. Lastly, respondents who had consumed alcohol in the last year and reported bingeing three or more times in the past 30 days were categorized as “frequent binge drinkers” (i.e., heavy episodic drinkers).

Mental health functioning. The mental health functioning of student-athletes was measured using the Mental Health Continuum - Short Form (MHC-SF, Keyes, 2002, see Appendix I). The MHC-SF is a 14-item questionnaire, derived from the long form (MHC-LF), that assesses emotional well-being (EWB, three items), social well-being (SWB, five items), and psychological well-being (PWB, six items). Student-athletes were asked to rate how they had been feeling during the past month using a 6-point Likert scale from *never* (0) to *every day* (5). Three mean subscale scores were obtained and higher scores were indicative of higher mental health functioning. In addition to this continuous assessment, the MHC-SF allowed for a categorical assessment of mental health, whereby participants were categorized based on the following three categories: a) *flourishing*, which reflects the presence of mental health, b) *languishing*, which characterizes an absence of mental health, and c) *moderately mentally healthy*, which represents those who are neither flourishing nor languishing (Keyes, 2009). To be categorized as flourishing, student-athletes had to report experiencing ‘every day’ or ‘almost every day’ at least one of the three symptoms of emotional well-being and at least six of the eleven indicators of positive functioning (SWB and PWB) over the past month. Those reporting ‘never’ or ‘once or twice’ during the past month on at least one measure of emotional well-being

and at least six measures of social and psychological well-being were considered to have languishing mental health. Those who met neither of the criteria for flourishing or languishing were deemed to have moderate mental health (Keyes, 2009). The MHC-SF has shown excellent internal consistency ($> .80$) and discriminant validity in adolescents (ages 12-18) and adults in the U.S., Netherlands, and South Africa (Keyes, 2005, 2006; Keyes et al., 2008; Lamers et al., 2011; Westerhof & Keyes, 2009). The three-factor structure of the long and short forms was confirmed in nationally representative samples of U.S. adults (Gallagher, Lopez, & Preacher, 2009) and adolescents (Keyes, 2005, 2009), and in college students (Robitschek & Keyes, 2009). The validated French-language version of the MHC-SF, used by Statistics Canada in the Canadian Community Health Survey – Mental Health (2012), was also used in this study.

Stress. Student-athletes' stress was measured using the Student-Life Stress Inventory (SLSI, Gadzella, 1991, see Appendix J). The SLSI is a 51-item self-report instrument evaluating: (a) frequency of types of stressors (i.e., frustrations, conflicts, pressures, changes, and self-imposed) and (b) frequency of maladaptive reactions to stressors (i.e., physiological, emotional, behavioral, and cognitive, Gadzella, 1994). The SLSI was chosen because it captures information on major stressors that university students and student-athletes typically face (e.g., academic, time management, financial, Sax, 1997). Respondents were first asked to rate their stress as mild, moderate or severe, and then to rate their experience and reactions to stressors using a five-point Likert scale ranging from *never* (1) to *most of the time* (5). Subscale scores for the frequency of experienced stressors and frequency of maladaptive reactions to stressors were generated, with a high score indicating a high frequency of experienced stressors and more frequent debilitating reactions to stress. The SLSI has been shown to be valid, reliable, and internally consistent for measuring the frequency of students' stressors and maladaptive reactions to stressors in studies

with American college students (Gadzella, 1994; Gadzella, Baloglu, Masten, & Wang, 2012). No French-language version of the SLSI existed thus the English version was translated by a professional translator and verified by the thesis supervisor (see results for internal consistency coefficients).

Mood states. Student-athletes' mood states were assessed using the shortened version of the Profile of Mood States (POMS-SF, Shacham, 1983, adapted from McNair, Lorr, & Droppleman, 1971, see Appendix K). The POMS-SF consists of 37 adjectives assessing the intensity of six experienced mood states (i.e., tension, depression, anger, vigor, fatigue, and confusion). Student-athletes were asked to assess how appropriate each word was to describe how they had been feeling over the past week using a Likert scale ranging from *not at all* (0) to *extremely* (4). Subscale scores were derived for each of the six mood states, along with a total mood disturbance score (LeUnes & Burger, 2000); higher scores indicated more intense experience of mood states and greater disturbance of mood. The ideal mood profile (referred to as the "iceberg profile") features scores below that of the normative sample (i.e., 50th percentile) on the scales of tension, depression, anger, fatigue, and confusion, and higher than that of the normative sample (i.e., above the 50th percentile) on the scale of vigor (Renger, 1993). The reliability and validity of both the POMS and POMS-SF have been shown across a variety of domains, including sport. The POMS has been used in over 400 sport-related studies (Bourgeois, LeUnes & Meyers, 2010), some of which involved intercollegiate athletes (LeUnes, Daiss, & Nation, 1986; Nation & LeUnes, 1982). A French-Canadian adaptation of the English 37-item POMS-SF version (Shacham, 1983) was validated by Fillion and Gagnon (1999).

Self-regulation. Student-athletes' self-regulation capacity was measured using the Adolescent Self-Regulatory Inventory (ASRI, Moilanen, 2007, see Appendix L), a 36-item self-

report instrument that assesses five components (monitoring, activating, adapting, persevering, and inhibiting), four domains (emotional, behavioural, attentional, and cognitive), and two temporal contexts (i.e., long and short-term) of self-regulation. Student-athletes rated *how true* each statement about their engagement in self-regulation was using a 5-point Likert scale ranging from *not at all true for me* (1) to *really true for me* (5). A cumulative score was generated, with a higher score indicating greater capacity to self-regulate. Given that university student-athletes must manage both academic and athletic demands, this inventory was deemed the most salient to assess their overall self-regulation capacity. The ASRI was used in two studies with undergraduate students under the age of 20, and was demonstrated as valid and reliable through a factor analysis (Moilanen, 2007). A French-language version of the ASRI was not available, as such, the English version was translated by a professional translator and verified by the thesis supervisor (see results for internal consistency coefficients).

Coaching climate. Student-athletes' perceptions of the coaching climate were evaluated using the Sport Climate Questionnaire (SCQ, Baard, Deci, & Ryan, 2000; see Appendix M). This 15-item questionnaire assessed the degree to which participants perceived their coach to be autonomy-supportive using a 7-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (7). A high mean score was indicative of a higher level of perceived autonomy-supportive climate. The SCQ is both valid and reliable (e.g. Standage, Duda, & Ntoumanis, 2006; Williams & Deci, 1996) and has been used with elite youth athletes (Adie et al., 2012) and intercollegiate athletes (Amorose & Anderson-Butcher, 2007). As a French-language version of the SCQ was not available, the English version was translated by a professional translator and verified by the thesis supervisor (see results for internal consistency coefficients in Table 1 of Article 2).

Data Analysis

All statistical analyses were carried out in SPSS Version 21.0. Individuals who left entire surveys blank were deleted. A missing data analysis was performed with the remaining sample ($n=388$) indicating that only 2.75% of the data were missing. When less than 5% of data are missing, influences of missing data are negligible (Tabachnick & Fidell, 2013). Missing data were treated with multiple imputations using an expectation-maximization method (Tabachnick & Fidell, 2013). Internal consistency reliability coefficients were tested for French and English instruments at Time 1 ($n=388$) and Time 2 ($n=110$). Descriptive statistics were obtained to identify univariate and multivariate outliers and variables were also screened for normality. No irregularities were observed.

Research Questions 1 and 1.1. Mean subscale scores, standard deviations, and categorical scores of mental health functioning (i.e., languishing, moderate, flourishing), were calculated for Time 1 and Time 2. Then, a five-way repeated measures MANOVA was conducted to test whether significant differences existed in student-athletes' level of mental health functioning between Time 1 and Time 2 based on gender (i.e., male, female), alcohol use (i.e., non-drinker, non-binger, infrequent binger, frequent binger), living situation (i.e., on-campus, off-campus with family, off-campus without family), year of study (i.e., first year, subsequent years), and type of sport (i.e., individual, team). The three dimensions of mental health functioning (i.e., EWB, SWB, PWB) served as the dependent variables that varied over time while gender, alcohol use, living situation, year of study, and type of sport served as independent variables. It should be noted that all assumptions of multivariate analysis of variance testing were met, with the exception of the alcohol use variable, which violated the assumption

of adequate sample size. As such, results pertaining to this variable should be cautiously interpreted.

Given the exploratory nature of the study and the restricted statistical power due to the limited sample size, a series of five repeated measures MANOVAs were also conducted to individually test whether gender (i.e., male, female), alcohol use (i.e., non-drinker, non-binger, infrequent binger, frequent binger), living situation (i.e., on-campus, off-campus with family, off-campus without family), year of study (i.e., first year, subsequent years), type of sport (i.e., individual, team) resulted in significantly different levels of mental health functioning in student-athletes across time. The three dimensions of mental health functioning (i.e., EWB, SWB, PWB) served as the dependent variables measured at both time points, while gender, alcohol use, living situation, year of study, and type of sport served as the independent variables. *P*-value was adjusted to account for multiple comparisons (Tabachnick & Fidell, 2013).

Finally, to ensure that no potential significant differences in student-athletes' mental health functioning were missed due to a lack of statistical power, a 5-way MANOVA was conducted with the larger sample ($n=388$) data to cross-sectionally examine the main effects of the variables of interest at Time 1. Again, gender (i.e., male, female), alcohol use (i.e., non-drinker, non-binger, infrequent binger, frequent binger), living situation (i.e., on-campus, off-campus with family, off-campus without family), year of study (i.e., first year, subsequent years), and type of sport (i.e., individual, team) served as the independent variables, while the three dimensions of mental health functioning (i.e., EWB, SWB, PWB) were used as the dependent variables.

Research Questions 2 and 3. Using the structural equation modeling AMOS 21 software program (Arbuckle, 2012), a path analysis was conducted using a Maximum Likelihood (ML)

estimation to determine the relationship between student-athletes' mental health functioning (EWB, SWB and PWB served as the dependent variables), and the independent variables of stress (frequency of stressors, frequency of maladaptive reactions to stress), mood states (fatigue, vigor, tension, depression, anger, confusion), self-regulation capacity, and perceptions of coaching climate at Time 2. Model fit was assessed using a combination of fit indices: Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA), and the χ^2 statistic.

To investigate whether changes in self-regulation capacity over the athletic/academic year were associated with changes in the other variables of interest, an independent *t*-test was first performed to determine if there were significant differences in student-athletes' total self-regulation capacity scores from Time 1 to Time 2. To ensure that intra-individual differences were not missed by the *t*-test, a preliminary path model was conducted whereby a change score for self-regulation capacity was used as the independent variable and change scores for the remaining variables of interest served as the dependent variables [i.e., MHF (EWB, SWB, PWB); stress (frequency of stressors, frequency of maladaptive reactions to stress); mood (fatigue, vigor, tension, depression, anger, confusion); perceptions of coaching climate].

Chapter 4 - Results

The following section includes the results of this research, which were articulated in two distinct articles. Article 1 focuses on Research Questions 1 and 1.1 and thus, presents the levels and prevalence of mental health functioning in CIS student-athletes across time. It also addresses the influence of time of year, gender, alcohol use, living situation, year of study, and type of sport on MHF. Article 2 targets Research Questions 2 and 3, that is, the relationships between CIS student-athletes' mental health functioning and stress, mood, self-regulation capacity, and perceptions of coaching climate. The relationship between changes in self-regulation capacity and changes in the other variables was also addressed. The two articles are presented in the format required by the scientific journals to which they will be submitted for publication.

Article 1: Levels and Prevalence of Mental Health Functioning in
Canadian Interuniversity Sport (CIS) Student-Athletes
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Abstract

This study aimed to examine levels and prevalence of mental health functioning (MHF) in Canadian intercollegiate student-athletes and the impact of time of year, gender, alcohol use, living situation, year of study, and type of sport on MHF. Student-athletes from 30 Canadian universities completed an online survey in November 2015 ($n=388$) and March 2016 ($n=110$). Results showed that MHF levels were, on average, moderate to high, and more student-athletes were flourishing compared to those languishing. MHF levels did not significantly differ across time based on gender, alcohol use, living situation, year of study, and type of sport. However, women had significantly higher levels of social well-being than men during the first part of the year (November). Of those who participated at both time points ($n=110$), 18% reported a previous mental illness diagnosis. These student-athletes maintained moderate MHF across time and 30% of them were categorized as flourishing at Time 2. These findings support Keyes' (2002) dual-continua model of mental health and mental illness, and suggest that the presence of mental illness does not automatically imply low levels of well-being and languishing.

Keywords: mental health functioning, well-being, student-athletes, individual differences, university sport

Introduction

Being a university student-athlete comes with complex pressures additional to those of normal student life, that can impact well-being and performance (Humphrey, Bowden, & Yow, 2013; Neal et al., 2013). For example, student-athletes must manage both sport and academic demands and excel in both domains to maintain their athletic eligibility status. It is thus not surprising that student-athletes are predisposed to the same or an even greater risk of experiencing declines in their mental health and well-being, as their non-athlete peers (Brewer & Petrie, 2002; Neal et al., 2013). However, concern for the well-being of student-athletes has traditionally been restricted to their physical health and its influence on performance outcomes in sport and academia (Beauchemin, 2014). One potential explanation for this is the assumption that athletes are inherently mentally healthy (Bond, 2002). Another is that mental health problems and illnesses have not been openly discussed within this population due to a prevailing stigma. Despite calls to address the health of student-athletes from a more holistic perspective (e.g., Watson & Kissinger, 2007), mental health in Canadian university student-athletes remains unknown. As such, the present study is a first step in empirically examining this critical dimension of health in this unique sub-population of Canadian university students. It is our hope that results will serve as a springboard to conduct more research and eventually develop effective counseling services, educational programming, and policies to protect and promote the mental health of Canadian student-athletes.

Mental Health and Illness

Mental health has garnered growing international attention over the past decade. The World Health Organization (WHO, 2005) defined *mental health* as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life,

can work productively and fruitfully, and is able to make a contribution to his or her community” (p. 10). Similarly, Keyes (2002) defined mental health as a “syndrome of symptoms of positive feelings and positive functioning in life” (p. 604), which he operationalized as the sum of the following core components of subjective well-being: emotional well-being, psychological well-being, and social well-being (Westerhof & Keyes, 2010). On the other hand, *mental illness* is defined as “persistent and substantial deviation from normal functioning that impairs an individual’s ability to execute [his/her] social roles, and generates emotional suffering” (Keyes, 2003, p. 293). Within the category of mental illness reside conditions such as anxiety disorders, major depressive episodes, and unipolar and bipolar depression (Keyes, 2007). These definitions show that mental health and mental illness capture various important aspects of human functioning.

Interestingly, mental health was traditionally understood as the absence of mental illness (e.g., depression, anxiety), which is a minimal conceptualization and outcome of psychosocial development over the lifespan (Westerhof & Keyes, 2010). Underlying this incapacious understanding of mental health is the assumption that increases in psychological distress automatically result in declines in well-being (Renshaw & Cohen, 2014). However, Keyes (2002) refuted this notion and proposed a dual-continua model of mental health and illness to feature mental health and mental illness as related but distinct phenomena that contribute to the overall positive functioning of individuals throughout the lifespan. Keyes (2002) postulated that subjective well-being is a key aspect of mental health that encompasses feelings of happiness and satisfaction with life (emotional well-being), positive individual functioning (psychological well-being), and positive societal functioning (social well-being). Within this more comprehensive understanding of mental health, the presence of mental health in life is described as *flourishing*,

while the absence of mental health is characterized as *languishing* (Keyes, 2005; Peter, Roberts, & Dengate, 2011; Westerhof & Keyes, 2010). Research with Canadian university students (Durand-Bush, McNeil, Harding, & Dobransky, 2015; Peter et al., 2011) has supported the notion that indicators of psychological distress and well-being are related, yet distinct facets of overall mental health. For example, a sample of Canadian undergraduates surveyed by Durand-Bush et al. (2015) reported high levels of psychological distress while simultaneously reporting moderate to high levels of psychological well-being, substantiating Keyes' dual-continua model. While these findings are noteworthy, additional studies must be conducted to determine the prevalence of students who are flourishing and languishing across Canadian university campuses given the concern raised in different studies about this cohort's mental health.

Mental Health in University Students

Adlaf and colleagues (2004) found that Canadian undergraduate students' mental health was at risk, with 29% of their sample (N=6282) exhibiting elevated psychological distress. The most common symptoms of poor mental health were constant feelings of stress, unhappiness and depression, and loss of sleep due to worry. These results are similar to those emerging from other studies conducted with Canadian university students (American College Health Association [ACHA], 2009)]. Specifically, undergraduate respondents from six Ontario post-secondary institutions indicated the most common factors affecting their academic performance to be stress, sleep difficulties, and anxiety. A high number of them reported being so overwhelmed by feelings of anxiety (47%) and depression (30%) in the last 12 months that it was difficult for them to function (ACHA, 2009). A wellness report from the University of Alberta (University of Alberta Wellness Services, 2011) also showed that over 50% of the sample of 5000 undergraduate and graduate students reported being unable to function due to excessive feelings

of anxiety and depression. Moreover, 7% had seriously thought about suicide and 1% had actually attempted it. Evidently, these statistics are cause for concern.

Stress is an important antecedent to poor mental health in university-aged students. Stress occurs when the demands placed on individuals exceed their resources and perceived ability to cope (Mikolajczyk, Maxwell, Naydenova, Meier, & Ansari, 2008). When excessive and perceived negatively, stress turns into psychological distress and can lead to negative emotional affect, depressive symptoms, and physical and mental illness (Campbell, Svenson, & Jarvis, 1992; Mikolajczyk et al., 2008; Misra & McKean, 2000). Psychological distress may significantly vary according to university students' gender, alcohol use, and year of study. For instance, a study of 457 Canadian undergraduate students showed that women were more likely than men to report overwhelming stress levels (Campbell et al., 1992). Furthermore, Dyson and Renk (2006) found that female college freshman were more likely than their male counterparts to manage stress by using emotional rather than problem-focused coping strategies, the former of which was associated with maladaptive functioning and depressive symptoms (McNamara, 2000).

Alcohol use is another factor that has been associated with not only depressive symptoms but also suicidal ideation and ineffective emotional regulation in college and university students (Goldstein, Flett, Wekerle, & Wall, 2009; Gratz, Conrad, & Roemer, 2002). It is alarming that about one third (32%) of the students in Adlaf and colleagues' (2005) study with Canadian university students reported hazardous drinking patterns (i.e., binge drinking). Given the prevalence and negative consequences associated with excessive use of alcohol, mental health researchers should further examine this variable.

Another risk factor for experiencing poor mental health is year of study, as the transition from high school to university can be particularly difficult, especially for those students living off campus without parents or family (Adlaf et al., 2005). This is in part due to the greater academic demands that are placed on students at the university level compared to that of high school. Furthermore, students must form new social networks and many face homesickness and loneliness (Park, Edmondson, & Lee, 2012). Pritchard, Wilson, and Yamnitz (2008) showed declines in students' psychological and physical health over their first year of university, including an increased frequency of drinking and intoxication and prevalence of negative affect (e.g., depression, anxiety, tension). Multiple studies have documented high levels of stress, anxiety, and depression in first year university students (Dyson & Renk, 2006; Sasaki & Yumasaki, 2007; Sher, Wood, & Gotham, 1996), calling attention to this particularly difficult time in the development of young adults.

University student-athletes. Student-athletes are a distinctly identifiable sub-group of students on university campuses whose athletic participation adds unique benefits and challenges. On the one hand, sport participation can help student-athletes to develop a positive identity, strong character, a sense of responsibility and sociability, and self-acceptance (Chu, 1989; Harris, 1993). It can also contribute to the development of high self-esteem, self-discipline, leadership, networking, and teamwork skills (Watt, Moore, & Howard-Hamilton, 2001). On the other hand, playing an intercollegiate sport adds a complex layer to student life. Student-athletes face unique demands that can lead to distress and low well-being (Humphrey et al., 2013; Kimball & Freysinger, 2003; Miller & Kerr, 2002). For instance, in addition to managing many of the same academic, emotional, and personal goals and concerns as their non-athlete colleagues, student-athletes must balance the often conflicting roles of student and

athlete, manage an inflexible and demanding schedule, monitor their nutrition and body composition, forge relationships outside of their sports network, and cope with physical fatigue and injury (Aries, McCarthy, Salovey, & Banaji, 2004; Martens & Lee, 1998; Watt et al., 2001). Interestingly, Dubuc-Charbonneau, Durand-Bush, and Forneris (2014) found in a sample of 145 Canadian Interuniversity Sport (CIS) student-athletes from two Ontario universities that women had significantly higher levels of emotional and physical exhaustion than men. Similar differences were found for swimmers and basketball players when compared to hockey players and fencers. This suggests that gender and type of sport may be important variables to consider when studying the mental health and well-being of student-athletes.

Kimball and Freysinger (2003) found that collegiate sport acted as both a buffer and a source of stress, depending on whether or not sport facilitated self-determination, self-control, and competence in student-athletes. Of note, stress resulting from being a student-athlete can exacerbate an existing mental health condition or trigger a new psychological concern (Neal et al., 2013). According to Yang and colleagues (2007), athletes who are female, freshman, or are experiencing pain are more likely to report symptoms of ill-being. Antecedents of ill-being in athletes are reportedly similar to those in the general population but also include overtraining, injury, competitive failure, aging, and retirement from sport (Puffer & McShane, 1991).

To summarize, the aforementioned studies suggest that mental health research and initiatives should become a priority across university campuses. Furthermore, while some surveys targeting mental health and illness indices have been conducted with American and Canadian university student populations, the mental health of Canadian university student-athletes remains relatively unknown. The National Collegiate Athletic Association (NCAA) in the U.S. is taking groundbreaking steps towards increasing awareness and supporting college

athletes with psychological concerns, through NCAA-funded initiatives and the identification of evidence-based best practices. The sociopolitical stage has been set in Canada by pioneers like Clara Hughes and the Canadian Olympic Committee initiative “Game Plan” to champion advances in mental health. Thus, it is timely for Canadian university and sport governing bodies to follow the NCAA’s lead. In 2013, the CIS endorsed the creation of a policy that will protect and promote the mental health of student-athletes, but this policy has yet to be created due to insufficient evidence. The purpose of this study was to provide foundational data on the MHF of CIS student-athletes to help steer the creation of mental health policies and important standards of practice. Given the focus and value of Keyes’ multidimensional functioning model (Westerhof & Keyes, 2010) in mental health research, it was used to guide the current study. The following research questions and hypotheses were examined:

1. **What is the level and prevalence of MHF of student-athletes competing in CIS sport at two different time points in their academic year (Fall = Time 1, Winter = Time 2)?** Given that student-athletes are vulnerable to high levels of stress (Kimball & Freysinger, 2003) and diminished levels of well-being (Neal et al., 2013; Watson & Kissinger, 2007), it was hypothesized that student-athletes would exhibit moderate to low levels of MHF and there would be a lower prevalence of student-athletes flourishing compared to those languishing.
2. **Are there significant differences in CIS student-athletes’ level of MHF between Time 1 and Time 2 and based on gender, alcohol use, living situation, year of study, and type of sport?**
 - (a) Time: We hypothesized that student-athletes would exhibit significantly diminished MHF at Time 2 in comparison to their Time 1 scores. This hypothesis was made under

the presumption that student-athletes would be at the greatest risk of ill-being (e.g., distress, burnout) by the end of the Winter semester due to the prolonged experience of stressors such as academic and athletic demands (e.g., assignments, exams, playoffs), and fatigue (Dubuc-Charbonneau, Durand-Bush, & Forneris, 2014).

- (b) Gender: Given that female university students reported overwhelming stress levels (Campbell et al., 1992) and are more likely to employ maladaptive coping methods (Dyson & Renk, 2006), and since female university student-athletes experienced significantly higher rates of emotional and physical exhaustion than their male counterparts (Dubuc-Charboneau et al., 2014), we hypothesized that female student-athletes would exhibit significantly lower MHF scores than male student-athletes.
- (c) Alcohol use: Since alcohol is widely used by collegiate athletes and has a negative effect on their health (Adlaf et al., 2005; Goldstein et al., 2009; Gratz et al., 2002), we hypothesized that student-athletes exhibiting hazardous drinking patterns (i.e., “frequent binge drinking”; Nelson & Wechsler, 2001), would also exhibit significantly lower MHF compared to their peers who did not.
- (d) Living situation: Since the transition from high school to university has been documented as particularly difficult, especially for those living off campus without parents or family (Adlaf et al., 2005), we hypothesized that student-athletes living off-campus without family, would report significantly lower levels of MHF than students living on campus or off-campus with family.
- (e) Year of study: We hypothesized that first year undergraduate students would exhibit significantly lower MHF than students in their second year of undergraduate studies and beyond, as research indicates that it is not uncommon for students’ psychological

and physical health to deteriorate over their first year of university due to the challenging transition between high school and university (Park et al., 2012; Pritchard et al., 2008).

- (f) Type of sport: Dubuc-Charbonneau and colleagues (2014) found that the type of sport can impact emotional and physical exhaustion in student-athletes. Consequently, we expected to see differences in MHF scores based on sport type (i.e., individual versus team sport).

Methods

Participants

Participants at Time 1 (November 2015) were 388 student-athletes (age 17-26, $M = 20$ years; $SD = 1.96$) from 30 Canadian universities competing in the CIS system in the Canada West ($n = 61$), Ontario University Association (OUA; $n = 118$), Réseau du sport étudiant du Québec (RSEQ; $n = 84$), and Atlantic University Sport (AUS; $n = 125$) divisions. A total of 110 student-athletes of the initial 388 sample volunteered to participate at Time 2 (March 2016). See Table 1 for a summary description.

Instruments

Student-athletes' MHF was assessed using the Adult Mental Health Continuum-Short Form (MHC-SF; Keyes, 2002), a 14-item self-report instrument comprising three subscales (i.e., emotional well-being [EWB], social well-being [SWB], and psychological well-being [PWB]). EWB items measured whether student-athletes felt happy, interested, and satisfied with life. SWB items assessed their perceptions of their social contribution, integration, actualization, acceptance, and coherence. Lastly, PWB items measured student-athletes' self-acceptance, perceptions of mastery, positive relations with others, personal growth, autonomy, and purpose

in life. Student-athletes were asked to rate how they had been feeling during the past month using a 6-point Likert scale from *never* (0) to *every day* (5). The MHC-SF provides a continuous assessment (level of mental health based on the three well-being subscales) as well as a categorical assessment of mental health (i.e., flourishing, moderate, languishing). Individuals categorized as having flourishing mental health answered ‘every day during the past month’ or ‘almost every day during the past month’ for at least one of the three items of hedonic well-being (EWB) and at least six of the eleven items of positive functioning (SWB and PWB). On the other hand, individuals categorized as languishing reported ‘never during the past month’ or ‘once or twice during the past month’ for at least one of the three items of EWB and at least six of the eleven items of positive functioning. Those who were neither flourishing nor languishing were categorized as having moderate mental health. The MHC-SF has shown excellent psychometric properties and has been used extensively with college student and adult populations (Keyes, 2006; Keyes et al., 2008; Robitschek & Keyes, 2009; Westerhof & Keyes, 2010). The validated French-language version of the MHC-SF used by Statistics Canada in the Canadian Community Health Survey – Mental Health (2012) was available for Francophone student-athletes.

Student-athletes also answered an English or French demographic questionnaire at Time 1 to allow researchers to describe the sample and understand individual differences that may be related to their overall functioning (i.e., gender, alcohol use, living situation, year of study, type of sport, previous mental illness diagnosis). For example, student-athletes’ drinking habits were assessed based on a study by Wechsler, Davenport, Dowdall, Moeykens, and Castillo (1994) and Nelson and Wechsler (2001) that compared drinking patterns, specifically examining “binge drinking” (i.e., consuming five or more drinks for males, and four or more drinks for females, in one sitting), between athletes and non-athletes on American college campuses. Student-athletes

were categorized as either: (a) “non-drinkers” (never drank alcohol, or had not done so in the last year), (b) “non-binge drinkers” (consumed alcohol in the past year, but did not binge in the past 30 days), (c) “infrequent bingers” (consumed alcohol in the past year, and binged only once or twice over the past 30 days), (d) “frequent binge drinkers” (consumed alcohol in the past year, and binged three or more times in the past 30 days).

Procedures

In October 2015, the primary researcher contacted Athletic Directors of eligible CIS-member universities to seek their support in inviting their student-athletes to participate in the study. Student-athletes were then invited to partake in the study at Time 1 (November 2015) via an email from their Athletic Director and/or via the Student-Athlete Mental Health Initiative (SAMHI)’s website and social media platform. They were given a four-week window to complete the online survey, which included a demographic questionnaire and an additional questionnaire to assess their mental health functioning. The Athletic Directors emailed a reminder message after the first two weeks of this time frame. Student-athletes were invited to include their email address in the survey if they wanted to receive an invitation to participate at Time 2 (March 2016). Those who provided their email address received, via email, a link to repeat the MHC-SF (but not the demographic questionnaire) in March 2016. The survey took approximately 20-25 minutes to complete at both time points. Ethics approval was obtained from the host institution to conduct this study and from all universities from which student-athletes were recruited through Athletic Directors.

Data Analysis and Results

All statistical analyses were carried out in SPSS Version 21.0. Individuals who left entire questionnaires blank were deleted. A missing data analysis test was then performed with the

remaining sample ($n=388$), revealing that only 2.75% of the data were missing. When less than 5% of data are missing, influences of these missing data are negligible (Tabachnick & Fidell, 2013). As such, missing data were treated with multiple imputations using an expectation-maximization method (Tabachnick & Fidell, 2013). Data did not violate assumptions of univariate (no instances of skewness or kurtosis) or multivariate (no Mahalanobis d -squared scores were significant at $p < .001$) normality (Kline, 2010).

Internal consistency reliability coefficients were computed for the English and French version of the MHC-SF at Time 1 ($N=388$) and Time 2 ($n=110$). Coefficients varied from 0.722 and 0.935 and were deemed acceptable (DeVellis, 2012, see Table 2). Next, average MHF total and subscale scores and standard deviations were computed for Time 1 and Time 2 and a categorical assessment was performed to determine the prevalence of student-athletes who were languishing, moderately mentally healthy, and flourishing (see Table 3). The same indices were provided for student-athletes with and without a previous mental illness diagnosis (see Table 4).

Next, the assumptions of multivariate analysis of variance were tested, showing that the data were adequate on all tests except one. The variable alcohol use, specifically, at the frequent-binger level, violated the assumption of adequate sample size. Thus results pertaining to this variable should be interpreted with caution. A five-way repeated measures MANOVA was conducted to test whether significant differences existed in student-athletes' level of MHF between Time 1 and Time 2 and based on gender (i.e., male, female), alcohol use (i.e., non-drinker, non-binger, infrequent binger, frequent binger), living situation (i.e., on-campus, off-campus with family, off-campus without family), year of study (i.e., first year, subsequent years) and type of sport (i.e., individual, team). The three dimensions of MHF (i.e., mean scale scores

for EWB, SWB, PWB) served as the dependent variables that varied over time while gender, alcohol use, living situation, year of study, and type of sport served as independent variables.

Box's M value of 61.33 was associated with a non-significant p value of .54, which suggested that the covariance matrices between groups were equal for the purposes of the MANOVA (Tabachnick & Fidell, 2013). Since the sample sizes of the independent groups were unequal, Pillai's trace was used to assess multivariate significance (Tabachnick & Fidell, 2013). When interpreting Pillai's trace, results showed a non-significant main effect of time on student-athletes' MHF, $V = .089$, $F(3, 58) = 1.897$, $p = .14$, $\eta_p^2 = .089$. There were also no significant interactions between time and gender ($V = .007$, $F(3, 58) = 1.27$, $p = .94$, $\eta_p^2 = .007$), alcohol use ($V = .085$, $F(12, 201) = .488$, $p = .920$, $\eta_p^2 = .028$), living situation ($V = .062$, $F(6, 132) = .708$, $p = .643$, $\eta_p^2 = .031$), year of study ($V = .043$, $F(3, 65) = .978$, $p = .409$, $\eta_p^2 = .043$), and type of sport ($V = .025$, $F(3, 65) = .545$, $p = .653$, $\eta_p^2 = .025$), at the $p < .05$ level.

Given the exploratory nature of the study and the aim to establish sound foundational data, and given that significant differences could possibly be missed due to restricted statistical power as a result of the limited sample size, a series of five repeated measures MANOVAs were also conducted to *individually* test whether gender (i.e., male, female), alcohol use (i.e., non-drinker, non-binger, infrequent binger, frequent binger), living situation (i.e., on-campus, off-campus with family, off-campus without family), year of study (i.e., first year, subsequent years), and type of sport (i.e., individual, team) resulted in significantly different levels of MHF in student-athletes across time. The three dimensions of MHF (i.e., EWB, SWB, PWB) served as the dependent variables measured at both time points, while gender, alcohol use, living situation, year of study, and type of sport served as the independent variables. Pillai's trace was used to

assess multivariate significance and p -value was adjusted to account for multiple MANOVAs and (Tabachnick & Fidell, 2013).

Findings indicate that there were no significant multivariate level main effects for time or any of the independent variables (i.e., gender ($V = .010$, $F(3, 106) = .340$, $p = .796$, $\eta_p^2 = .010$), alcohol use ($V = .099$, $F(12, 315) = .897$, $p = .550$, $\eta_p^2 = .033$), living situation ($V = .047$, $F(6, 212) = .850$, $p = .533$, $\eta_p^2 = .023$), year of study ($V = .022$, $F(3, 106) = .813$, $p = .489$, $\eta_p^2 = .022$), and type of sport ($V = .017$, $F(3, 106) = .607$, $p = .612$, $\eta_p^2 = .017$). Furthermore, there were no significant interaction effects between time and the other aforementioned independent variables (see Table 5 for summary statistics of main effects of time and independent variables and interaction effects of time and each independent variable).

Finally, to ensure that no potential significant differences in student-athletes' mental health functioning were missed due to a lack of statistical power, a 5-way MANOVA was conducted with the larger sample data ($n=388$) to cross-sectionally examine the main effects of the variables of interest at Time 1. Again, gender (i.e., male, female), alcohol use (i.e., non-drinker, non-binger, infrequent binger, frequent binger), living situation (i.e., on-campus, off-campus with family, off-campus without family), year of study (i.e., first year, subsequent years), and type of sport (i.e., individual, team) served as the independent variables, while the three dimensions of mental health functioning (i.e., EWB, SWB, PWB) were used as the dependent variables. There was a statistically significant difference in MHF based on gender ($V = .029$, $F(3, 317) = 3.202$, $p = .024$, $\eta_p^2 = .029$). Between-subjects tests and profile plots revealed that student-athletes' social well-being differed based on their gender ($F(1, 319) = 7.706$, $p = .006$, $\eta_p^2 = .024$); specifically, women had significantly lower social well-being than men. No significant main effects of alcohol use ($V = .017$, $F(9, 957) = 614$, $p = .786$, $\eta_p^2 = .006$), living

situation ($V = .033$, $F(6, 636) = 1.761$, $p = .105$, $\eta_p^2 = .016$), year of study ($V = .005$, $F(3, 317) = .574$, $p = .633$, $\eta_p^2 = .005$), and type of sport ($V = .009$, $F(3, 217) = .927$, $p = .428$, $\eta_p^2 = .009$) were found.

Discussion

The objective of this study was to provide a baseline understanding of the MHF of student-athletes competing in the CIS system. We hypothesized that their MHF would be low to moderate, vary based on gender, alcohol use, living situation, year of study, type of sport, and decline across time as it was presumed that the cumulative effects of demands experienced over an academic year would cause fatigue and possibly ill-being.

Generally, the student-athletes were experiencing moderate to high levels of MHF, which did not support our hypothesis. There were no cut-off points specified in the literature, thus we suggested some, which may enable future researchers using the MHC-SF to make comparisons with the results of this study. The student-athletes were categorized as having low (0-1.66), moderate (1.67-3.33), or high (3.34-5.0) levels of MHF. At Time 1, they reported, on average, high levels of EWB (3.7), moderate levels of SWB (3.2), and high levels of PWB (3.5). In comparison, even though there was a slight decrease in average levels at Time 2, EWB (3.6) and SWB (3.0) remained high and moderate, respectively. However, student-athletes' PWB (3.2) decreased to a moderate level at the end of the year. Relative to MHF levels reported in other studies with university students, the CIS participants in this study experienced higher MHF than non-athletes. For example, the average Canadian undergraduate student in two samples surveyed by Durand-Bush and colleagues (2015) reported a low to moderate level of MHF. The current moderate to high levels were surprising given the mental health concerns for student-athletes raised by other researchers (Humphrey et al., 2013; Neal et al., 2013).

We had hypothesized that a greater proportion of student-athletes would be languishing as opposed to flourishing in the present sample; however, results showed that the opposite was true. Additionally, in comparison to other Canadian university student populations, there was a higher prevalence of student-athletes flourishing in the current study. Peter and colleagues (2011) surveyed a sample of Canadian university students ($N=1234$), finding that 8.7% were languishing, 67% were moderately mentally healthy, and 24% were flourishing. This somewhat comes in contrast to the 2%, 52%, and 46% of CIS student-athletes who were languishing, moderately mentally healthy, and flourishing at Time 2 in this sample. Interestingly, those displaying moderate mental health are sometimes referred to as “ambivalent” or “at risk” (Eklund, Dowdy, Jones, & Furlong, 2011), and lack attention in the literature, as the absence of clinical symptoms of mental illness has remained the dominant focus of well-being research and programming. However, with calls for a shift towards mental health prevention and promotion, the moderately mentally healthy deserve closer attention because although they are not in distress, they are not optimally functioning either. These results seem encouraging, yet they are a first look into student-athletes’ MHF and perhaps do not tell the whole story. For instance, the overall mean level of participants’ MHF at Time 1 (47.9) sits between the mean levels of MHF reported by American college students classified as at-risk (i.e., demonstrating low life satisfaction but also low clinical symptoms of depression; $M=48.4$) and ambivalent (i.e., demonstrating high life satisfaction but moderate to high levels of clinical symptoms; $M=46.2$) in a study by Eklund and colleagues (2011). Similarly, 1.7% of the “flourishing” students in Peter and colleagues’ (2011) inquiry were found to be simultaneously experiencing symptoms of well-being and depression. Low (2011), who studied American college students, reported similar

findings, in that 12.8% of those categorized as “flourishing” also reported elevated depression scores.

As a result of our demographic questionnaire, we found in the current study that 18% (n=20) of the 110 student-athletes who participated at both time points reported a previous mental illness diagnosis. These individuals maintained moderate EWB, SWB, and PWB across time, despite this self-reported diagnosis. Furthermore, 20% of them were flourishing at Time 1, and 30% were flourishing at Time 2. This supports Keyes’ (2002) dual-continua model and confirms the findings of other studies showing that mental illness does not automatically imply lower levels of well-being or a higher prevalence of languishing mental health (Durand-Bush et al., 2015; Low, 2011; Peter et al., 2011). Given the support the dual-continua model has received, further research is warranted to discover moderating factors in the relationship between student-athletes’ mental health and mental illness. The use of additional mental illness measures, in conjunction with mental health scales such as the MHC-SF (e.g., Keyes, 2002), may be necessary to shed more light on the subject.

The moderate and high levels of MHF reported by the student-athletes in this study could possibly be attributed to the benefits of sport. Several researchers have demonstrated the positive impact of sport in student-athletes’ lives such the development of self-esteem, self-discipline, leadership, and teamwork (Watt et al., 2001). As Kimball and Freysinger (2003) suggested, even though athletes face stressful demands, their sporting activities may act as a buffer to stress when they facilitate self-determination, self-control, and competence. It is thus possible that the student-athletes in the current study were highly self-regulated individuals capable of balancing their sport and academic workload. Nevertheless, one must be mindful that university students have been shown to experience high levels of stress (ACHA, 2009; Adlaf et al., 2005; University

of Alberta Wellness Services, 2011) and student-athletes may be especially vulnerable to ill-being due to the excessive and often conflicting demands imposed upon them (Humphrey et al., 2013; Miller & Kerr, 2002). One must also consider that student-athletes may be over-reporting high functionality and under-reporting ill-being symptoms due to a prevailing mental illness stigma and the expectation in sport to demonstrate mental toughness and push through injury and illness (Steiner et al., 2010). Such attitudes and norms have fostered an underutilization of counseling services by NCAA student-athletes, and are a barrier to help-seeking within this population (NCAA, 2014). Lopez and Levy (2013) identified that the fear of stigma for seeking mental health services, the fear of teammates finding out that they are in treatment, and the fear of being considered weak prevent student-athletes from getting assistance. Similarly, Delenardo (2013) found that CIS football players unanimously reported that mental illness is perceived as a reflection of weak character. The players also stated that showing compassion and understanding for a teammate with a mental illness puts athletes at risk of being viewed by peers as “weak-minded” as well. If this is indeed the case, more work must be done to normalize the conversation and treatment surrounding mental health struggles in student-athletes.

Our other hypotheses in the current study were also not supported, that is, there were no significant differences in student-athletes’ MHF from Time 1 to Time 2 and based on gender, alcohol use, living situation, year of program, and type of sport. Our multiple analyses performed indicate that collectively, the student-athletes in this study experienced fairly stable MHF over the academic year and athletic season, and their MHF did not vary over the season based on the aforementioned individual differences. This was surprising since other researchers found the opposite. Of note, the CIS student-athletes reported much healthier drinking habits than NCAA counterparts in another study (Nelson & Wechsler, 2001). For instance, a lower percentage of

CIS student-athletes were frequent (2.7%) and infrequent (20.6%) bingers compared to NCAA student-athletes (30.7% and 26.3%, respectively). Moreover, 64.5% of CIS participants consumed alcohol but did not binge in comparison to 28.2% of NCAA student-athletes, while a similar percentage of CIS and NCAA student-athletes abstained from drinking (12.7% and 14.9%, respectively).

There was a significant effect of gender on social well-being when the data were analyzed cross-sectionally with the larger Time 1 sample ($n=388$), which partially supported our hypothesis that women would exhibit significantly lower mental health functioning than their male counterparts. It is not clear why the social dimension was the only aspect of MHF significantly affected by gender, however, one can speculate several possibilities for this association. Keyes understands social well-being as the “public and social criteria people use to evaluate their functioning” (2002, p. 606). First, given the relative greater importance society places on men’s sports than women’s sports, female athletes may feel they have less to contribute to society through sport participation than their male counterparts. For example, in 1997, America’s two largest sports news programs (ESPN SportsCentre and CNN Sports Tonight) devoted just five percent of their air-time to women’s sports (Tuggle, 1997). While women’s sports have gained some ground in terms of media attention (Bernstein, 2002), “coverage of women’s sports in today’s digitized and globalized media remains inequitable, incommensurate, and too often, sexist” (Creedon, 2014). This stagnation in the social advancement of women’s sports may lead participants to feel there is a lack of opportunity for social actualization, that is, that society is not becoming a better place for female athletes. Lastly, although historically there have never been more women participating in sport, the focus on female athletes remains on their physical appearance, femininity and/or heterosexuality, rather

than their athletic ability or accomplishments (Fink, 2014). Indeed, in a study by Reichart Smith (2016), 90% of 83 female Division I collegiate-athlete participants admitted to having compared their physical appearance to mediated images of female athletes, and reported feeling the greatest body dissatisfaction when viewing sexualized media portrayals of female athletes. It is possible that if female student-athletes do not feel they meet these stereotypes (of femininity, body form and/or heterosexuality), they may perceive greater difficulty in integrating themselves into society outside of sport. Although these findings should be interpreted with caution, they do provide rationale for future researchers to continue exploring the possible effect of gender on the mental health functioning of student-athletes. That being said, it is likely that there are more impactful predictors of mental health functioning than the demographic differences explored in this study, and so further research is warranted to discover what these factors may be. The overall non-significant results across time suggest a general stability in the functioning of this sample of Canadian student-athletes, thus it may be plausible to develop and promote common mental health programs and policies for this population. Nonetheless, more research must be conducted before arriving at definite conclusions.

Limitations

Sample size is a limitation of this study. Of the 1124 student-athletes who accessed the survey at Time 1, only 388 sufficiently completed it and could be included in the study. Furthermore, there was high attrition from Time 1 to Time 2 (72%), which diminished statistical power when performing the repeated-measures MANOVA tests. Attrition may be attributed to the busy life of student-athletes; completing the survey at Time 1 and 2 may have been perceived as an additional demand that some student-athletes could not fulfill. Given the limited sample, it cannot be considered representative of the CIS student-athlete population (approximately 12,000

student-athletes compete in CIS-sanctioned sport each year). Further, potential sample bias must be acknowledged. Indeed, it is possible that more high-functioning athletes completed the survey at both time points, which may have skewed the positive results. Nonetheless, it is noteworthy that the sample did include both men and women competing in individual and team sports in different regions of Canada.

Another limitation pertains to the use of self-report questionnaires. As previously discussed, the student-athletes may have over-reported their level of MHF for fear of being stigmatized, even though all precautions were taken to ensure confidentiality and anonymity. Furthermore, despite the acceptable internal consistency coefficients of the MHC-SF, it is possible that the items did not fully capture the functioning of student-athletes, given that their demands and priorities are different than those of non-athlete populations. It is recommended that a confirmatory factor analysis be performed on the MHC-SF to assess its relevancy within a student-athlete population in the future. Given that this is the first study to examine the MHF of Canadian student-athletes, more studies are warranted so that trends and mental health profiles can be derived to inform policy and practice.

Conclusion and Practical Implications

This study showed that the MHF of a sample of CIS student-athletes was moderate to high across the 2015-2016 athletic and academic year. Furthermore, more student-athletes were flourishing than languishing at both time points. Contrary to our hypotheses, MHF did not vary across time based on individual differences such as gender, alcohol use, living situation, year of study, and type of sport. However, the small sample size may have limited our ability to detect significant differences. When we performed analyses with the larger sample at Time 1, we found

a significant difference between female and male student-athletes' social well-being, which partially supported our hypothesis that women would report lower MHF than men.

The overall non-significant results justify the exploration of other factors, beyond demographics, that could be influencing the MHF of CIS student-athletes. Given that sport was previously found to buffer stress and facilitate self-determination and self-control (Kimball and Freysinger, 2003), it would be interesting to examine the relationship between stress, self-regulation capacity, and MHF in this population.

From a practical standpoint, the results of this study provide a preliminary baseline understanding of CIS student-athletes' MHF. Student-athletes, including those who may have a mental illness diagnosis, appear to experience moderate mental health, which indicates that although they are not languishing, they are also not flourishing (i.e., performing and developing in a healthy way). As such, programs and activities focused on promoting and maintaining positive mental health and reducing mental illness stigma within the athletics community, will be important first steps in ensuring the future well-being of student-athletes.

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Table 1

Summary of Sample Demographics

Gender	Time 1 (N=388)	Time 2 (n=110)
Male	37.6% (n=146)	25.5% (n=28)
Female	62.4% (n=242)	74.5% (n=82)
Alcohol Use		
Non-drinker	7.7% (n=30) ^a	12.7% (n=14)
Non-binger	53.1% (n=206)	64.5% (n=71)
Infrequent binger	24.5% (n=95)	20.6% (n=22)
Frequent binger	5.2% (n=20)	2.7% (n=3)
Living situation		
On-campus (in residence)	17% (n=66)	14.5% (n=16)
Off-campus (with family)	29.4% (n=114)	30.9% (n=34)
Off-campus (without family)	53.6% (n=208)	54.5% (n=60)
Year of study		
1 st year undergraduate	21.9% (n=85)	22.7% (n=25)
2 nd year undergraduate	22.9% (n=89)	19% (n=21)
3 rd year undergraduate	24.5% (n=95)	30% (n=33)
4 th year undergraduate	16.8% (n=65)	18% (n=20)
5 th year undergraduate	9.3% (n=36)	5.5% (n=6)
Graduate	4.6% (n=18)	4.5% (n=5)

Table 1 (continued)

Type of Sport		
Team sport ^b	71.4% (n=277)	65.5% (n=72)
Individual sport ^c	28.6% (n=111)	25.5% (n=38)
Year of sport participation		
First	29.4% (n=114)	27.3% (n=30)
Second	20.4% (n=79)	21.8% (n=24)
Third	24.7% (n=96)	30.9% (n=34)
Fourth	16% (n=62)	12.7% (n=14)
Fifth	9.5% (n=37)	7.3% (n=8)
Previous mental illness diagnosis	12% (n=46)	18%(n=20)

Note. ^a 37 individuals did not provide sufficient data to be classified.

^b Team sport = basketball, football, volleyball, soccer, rugby, ice hockey, field hockey, curling, baseball; ^c Individual sport = athletics, swimming, rowing, badminton, fencing, skiing, squash, wrestling.

Table 2

Internal Consistency Coefficients, Grouped by Time and Questionnaire Language

Time 1 (n=388), Range = $0.722 \leq \alpha \leq 0.935$			
<u>ENGLISH</u> (n=363)		<u>FRENCH</u> (n=25)	
Measure	Internal consistency	Measure	Internal consistency
MHC-SF	$\alpha = 0.932$	MHC-SF	$\alpha = 0.876$
EWB	$\alpha = 0.891$	EWB	$\alpha = 0.935$
SWB	$\alpha = 0.863$	SWB	$\alpha = 0.872$
PWB	$\alpha = 0.869$	PWB	$\alpha = 0.722$
Time 2 (n=110) ^a , Range = $0.866 \leq \alpha \leq 0.929$			
Measure	Internal consistency		
MHC-SF	$\alpha = 0.929$		
EWB	$\alpha = 0.873$		
SWB	$\alpha = 0.866$		
PWB	$\alpha = 0.884$		

Note. MHC-SF = Mental Health Continuum-Short Form; EWB = Emotional Well-Being; SWB = Social Well-Being; PWB = Psychological Well-Being.

^a Not split by language because there was only one French language respondent at Time 2.

Table 3

Level and Prevalence of MHF Across Time^a

	Time 1	Time 2
Level of MHF	<i>M</i> (SD)	<i>M</i> (SD)
EWB	3.7 (0.9)	3.6 (1.0)
SWB	3.2 (1.0)	3.0 (1.0)
PWB	3.5 (1.0)	3.2 (1.0)
Total MHF	47.3 (12.5)	43.9 (12.8)
Prevalence of MHF	%	%
Languishing	1.8% (n=2)	1.8% (n=2)
Moderately mentally healthy	52.7% (n=58)	51.8% (n=59)
Flourishing	45.5% (n=50)	44.5% (n=49)

Note. MHF = Mental Health Functioning; EWB = Emotional Well-Being; SWB = Social Well-Being; PWB = Psychological Well-Being; *M* = Mean, SD = Standard Deviation.

^a Based on student-athletes who participated at both time points ($n = 110$).

Table 4

Level and Prevalence of MHF Based on Student-Athletes With and Without a Previous Mental Illness Diagnosis^a

	Time 1		Time 2	
	Diagnosis (n=20)	No diagnosis (n=90)	Diagnosis (n=20)	No diagnosis (n=90)
Level of MHF	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)
EWB	3.4 (0.9)	3.8 (0.8)	3.0 (0.9)	3.8 (1.0)
SWB	2.6 (1.0)	3.2 (1.0)	2.5 (1.0)	3.0 (1.0)
PWB	3.1 (1.0)	3.5 (1.0)	3.1 (1.0)	3.5 (1.0)
Prevalence of MHF	%		%	
Languishing	5% (n=1)	1% (n=1)	5% (n=1)	1.1% (n=1)
Moderately mentally healthy	75% (n=15)	48% (n=43)	65% (n=13)	50.0% (n=45)
Flourishing	20% (n=4)	51% (n=46)	30% (n=6)	48.9% (n=44)

Note. *M* = Mean; *SD* = Standard Deviation; EWB = Emotional Well-Being; SWB = Social Well-Being; PWB = Psychological Well-Being; MHF = Mental Health Functioning.

^a Based on student-athletes who participated at both time points (*n* = 110).

Table 5

Summary of Main and Interaction Effects of Gender, Alcohol Use, Living Situation, Year of Study and Type of Sport on MHF for Five Separate RM-MANOVAs

Main Effects ^a	V	F	DF	DF Error	p	η^2_p
Gender	.010	.340	3	106	.796	.010
Alcohol Use	.047	.850	6	212	.533	.023
Living Situation	.099	.897	12	315	.55	.033
Year of Study	.022	.813	3	106	.489	.022
Type of Sport	.017	.607	3	106	.612	.017
Time (Gender)	.045	1.657	3	106	.181	.045
Time (Alcohol Use)	.055	1.985	3	103	.121	.055
Time (Living Situation)	.061	2.276	3	105	.084	.061
Time (Year of Study)	.063	2.391	3	106	.391	.028
Time (Type of Sport)	.05	1.853	3	106	.391	.028
Interaction Effects	V	F	DF	DF Error	p	η^2_p
Time * Gender	.015	.541	3	106	.656	.015
Time * Alcohol Use	.107	.974	12	315	.474	.036
Time * Living Situation	.029	.517	6	212	.795	.014
Time * Year of Study	.028	1.01	3	106	.391	.028
Time * Type of Sport	.066	2.497	3	106	.064	.066

Note. V = Pillai's Trace; F = F-Ratio; DF = Degrees of Freedom; p = Significance value; η^2_p = Partial eta squared; MHF = Mental Health Functioning.

^a Main effects of time, independent variable denoted in brackets

Article 2

Investigating university student-athletes' mental health functioning in relation to their stress,
mood, self-regulation capacity, and perceptions of coaching climate

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Abstract

The purpose of this study was to investigate the relationship between mental health functioning (MHF) and stress, mood, self-regulation capacity, and perceptions of coaching climate in Canadian Interuniversity Sport (CIS) student-athletes. It also served to determine if changes in self-regulation capacity were associated with changes in the other aforementioned variables across the academic/ athletic year. Student-athletes from 30 Canadian universities completed an online survey in November 2015 ($n = 388$) and March 2016 ($n = 110$). The data were subjected to a path analysis and results supported our hypotheses, revealing significant relationships between MHF and frequency of maladaptive reactions to stressors, mood states (i.e., vigor, depression, and anger), self-regulation capacity, and perceptions of coaching climate. There was no significant change in self-regulation capacity across time, thus our hypothesis that a change in this competency would be associated with changes in the other variables was not supported.

Keywords: mental health, student-athletes, university, stress, mood, self-regulation, coaching climate

Introduction

While participation in intercollegiate sport has been shown to result in positive outcomes such as higher graduation rates, the development of a positive identity, strong character, and a sense of responsibility (Chu, 1989; Harris, 1993; Watt, Moore, & Howard-Hamilton, 2001), it can also lead to negative outcomes such as distress and low well-being (Humphrey, Bowden, & Yow, 2013; Kimball & Freysinger, 2003; Miller & Kerr, 2002). Student-athletes are a unique sub-group of students on university campuses who must manage similar academic and personal goals and challenges as their non-athlete peers. However, they must also travel, cope with fatigue and injury, balance multiple roles, manage a grueling schedule, monitor their nutrition and body composition, and excel in both sport and academia to maintain their student-athlete status (Aries, McCarthy, Salovey, & Banaji, 2004; Martens & Lee, 1998; Watt et al., 2001). As such, it is not surprising that participation in collegiate sport puts student-athletes at risk of experiencing ill-being and mental health challenges (Neal et al., 2013).

Mental Health and Mental Illness

Mental health represents “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (World Health Organization [WHO], 2005, p. 10). It is a “syndrome of symptoms of positive feelings and positive functioning in life” (Keyes, 2002, p. 604), characterized by emotional, social, and psychological well-being (Westerhof & Keyes, 2010). Conversely, mental illness pertains to “persistent and substantial deviation from normal functioning that impairs an individual’s ability to execute [his/her] social roles, and generates emotional suffering” (Keyes, 2003, p. 293). According to Keyes (2002), mental health and mental illness are related but distinct constructs that influence an individual’s

overall positive functioning. In the dual-continua model that Keyes (2002) postulated to demonstrate this relationship, the presence of mental illness does not automatically lead to decreased mental health and well-being, as presumed in traditional models of mental health.

Stress

There is much evidence documenting the stress of university students. Some university students have reported compromised mental health due to overwhelming levels of stress (e.g., Adlaf, Demers, & Gilksman, 2004; Durand-Bush, McNeill, Harding, & Dobransky, 2015). What is concerning is that student-athletes, a sub-cohort of this population, may experience more distress given that they must often manage greater responsibilities and pressures than their non-athlete counterparts. Interestingly, Kimball and Freysinger (2003) found that for some student-athletes, sport was positive as it provided a multitude of opportunities, including developing friendships and gaining social support. However, for others, sport was negative as it caused stress by constraining socialization with non-athlete peers. The authors also revealed that some athletes experienced stress as a result of controlling coaches who undermined their sense of autonomy. In another study, Humphrey et al. (2013) found that NCAA athletes' elevated stress was related to academic difficulties, athletic demands, time, interpersonal relationships, and finances, which negatively impacted their overall health, and their athletic and academic performance. While stress levels in some Canadian university students have been documented, those of Canadian university student-athletes have not. As such, more research is warranted since stress and mental health have been linked (Adlaf et al., 2004; Durand-Bush, McNeill, Harding, et al., 2015; Humphrey et al., 2013).

Mood

Mood is important to consider when investigating mental health as it is an inherent component of emotional well-being. According to Lane and Terry (2000), mood represents a set of feelings targeting multiple emotions that vary in intensity and duration. Mood impacts the mobilization of personal resources to cope with task demands (Batson, Shaw, & Oleson, 1992) thus it is not surprising that it has been found to influence athletic performance. For example, negative mood dimensions such as fatigue, anger, and tension can lead to injury (Nippert & Smith, 2008; Petrie, 1993) and hinder performance (Beedie, Terry, & Lane, 2000). Negative mood states can also impair the recovery process following an injury (Nippert & Smith, 2008). Athletes who engage in self-regulatory behavior, whereby they consciously recognize the intensity of their mood and anticipate its impact on their behavior, may more effectively deal with intense mood states that impair performance (Thayer, Newman, & McClain, 1994). Mood states have not been explicitly examined in Canadian student-athletes or linked to their mental health functioning. Consequently, research is warranted to determine the type and strength of relationship between these two variables.

Self-Regulation

Self-regulation is another construct that has been linked to mental health in university students (Durand-Bush, McNeill, Harding, et al., 2015). It represents an individual's capacity to proactively plan, control, evaluate and adapt thoughts, feelings and actions through an ever-changing environment (Zimmerman, 2000). Self-regulation capacity was found to significantly predict university students' levels of stress, psychological well-being, and mental health functioning in two recent studies with 469 and 647 Canadian undergraduate students (Durand-Bush, McNeill, Harding, et al., 2015). Furthermore, it was reported that students who develop

and maintain effective self-regulation skills are more likely to thrive, have a stronger sense of identity (Hofer, Busch, & Kärtner, 2011), have greater psychosocial adjustment (Park, Edmondson, & Lee, 2012; Tangney, Baumeister, & Boone, 2004), and experience more positive mental health (fewer depressive symptoms, lower anxiety, and higher indices of well-being, Sher, Wood, & Gotham, 1996) than those with less effective self-regulation skills.

In the sport setting, self-regulation is important for individual and team performance (Durand-Bush, McNeill, & Collins, 2015) as well as team cohesion (Collins & Durand-Bush, 2010) and individual well-being (Dubuc-Charbonneau & Durand-Bush, 2015). Athletes can increase their capacity to self-regulate through increased self-awareness, practice, and support (Collins & Durand-Bush, 2010; Dubuc-Charbonneau & Durand-Bush, 2015; Durand-Bush, McNeill, et al., 2015). However, mood disorders such as depression and borderline personality disorder can pose barriers to self-regulation (Heatherton & Wagner, 2011). No studies have examined the relationship between mental health functioning and self-regulation capacity in Canadian university student-athletes thus it would be valuable to examine this given that self-regulation is a learned skill that may help this cohort to better manage themselves and their environment.

Coaching Climate

Coaches constitute a critical aspect of student-athletes' environment impacting their performance and well-being (Adie, Duda, & Ntoumanis, 2012). As previously mentioned, sport participation can lead to negative consequences, especially when individuals feel excessive pressure from significant others, such as coaches, in their social environment (Kimball & Freysinger, 2003; Reinboth & Duda, 2006). Athletes attach importance to the climate under which they perform (Pensgaard & Roberts, 2002) and coaches impact this climate through their

autonomy-supportive (Pelletier, Fortier, Vallerand, & Briere, 2002) or autonomy-depleting (Deci & Ryan, 1985) behaviours. Coaches fostering an autonomy-supportive climate help fulfill athletes' basic needs (i.e., autonomy, competence, and relatedness, Deci & Ryan, 1985). This type of climate also fosters vitality, positive affect, effort, self-esteem, trust, and satisfaction in athletes (Deci & Ryan, 1985; Pelletier et al., 2002). University student-athletes' perceptions of their coaching climate have not been explicitly examined in relation to their mental health functioning. Given the key role that coaches play in sport participants' athletic and personal development, and the potential they have to positively or negatively influence their experiences, this type of research is important.

In sum, several variables can affect the mental health functioning of university student-athletes. Given the concerns raised about the mental health of university students in general, and given the fact that the mental health functioning of Canadian student-athletes is unknown, it is timely to carry out an investigation with this population to examine how they are functioning and integrate key variables such as stress, mood, self-regulation capacity, and perceptions of coaching climate to better understand how these variables affect their mental health functioning.

Purpose of the Study and Hypotheses

The purpose of this study was to survey Canadian Interuniversity Sport (CIS) student-athletes at two different time points in their academic year in order to answer the following research questions and test the following hypotheses:

- 1. What is the relationship between CIS student-athletes' mental health functioning and stress, mood, self-regulation capacity, and perceptions of coaching climate at Time 2 when it is presumed they will feel most fatigued from their academic/athletic year and may be at risk of ill-being?** Based on existing research regarding university students'

mental health functioning, stress levels, self-regulation capacity (Durand-Bush, McNeill, Harding, et al., 2015), mood states (Batson et al., 1992; Beedie et al., 2000), and perceptions of coaching climate (Amorose et al., 2007; Reinboth & Duda, 2006), it was hypothesized that there would be a significant relationship between all of the variables. Specifically, we anticipated observing a positive association between mental health functioning, positive mood states (i.e., vigor), self-regulation capacity, and perceptions of coaching climate (high mean score indicative of autonomy-supportive coaching), as well as a negative association between these three variables and stress and negative mood states (i.e., tension, depression, anger, confusion; high mean score for the two latter variables indicative of depleting states).

2. **Are changes in self-regulation capacity from Time 1 to Time 2 associated with changes in student-athletes' mental health functioning, stress, mood, and perceptions of coaching climate?** Park and colleagues (2012) found that changes in self-regulation capacity over time significantly correlated to changes in adjustment of students during the first year of university. Furthermore, Durand-Bush, Collins, and McNeill (2012) reported that changes in self-regulation effectiveness (i.e., towards less effective regulation) were perceived to be associated with changes (i.e., increases) in stress, exhaustion, and ill-being in sport. As such, it was hypothesized that changes in student-athletes' self-regulation capacity over time would be related to changes in their mental health functioning, stress, mood states, and perceptions of coaching climate.

Methods

Participant Recruitment

Participants were student-athletes from 30 Canadian universities competing in the CIS system in the Canada West, Ontario University Association, Réseau du sport étudiant du Québec,

and Atlantic University Sport divisions. They met the following selection criteria to participate in the study: (a) they were competing in the CIS during the calendar year in which they completed the survey (2015-2016 season), (b) they were academically eligible to compete in university sport (i.e., in accordance with CIS Eligibility Policy 40.10) while pursuing any level, year, or program of study, and (c), they were attending all practices and team functions if they were not competing due to an injury.

After ethics approval was obtained from all participating Canadian CIS-member universities, the primary researcher contacted the Athletic Directors of these universities to seek their support in inviting their student-athletes to participate in the study. Potential participants were invited to partake in the study at Time 1 (November 2015) via an email from their Athletic Director and/or via calls for participants on the Student-Athlete Mental Health Initiative (SAMHI)'s website and social media platform. The invitation included a link to access a consent form and online survey, which took 20 to 25 minutes to complete. Participants had a four-week window to respond to a survey assessing their demographic information, MHF, stress, mood, self-regulation capacity, and perceptions of coaching climate. Athletic Directors emailed a reminder message after the first two weeks of this time frame. Those who completed the survey were invited to leave their email address if they wanted to receive an invitation to participate at Time 2 (March 2016). Those who provided their email address received a link via email to complete the same online survey (minus the demographic questions) in March 2016.

Time 1. The sample at Time 1 included 388 student-athletes (male = 146 [37.6%], female = 242 [62.4%]) in their first (n=85), second (n=89), third (n=95), fourth (n=65), and fifth year (n=36) of undergraduate studies, as well as Master's and Doctoral studies (n=18). Of these participants, 277 (71.4%) competed in team (i.e., basketball, football, volleyball, soccer, rugby,

ice hockey, field hockey, curling, baseball), and 108 (28.6%) in individual (i.e., athletics, swimming, rowing, badminton, fencing, skiing, squash, wrestling) sports. Furthermore, 114 of them were using their first year of athletic eligibility while the rest were using their second (n=79), third (n=96), fourth (n=62) and fifth and final (n=37) year of CIS eligibility.

Time 2. There was considerable attrition and only 110 (female = 82 [74.5%]; male = 28 [25.5%]) of the 388 student-athletes completed the survey again at Time 2. They were first (n=25), second (n=21), third (n=33), fourth (n=20) or fifth (n=6) year undergraduate students, or graduate students (n=5) who competed in team (n=79) and individual (n=31) sports and were in their first (n=30), second (n=24), third (n=34), fourth (n=14) and fifth (n=8) year of eligibility.

Instruments

An English and French version of an online survey was administered to assess demographical information (e.g., age, gender, year of study, program of study, year of sport participation, type of sport) and the following variables of interest: mental health functioning, stress, mood, self-regulation capacity, and perceived coaching climate. While questionnaires to measure these variables were available in English, three of them (i.e., stress, self-regulation capacity, perceived coaching climate) had to be translated in French by a professional translator and verified by the thesis supervisor.

Mental health functioning. Student-athletes' mental health functioning was assessed using the Adult Mental Health Continuum-Short Form (MHC-SF; Keyes, 2002). This 14-item self-report instrument comprises three subscales: (a) emotional well-being (EWB), which measures whether respondents feel happy, interested, and satisfied with life, (b) social well-being (SWB), which assesses whether respondents perceive they contribute to and are integrated into society, and (c) psychological well-being (PWB), which detects if respondents accept

themselves, master their environment, have positive relations with others, and perceive personal growth, autonomy, and purpose in life. Participants rate how they have been feeling during the past month using a 6-point Likert scale from *never* (0) to *every day* (5). Mean subscale scores were used, where a higher score is indicative of more positive MHF. The MHC-SF has shown excellent psychometric properties and has been used extensively with college student and adult populations (Keyes, 2006; Keyes et al., 2008; Robitschek & Keyes, 2009; Westerhof & Keyes, 2010).

Stress. Student-athletes' stress was measured using the Student Life-Stress Inventory (SLSI, Gadzella, 1991). The SLSI comprises 51 items that generate a subscale score for the frequency of stressors experienced (e.g., frustrations, conflicts, pressures, changes, and self-imposed) and for the frequency of maladaptive reactions to stressors (i.e., physiological, emotional, behavioral, and cognitive, Gadzella, 1994). Participants were asked to rate their stress as mild moderate or severe and then to rate their experiences and reactions using a five-point Likert scale ranging from *never* (1) to *most of the time* (5). High scores are indicative of more frequent experiences of stressors and more frequent maladaptive reactions to stressors. The SLSI has demonstrated acceptable validity and reliability with college student populations (Gadzella, 1994; Gadzella, Baloglu, Masten, & Wang, 2012).

Mood. Student-athletes' mood was assessed using the Profile of Mood States-Short form (POMS-SF, Shacham, 1983, adapted from McNair, Lorr, & Droppleman, 1981). The POMS-SF consists of 37 adjectives (e.g., happy, nervous) assessing the intensity of six experienced mood states (i.e., tension, depression, anger, vigor, fatigue, and confusion). Respondents indicate how accurately each adjective describes how they have been feeling during the past week using a Likert scale ranging from *not at all* (0) to *extremely* (4). Additionally, a total mood disturbance

score may be derived using mean subscale scores and the following formula: (fatigue + vigor + tension + depression + anger + confusion) – vigor. The POMS-SF has been shown to be valid and reliable with intercollegiate athletes (LeUnes & Nation, 1982; LeUnes, Daiss, & Nation, 1986)

Self-regulation capacity. Student-athletes' self-regulation capacity was measured using the Adolescent Self-Regulatory Inventory (ASRI, Moilanen, 2007). This 36-item instrument assesses various components of self-regulation (e.g., emotional, behavioural, attentional, and cognitive) and generates a total self-regulation score as well as two subscale scores reflecting the respondent's engagement in long and short-term self-regulation. Participants rate *how true* each statement is using a 5-point Likert scale ranging from *not at all true for me* (1) to *really true for me* (5). The ASRI was used in two studies with undergraduate students under the age of 20 and demonstrated acceptable psychometric properties (Moilanen, 2007).

Coaching climate. Student-athletes' perceptions of the coaching climate were evaluated using the Sport Climate Questionnaire (SCQ, Baard, Deci, & Ryan, 2000). This 15-item questionnaire generates a total score reflecting the degree to which participants perceive their coach to be autonomy-supportive, based on a 7-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (7). Higher scores are indicative of perceptions of a more autonomy-supportive climate. The SCQ has been used with intercollegiate athletes (Amorose & Anderson-Butcher, 2007) and is a valid and reliable instrument (Standage, Duda, & Ntoumanis, 2006; Williams & Deci, 1996).

Data Analysis and Results

A missing data analysis indicated that only 2.75% of the data were missing. With less than 5% of the data missing, they were treated with multiple imputations using an expectation-

maximization method (Tabachnick & Fidell, 2013). Data were assessed for violations of normality and no instances of univariate skewness or kurtosis were found. Mahalanobis d-squared were examined to assess multivariate normality. No scores were significant at $p < .001$, suggesting normality at a multivariate level (Kline, 2010). The ML method of estimation was used and robust goodness of fit indices were reported.

Internal consistency reliability coefficients were computed for the English and French versions of all measures at Time 1 ($N=388$) and Time 2 ($n=110$). Given that there was only one francophone participant at Time 2, coefficients for the French version of the measures were not included in the article. With the exception of the ASRI subscales assessing long-term and short-term regulation, coefficients varied from 0.722 to 0.945 (see Table 1) and were deemed acceptable (DeVellis, 2012). Due to the unacceptable internal consistencies of the two ASRI subscales, scores from these scales were not included in subsequent analyses; only total self-regulation scores were utilized.

To answer the first research question, Time 2 descriptive statistics were obtained, including correlations between subscale scores (see Table 2); data were screened for univariate and multivariate outliers as well as normality. At Time 2, CIS student-athletes reported moderate mental health functioning [EWB ($M = 10.92$, $SD = 2.96$), SWB ($M = 14.69$, $SD = 5.16$), PWB ($M = 19.3$, $SD = 5.9$)], and rated their level of stress as mild (25.5%), moderate (31.8%) or severe (42.7%) ($M = 138.2$, $SD = 23.9$). Student-athletes also reported high total mood disturbance scores ($M = 29.68$, $SD = 23.03$). Furthermore, they reported a moderate capacity to self-regulate ($M = 91.0$, $SD = 8.3$), and their perceptions of their coaching climate ($M = 68.33$, $SD = 19.39$) reflected an autonomy-supportive rather than a controlling climate.

Using the structural equation modeling AMOS 21 software program (Arbuckle, 2012), a path analysis was conducted using Maximum Likelihood (ML) estimation to test the relationship between the variables. Model fit was assessed using a combination of fit indices: Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA), and the χ^2 statistic. Fit indices were deemed to indicate good model fit if: CFI > 0.95, SRMR < 0.08, RMSEA < 0.05, and if the χ^2 statistic was non-significant (Tabachnick & Fidell, 2013). The initial model featured Frequency of stressors, Frequency of maladaptive reactions to stressors, Fatigue, Vigor, Tension, Depression, Anger, Confusion, Self-regulation capacity and Perceptions of coaching climate as independent variables with paths to three dependent variables: EWB, SWB and PWB. Because of the modest correlation amongst variables in the model (with the exception of perceived coaching climate, which was not related to stress, fatigue or vigor), and the demonstrated relationship between the independent variables and well-being in the literature, the independent variables were included in the final model regardless of whether or not they shared a significant path with a dependent variable.

Model Fit

Summary statistics for the path model indicated issues with model fit: CFI = .886, SRMR = .051, RMSEA = .542 (90% CI = .453-.636), and $\chi^2 = 99.045$, $p > .001$. For a summary of the initial standardized beta weights see Table 3. The largest modification index was 49.48, indicating that the model would fit better if the social and psychological well-being error terms were allowed to covary. A revised model was tested where the disturbance terms for social and psychological well-being were free to covary. There were evident improvements to model fit, CFI = .963, SRMR = .039, RMSEA = .378 (90% CI = .271-.496), and $\chi^2 = 99.045$, $p > .001$. However, issues remained surrounding the RMSEA. In order to further improve model fit, we

engaged in an iterative process of deleting non-significant pathways and re-testing the model until we reached adequate model fit. By deleting non-significant pathways, we were able to free more parameters, which increased the degrees of freedom and improved the interpretability of the remaining pathways. In an attempt to maintain the integrity of the scales, we allowed for the variables to correlate without having a path to dependent variables. The final model generated a significant chi-square value [$\chi^2 = 37.103, p = .005$], however, all other indices showed either good model fit [CFI = .977, SRMR = .035] or acceptable model fit [RMSEA = .099 (90% CI = .053-.144)]. Effect sizes were moderate for EWB (.504), SWB (.361), and PWB (.568).

Results from the path analysis (see Figure 1) showed significant pathways between the following variables:

Stress. There was a mild negative relationship between Frequency of maladaptive reactions to stressors and EWB ($\beta = -.27$) and PWB ($\beta = -.13$). There were no significant relationships pertaining to Frequency of stressors.

Mood states. Vigor was positively moderately related to EWB ($\beta = .45$), and positively mildly associated with SWB ($\beta = .25$) and PSW ($\beta = .24$). Depression was negatively related with EWB ($\beta = -.20$), SWB ($\beta = -.25$), and PSW ($\beta = -.41$), with the latter relationship being the strongest. Interestingly, there was a positive mild relationship between Anger and PWB ($\beta = .29$). No significant relationships pertaining to Tension, Fatigue, and Confusion were found, although all three of the aforementioned mood states were correlated to one another and depression and anger with coefficients ranging from 0.637 to 0.695.

Self-regulation capacity. There was a mild positive relationship between Self-regulation capacity and SWB ($\beta = .17$) and Self-regulation capacity and PWB ($\beta = .26$).

Perceived coaching climate. Finally, there was a positive mild relationship between Perceived coaching climate and PWB ($\beta = .14$).

To answer the second research question, an independent *t*-test was first performed to determine if there were significant differences in student-athletes' self-regulation capacity scores between Time 1 ($M = 3.26$, $SD = .334$) and Time 2 ($M = 3.27$, $SD = .358$). The test revealed a non-significant result: $t(109) = -.470$, $p = .639$. To account for the possibility of intra-individual differences possibly missed by the *t*-test, a preliminary path model was created where change scores for self-regulation capacity served as the independent variable, and change scores for the remaining variables of interest (i.e., EWB, SWB, PWB, Frequency of stressors, Frequency of maladaptive reactions to stressors, Fatigue, Vigor, Tension, Depression, Anger, Confusion, and Perceived coaching climate) were dependent variables. Initial indices of fit for this model were quite poor, $CFI = .002$, $SRMR = 5.29$, $RMSEA = .257$ (90% CI = .237-.277), and $\chi^2 = 539.922$, $p > .001$. There were no significant pathways from the independent variable (i.e., Change in self-regulation capacity) to any of the dependent variables.

Discussion

The objective of the present study was to examine relationships between variables that could potentially influence the mental health functioning of CIS student-athletes. We hypothesized that there would be a positive association between mental health functioning, positive mood states, self-regulation capacity, and perceptions of coaching climate, and a negative association between these three variables and stress and negative mood states. Analyses revealed that student-athletes' mental health functioning is affected by the frequency of their maladaptive reactions to stressors, mood states, capacity to self-regulate, and the climate fostered by coaches. Another objective was to examine if any changes in self-regulation capacity over

time would bring about change in the other aforementioned variables, as this has never been measured within a student-athlete population. Analyses showed that student-athletes' self-regulation capacity was stable over time and changes in this variable were not related to changes in the other variables of interest, which did not support our hypothesis.

Stress

The path analysis revealed a mild negative pathway between the frequency with which student-athletes' have maladaptive reactions to stressors (i.e., physiological, emotional, behavioral, and cognitive responses to stressors) and their emotional and psychological well-being. This suggests that the more they experience negative reactions to stress, the more their mental health functioning decreases (e.g., happiness, satisfaction with life, personal growth, positive relations with others). Interestingly, the student-athletes reported higher mean scores on frequency of maladaptive reactions to stressors ($M = 64.5$) than some individuals in samples of 381 and 594 American college students whose scores ranged from $57.7 \leq M \leq 88.18$ (Gadzella & Bologlu, 1990). This could be cause for concern as Gadzella (1994) reported that adverse reactions to stressors can make it more difficult for some individuals to cope. Weiss (1999) suggested that some athletes may not have developed any coping skills outside of sport to help them manage stressors, which could explain why athletes exhibit maladaptive behavioral and emotional tendencies at the same rate as non-athletes. The significant relationship between student-athletes' maladaptive stress reactions and emotional and psychological well-being support the findings of a recent study with Canadian university students (Durand-Bush, McNeill, Harding, et al., 2015). Whether or not university students pursue athletics during their post-secondary studies, it appears that their mental health can negatively be affected by how they respond to stress. This implies that students should pay attention to their symptoms as well as

their appraisals of stressful situations given that stress is highly based on perceptions and can impact whether or not athletes feel challenged or threatened by what they encounter (Smith, 1986).

Mood

Mood was also significantly related to student-athletes' mental health functioning. In particular, vigor and depression had a strong relationship with MHF, with significant pathways from both of these mood states to all three dimensions of well-being. The higher student-athletes' vigor was, the higher their emotional, social, and psychological well-being were as well. Vigor thus appears to be an important dimension to track and foster in this population. Conversely, higher depressive scores were related to lower emotional, social, and psychological well-being. Important to note, student-athletes in this sample reported higher depressive mood disturbance than athlete norms (Terry & Lane, 2000) and three samples of NCAA football players (LeUnes & Nation, 1982). Depressed mood is characterized by a global negative self-schema (Abramson, Metalsky, & Alloy, 1989; Brown & Mankowski, 1993), unlike other mood dimensions, which do not have the same global influence; as such, the potential for depressive symptoms to more globally and negatively affect student-athletes could be high. Further study of depressed mood in student-athletes, as an independent construct, is warranted, as depression has been shown to influence the intensity and interactions of other mood dimensions and has consistently been associated with debilitated athletic performance (Beedie et al., 2000) and risk of injury (Nippert & Smith, 2008; Petrie, 1992).

Anger was also related to student-athletes' psychological well-being but in the opposite expected direction. This was a surprising finding that contradicts what Simpson and Newby (1994) found with NCAA football players; their high anger was associated with more depressive

symptoms. Then again, Beedie and colleagues (2000) argued that anger can either facilitate or hinder performance. It is possible that in the case of this sample of CIS student-athletes, their anger was facilitative and allowed them to grow and master their environment. It is also important to note that the student-athletes only reported, on average, “a little” anger and their scores were lower than that of the football players surveyed by Simpson and Newby (1994).

Given the relation of vigor and depression to all three indices of mental health functioning, and given the link between anger and psychological well-being, the POMS-SF may be an important predictor of well-being (MHC-SF). Future researchers may wish to take a more targeted approach to studying the relationship between mood and well-being.

Self-Regulation Capacity

Self-regulation capacity is another important variable to consider as it was significantly related to student-athletes’ social and psychological well-being. This finding is consistent with that of other studies showing that higher self-regulation capacity is associated with positive social and psychological outcomes such as better academic performance (Tangney et al., 2004), higher levels of pro-social behavior, and less maladaptive behavior (Eisenberg, Fabes, Murphy, Maszk, Smith, & Karbon, 1995) in adolescents and adults. Similar to what Durand-Bush, McNeill, Harding et al. (2015) suggested, enhancing the self-regulation skills of university student-athletes may help them to maintain appropriate levels of mental health functioning throughout their studies. Interestingly, there were no changes in this sample’s levels of self-regulation capacity throughout the academic year. This demonstrates that their capacity remained relatively stable regardless of their negative reactions to stress and depressive mood states. In this sense, self-regulatory competencies may act as a buffer against depleting experiences and states (Durand-Bush, McNeill, Harding et al., 2015).

More research must be conducted to determine if university student-athletes' self-regulation capacity can change over time and if these changes positively or negatively influence their stress, mood, and mental health functioning levels. For example, a recent study with university student-athletes reporting symptoms of burnout demonstrated that their capability to manage themselves and their environment was improved as a result of a self-regulation intervention, which was associated with improved levels of stress, well-being, and burnout (Dubuc-Charbonneau & Durand-Bush, 2015). However, it is not clear if the opposite is the case, that is, if decreases in self-regulatory competence bring about poorer mental health functioning. Additional research would help to better understand the value of developing and maintaining self-regulation skills in the university sport context.

Perceived Coaching Climate

The degree to which the student-athletes perceived their coach to create an autonomy-supportive environment was positively associated with their psychological well-being. This finding is consistent with that of other studies (e.g., Deci & Ryan, 1985; Pelletier et al., 2002) showing that autonomy-supportive coaching styles predict positive psychological outcomes. An autonomy supportive coaching style can foster enhanced mental health functioning in student-athletes and contribute to the development of important psychological attributes such as autonomy, self-acceptance, and personal growth. It would be worthwhile for coaches to develop and implement autonomy-supportive coaching skills, as these could be extremely valuable to the health and success of CIS student-athletes.

Mental Health Functioning and Athletic Performance

The present study demonstrated that student-athlete mental health is related to a number of constructs. Coaches may ask: "If athletic excellence is a physical pursuit, why focus on the

emotional, social, and psychological well-being of student-athletes?” A key reason for doing so is because the constructs that affect student-athlete mental health also hold implications for performance outcomes (Deci & Ryan, 1985; Amorose & Anderson-Butcher, 2007; Collins & Durand-Bush, 2010). As such, one can argue that improved performance could be a by-product of improved well-being. Unfortunately, this association is not common discourse and there is still a prevailing stigma surrounding mental health within athletics. Admitting mental illness or mental health challenges is still seen as a sign of weakness and this is not ordinarily discussed in relation to performance in the sporting environment. Consequently, promoting the mental health of CIS student-athletes will only be achieved through a collaborative effort by the entire athletics community, to create a new culture, such that, maintaining mental health becomes a part of being ready to perform athletically, succeed in the classroom, and grow as a person. This ideological shift must be met with coinciding research and resources to support student-athletes in their endeavor to achieve optimal well-being on and off the field of play. Post-secondary institutions in Canada operate fairly autonomously despite being members of the CIS, which has its own policies and procedures. As this is the case, a decentralized but collaborative approach to tackling student-athlete mental health would allow for institutional autonomy and information sharing among member schools.

Limitations

Regardless of the significant findings and the contributions the current study makes, it bares limitations. First, given the infancy of research in this field, it was not feasible to include all relevant constructs that may affect student-athletes’ mental health functioning. The sample size was also prohibitive. We had hoped to recruit more participants, however, student-athletes are enormously busy and the length of the survey may have discouraged them from completing

it. Furthermore, we did not perform a confirmatory factor analysis (CFA) to assess the goodness of fit of individual items prior to conducting the imputation and path analyses, nor did we perform an exploratory factor analysis (EFA) to determine the best possible model. That being said, the path analysis model generated to answer the first research question met the requirements for good and/or acceptable model fit. However, the second model performed to explore changes in self-regulation capacity (second research question) did not meet requirements, which was not surprising since there were no significant changes in self-regulation capacity between Time 1 and Time 2. As the mental health functioning of student-athletes is a relatively novel concept within the literature and the current study was exploratory in nature, the aforementioned results must be interpreted with caution. Lastly, although the questionnaires generated acceptable internal consistency coefficients, the validity of the subscales of the Adolescent Self-Regulatory Inventory is questionable. For this reason, total scores were utilized in the analyses. Moilanen (2007) reported favorable psychometric properties for this measure, however, more research is warranted to ascertain this.

Concluding Remarks

This study fosters an enhanced understanding of CIS student-athlete mental health functioning, through an investigation how stress, mood, capacity to self-regulate, and perceptions of the sport climate relate to their emotional, social, and psychological well-being. Results of a path analysis revealed that the frequency of student-athletes' adverse reactions to stressors and intensity of depressive mood states were negatively associated with their emotional well-being, while their vigor was positively related to this same emotional component. Their social well-being was positively linked to both their vigor and capacity to self-regulate. On the other hand, student-athletes' depressive mood states were negatively associated with their social well-being.

With regards to their psychological well-being, it was significantly positively related to several constructs including vigor, anger, self-regulation capacity, and perceptions of an autonomy-supportive coaching climate. Conversely, it was significantly negatively related to frequency of adverse reactions to stressors and depressive mood states. It is interesting that certain dimensions of mental health functioning were impacted by some constructs and not others. It is not clear at this point what explains this, however, mood appears to be particularly important as vigor and depression were both significantly associated with all three dimensions of mental health functioning and generated the strongest relationships. Another aim of the study was to explore whether changes in self-regulation capacity over the athletic/academic year would be associated with changes in the other variables of interest. None of the associations were significant. In fact, self-regulation capacity remained moderate across time, which can be interpreted as positive as this indicates that the student-athletes were able to manage themselves and their environment regardless of the time of year and the demands and stressors they faced.

The results of this study may inform the strategic directions of mental health promotion and programming designed for CIS student-athletes in the future. For example, frequent adverse reactions to perceived stress can be harmful to emotional and psychological well-being. Therefore self-regulation skills such as cognitive re-appraisal and relaxation may be integrated into programming to mitigate the negative outcomes associated with student-athlete stress. Mood states, particularly vigor and depression, may be important to track longitudinally, as both had strong associations with mental health functioning. Lastly, educating coaches about the positive outcomes (including on performance) associated with an autonomy-supportive sporting environment may motivate them to incorporate some of these principles into their own practice and philosophy. These are merely a number of suggested pathways to improving and protecting

the mental health of CIS student-athletes, however, they must be carried out in conjunction with anti-stigma initiatives and an effortful ideological shift in the way the athletics community views mental health: no longer as a liability, but as something for which to strive.

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Table 1

Internal Consistency Coefficients Grouped by Time and Questionnaire Language

Internal consistency coefficients			
	Time 1 (n=388)		Time 2 (n=110)
Scale	English (n=363)	French (n=25)	English ^a
MHC-SF	$\alpha = 0.932$	$\alpha = 0.876$	$\alpha = 0.931$
EWB	$\alpha = 0.891$	$\alpha = 0.935$	$\alpha = 0.837$
SWB	$\alpha = 0.863$	$\alpha = 0.872$	$\alpha = 0.875$
PWB	$\alpha = 0.869$	$\alpha = 0.722$	$\alpha = 0.851$
SLSI - FS	$\alpha = 0.866$	$\alpha = 0.899$	$\alpha = 0.854$
SLSI - RS	$\alpha = 0.886$	$\alpha = 0.884$	$\alpha = 0.896$
POMS-SF	$\alpha = 0.937$	$\alpha = 0.945$	$\alpha = 0.928$
Vigor	$\alpha = 0.810$	$\alpha = 0.837$	$\alpha = 0.857$
Tension	$\alpha = 0.868$	$\alpha = 0.796$	$\alpha = 0.867$
Depression	$\alpha = 0.930$	$\alpha = 0.957$	$\alpha = 0.918$
Anger	$\alpha = 0.880$	$\alpha = 0.900$	$\alpha = 0.881$
Confusion	$\alpha = 0.770$	$\alpha = 0.820$	$\alpha = 0.777$
Fatigue	$\alpha = 0.818$	$\alpha = 0.797$	$\alpha = 0.804$
ASRI	$\alpha = 0.787$	$\alpha = 0.814$	$\alpha = 0.812$
ST	$\alpha = 0.628$	$\alpha = 0.641$	$\alpha = 0.650$
LT	$\alpha = 0.719$	$\alpha = 0.778$	$\alpha = 0.705$
SCQ	$\alpha = 0.930$	$\alpha = 0.934$	$\alpha = 0.940$

Note. MHC-SF = Mental Health Continuum-Short Form; EWB = Emotional Well-Being; SWB = Social Well-Being, PWB = Psychological Well-Being, SLSI-FS = Student Life-Stress Inventory - Frequency of Stressors; SLSI-RS = Student Life-Stress Inventory - Frequency of Maladaptive reactions to Stressors; POMS-SF = Profile of Mood States-Short Form; ASRI = Adolescent Self-Regulatory Inventory; ST = Short-term self-regulation; LT = Long-term self-regulation; SCQ = Sport Climate Questionnaire.

^a = Not split by language because there was only one French language respondent at Time 2.

Table 2

Time 2 Correlations Between Scale Scores and Descriptive Statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Stressors													
2. Reactions	.673**												
3. Fatigue	.570**	.498**											
4. Vigor	-.237*	-.220*	-.289**										
5. Tension	.518**	.588**	.658**	-.261**									
6. Depression	.637**	.562**	.587**	-.450**	.687**								
7. Anger	.511**	.430**	.513**	-.189*	.695**	.772**							
8. Confusion	.578**	.492**	.658**	-.270**	.680**	.722**	.648**						
9. Self-regulation capacity	.388**	-.392**	-.274**	.253**	-.322**	-.337**	-.343**	-.420**					
10. Perceptions of coaching climate	-.170	-.093	-.169	.172	-.247**	-.268**	-.225*	-.236*	.213*				
11. EWB	-.416**	-.480**	-.348**	.594**	-.402**	-.550**	-.331**	-.372**	.260**	.205**			
12. SWB	-.440**	-.390**	-.348**	.436**	-.357**	-.510**	-.384**	-.390**	.371**	.251**	.668**		
13. PWB	-.469**	-.484**	-.397**	.517**	-.425**	-.584**	-.339**	-.498**	.490**	.369**	.689**	.787**	
Mean	138.2	64.5	8.63	9.76	9.14	7.67	6.38	6.69	91.00	68.33	10.92	14.69	19.3
SD	23.86	15.34	4.14	4.31	5.29	6.52	5.11	4.04	8.27	19.39	2.96	5.16	5.9
Skewness	-0.048	0.376	-0.03	0.234	0.464	1.149	0.661	0.330	-0.112	-0.346	-0.415	0.165	-0.148
Kurtosis	-0.268	-0.193	-0.784	-0.180	0.005	1.674	-0.321	-0.299	-0.061	-0.592	-0.863	-1.08	-0.668

Note. Stressors = Frequency of stressors; Reactions = Frequency of maladaptive reactions to stressors; EWB = Emotional Well-Being; SWB = Social Well-Being; PWB = Psychological Well-Being; *SD* = Standard deviation.

** = $p < .01$.

* = $p < .05$.

Table 3

Beta Coefficients and Significance Testing for Initial Path Model.

Path	β	p
EWB $\leftarrow$ Reactions to stressors	-0.282	.006
SWB $\leftarrow$ Reactions to stressors	-0.091	.431
PWB $\leftarrow$ Reactions to stressors	-0.171	.072
EWB $\leftarrow$ Frequency of stressors	-0.029	.781
SWB $\leftarrow$ Frequency of stressors	-0.134	.262
PWB $\leftarrow$ Frequency of stressors	-0.018	.854
EWB $\leftarrow$ Fatigue	0.051	.614
SWB $\leftarrow$ Fatigue	-0.017	.881
PWB $\leftarrow$ Fatigue	0.017	.858
EWB $\leftarrow$ Vigor	0.440	***
SWB $\leftarrow$ Vigor	0.253	.006
PWB $\leftarrow$ Vigor	0.241	.001
EWB $\leftarrow$ Tension	-0.023	.847
SWB $\leftarrow$ Tension	0.076	.569
PWB $\leftarrow$ Tension	0.015	.891
EWB $\leftarrow$ Depression	-0.241	.098
SWB $\leftarrow$ Depression	-0.195	.236
PWB $\leftarrow$ Depression	-0.372	.006

Table 3 (continued)

Path	β	p
EWB $\leftarrow$ Anger	0.048	.691
SWB $\leftarrow$ Anger	-0.070	.608
PWB $\leftarrow$ Anger	0.253	.024
EWB $\leftarrow$ Confusion	0.028	.809
SWB $\leftarrow$ Confusion	0.029	.824
PWB $\leftarrow$ Confusion	-0.109	.307
EWB $\leftarrow$ Self-regulation capacity	-0.032	.684
SWB $\leftarrow$ Self-regulation capacity	0.140	.121
PWB $\leftarrow$ Self-regulation capacity	0.239	.001
EWB $\leftarrow$ Coaching climate	0.061	.395
SWB $\leftarrow$ Coaching climate	0.101	.211
PWB $\leftarrow$ Coaching climate	0.196	.003

Note. Reactions to stressors = Frequency of maladaptive reactions to stressors; EWB = Emotional Well-Being, SWB = Social Well-Being, PWB = Psychological Well-Being; Coaching Climate = Perceptions of Coaching Climate; β = strength of relationship; p = significance.

Figure 1

Significant standardized beta weights for path analysis

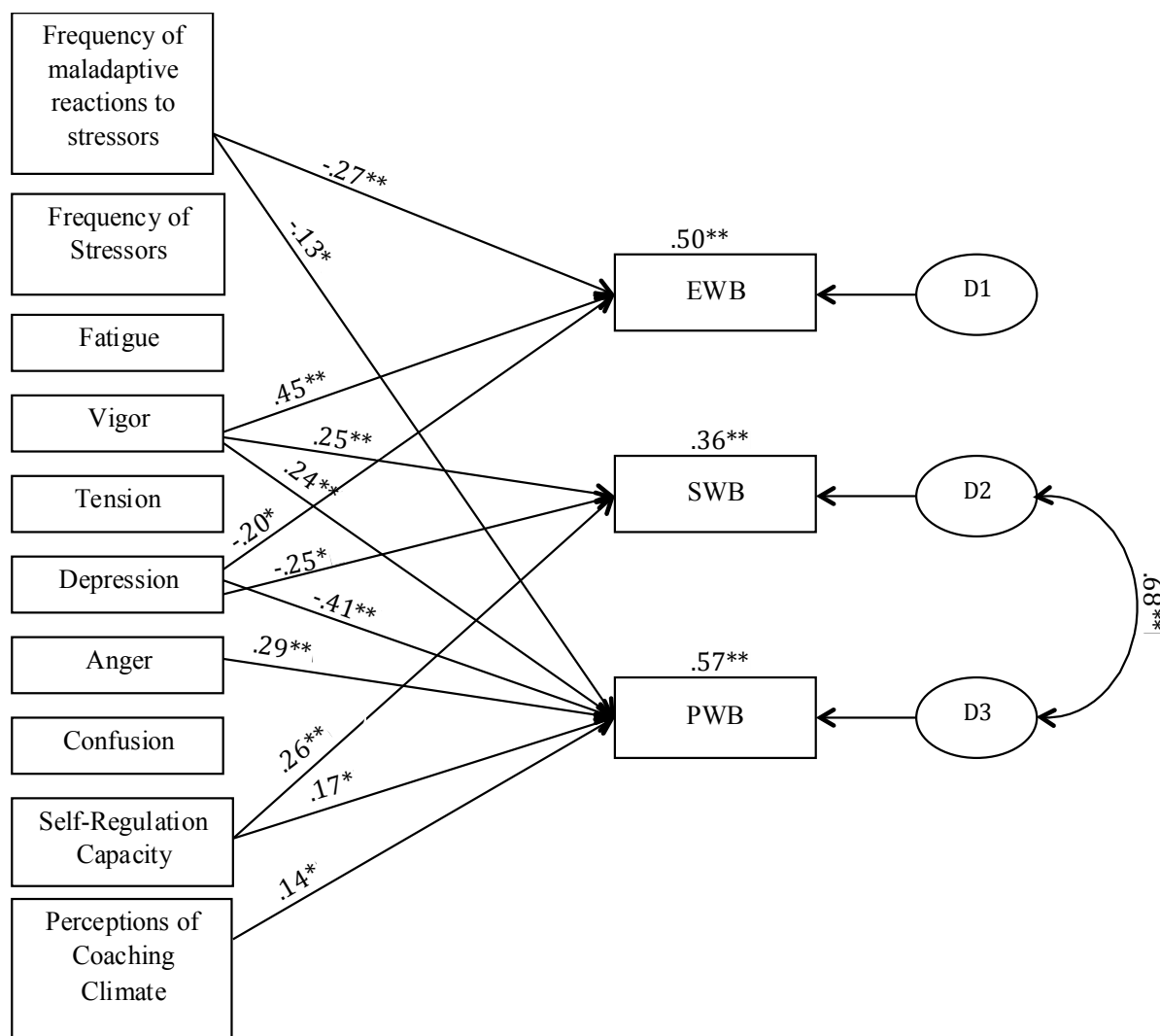


Figure 1. Significant standardized beta weights for path analysis.

Note. Only significant pathways are presented in this graph. Standardized Beta weights are found along straight arrows. The covariance between the disturbances for SWB and PWB is listed on the curved arrow. Standardized variance estimates for the exogenous variables are listed above their respective box. EWB = Emotional Well-Being, SWB = Social Well-Being, PWB = Psychological Well-being, D = Disturbance.

** = $p < .05$

* = $p < .01$

Chapter 5 - General Discussion

The goal of this study was to provide a first look at the mental health functioning (MHF) of Canadian university student-athletes through a holistic lens. Specifically, we were interested in understanding: (a) the levels and prevalence of CIS student-athlete MHF by assessing their emotional, social, and psychological well-being, and (b) whether individual differences such as gender, alcohol use, living situation, year of study, and type of sport affected MHF over the course of the 2015-2016 academic year/athletic season. Furthermore, the study aimed to (c) garner a deeper understanding of student-athletes' MHF through the examination of its relationship with other factors, specifically, stress, mood, self-regulation capacity, and perceptions of coaching climate, and discover whether (d) changes in self-regulation capacity over time were associated with changes in MHF, stress, mood, and perceptions of coaching climate.

Results showed that student-athletes in this study experienced moderate to high levels of mental health across time. Furthermore, these levels were higher than those of university students in other studies (e.g., Durand-Bush, McNeil, Harding, et al., 2015; Peter et al., 2011). Of interest, a higher prevalence of CIS student-athletes were flourishing in comparison to those languishing in this study. Important to note, 18% of the student-athletes who participated at both time points reported a previous mental illness diagnosis. Yet, these individuals maintained moderate mental health functioning across time, despite this self-reported diagnosis. Furthermore, 20% of them were flourishing at Time 1 and 30% were flourishing at Time 2. These findings provide additional support for the dual-continuum model proposed by Keyes (2002), solidifying that mental health and illness are related yet unique constructs. In other

words, even though student-athletes may be facing a mental illness, it does not mean that they cannot experience well-being and manage to function in their academic / athletic environment.

It was quite surprising that the student-athletes' mental health functioning did not differ across time based on their gender, alcohol use, living situation, year of study or sport played, given the amount of research that has demonstrated differences in well-being based on these factors. These results indicate that administrators and policy makers may be able to consider student-athletes as a cohesive unit when making plans to promote and protect their mental health. However, more research must be conducted before arriving at this conclusion, especially because some of our results did suggest that MHF may vary based on gender. Furthermore, student-athletes' MHF varied based on the frequency of their maladaptive reactions to stressors, mood, capacity to self-regulate, and their perceptions of the climate fostered by coaches, which supports previous research (e.g., Durand-Bush, McNeill, Harding, et al., 2015). Notably, the frequency of their maladaptive reactions to stressors and intensity of depressive states were negatively linked to their emotional and psychological well-being. Conversely, their vigor states were positively related to all three dimensions of their well-being. Furthermore, their capacity to regulate their inner states and behaviours was positively associated with their social and psychological well-being, while their perceptions of an autonomy supportive coaching climate generated a positive relationship with psychological functioning. These constructs deserve further evaluation, as they may be key in preventing mental health difficulties and promoting mental-health enhancing activities among student-athletes.

Towards a Preliminary Mental Health Profile of Canadian Student-Athletes

A preliminary mental health profile of CIS student-athletes can be derived based on the results of this study. Findings demonstrate the co-existing benefits and drawbacks of competing

in university athletics. In general, it appears that much of the time, student-athletes felt happy, confident, challenged to grow, and satisfied with their life, relationships, and community. However, some student-athletes experienced the opposite, reflecting languishing mental health, and they deserve attention. According to Keyes (2002), individuals who are languishing experience lower satisfaction with their personal and social environment, and they feel less purposeful in their life (Keyes, 2002), which contributes to greater difficulty adjusting and a less positive outlook on life. As such, student-athletes who were languishing and even those who were moderately healthy in this study could be experiencing some deficiencies in their life that could negatively impact their daily functioning and possibly their academic and sporting performance as well. Performance indicators were not included in this study, however, it would be important to examine these in relation to mental health status in the future as student-athletes falling within the languishing category would arguably be the most at risk to suffer decreases in performance.

The “big picture”. Results of this study, although encouraging, do not tell the whole story and this must be acknowledged in discussing a preliminary profile of mental health of CIS student-athletes. For instance, the student-athletes’ moderate to high levels of MHF were concomitant with moderate to high levels of stress and depressive mood disturbance exceeding those of athlete norms (Terry & Lane, 2000) and three samples of NCAA football players (LeUnes & Nation, 1982). In comparing CIS student-athletes with the aforementioned samples, they were the only group who did not demonstrate the typical “iceberg profile” that is thought to facilitate athletic performance (Terry & Lane, 2000) (see Figure 2). Therefore, one could argue that their mood states were not optimal, even though they reported moderately high mental health functioning. What is interesting is that the CIS student-athletes’ vigor and depression

scores were significantly associated with their MHF and these relationships were of moderate effect. Perhaps their high vigor helped to temper some of their depressive feelings, leading them to maintain moderate MHF. More research is warranted to further examine these noticeable relationships.

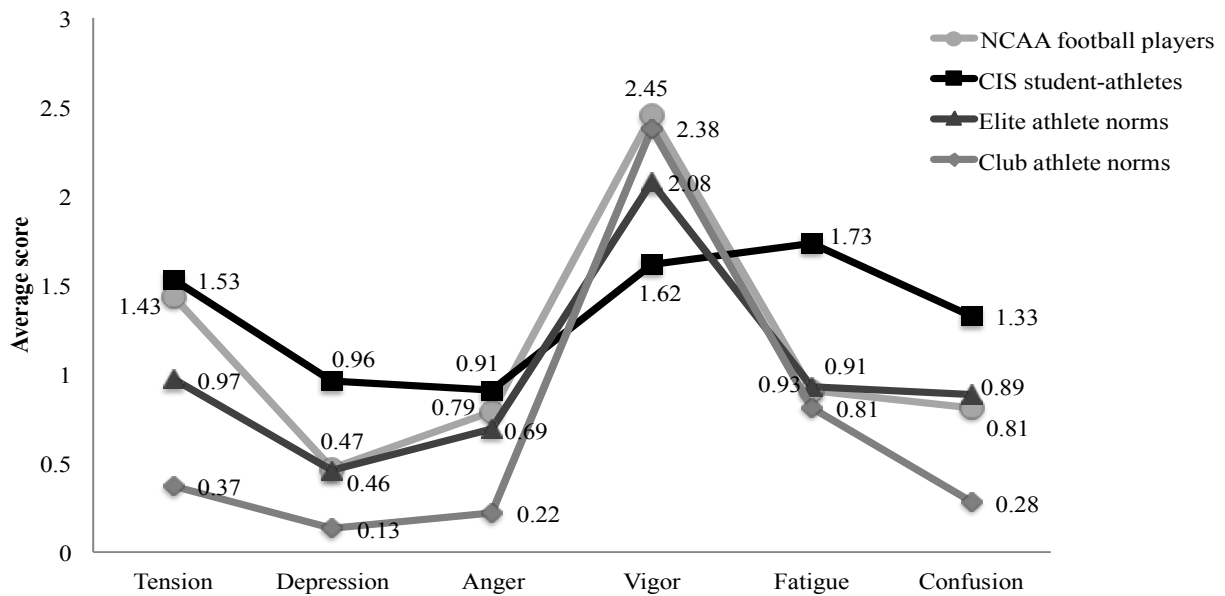


Figure 2. CIS student-athletes' mood profile compared to norms and NCAA football players

The paradoxical finding that CIS student-athletes, on average, exhibited favorable MHF despite experiencing high levels of stress and depressed mood could also be attributed to the moderate self-regulation capacity they reported, which could have allowed them to build up resilience to high levels of pressure and stress (Steiner et al., 2010). Alternatively, it could perhaps be due to the tendency of elite athletes to engage in denial of distress and repressive defensiveness where they no longer register the fact that a situation is highly stressful. Steiner and colleagues (2010) warn that this over-automated self-regulation may be effective in the short-term, however, over an extended period of time fraught with pressures and the potential for traumatic events (e.g., sport injury), denial and repressive defensiveness may predispose athletes

to unhealthy coping mechanisms such as substance abuse, eating disorders, and affective disorders.

In this process of mapping out a preliminary mental health profile of Canadian student-athletes, it is important to note that multiple factors are indeed associated with the functioning of this cohort of university students. Given that several significant relationships were found in this study, it is important to consider the ‘big picture’, that is, the whole student-athlete and not just those factors traditionally thought to influence their ability to perform athletically. For example, in devising high performance programming for CIS student-athletes in the future, leaders and practitioners should consider how these individuals react to stress, how their mood fluctuates over time, and what skills they possess to manage various situations. Activities and programs should also integrate their coaches given that these key individuals can impact how student-athletes function. As found in previous studies, results of this research demonstrate that coaches can be effective by creating an autonomy-supportive or task-oriented climate (e.g., Pelletier et al., 2002; Reinboth & Duda, 2006)

Future Directions and Recommendations

Keyes, Dhingra and Simoes (2010) examined changes in levels of mental health of a large American adult population over a period of 10 years, finding that positive changes in mental health were strongly predictive of prevalence and incidence of mental illness a decade later. These findings suggest that early identification and intervention, along with mental health promotion among the CIS student-athlete population may not only facilitate the achievement of optimal well-being and performance but also safeguard these individuals for the future. Following are recommendations to start positively changing the mental health landscape in the CIS system.

Institutional Level

1. Adopt a preventative and promotional perspective towards CIS student-athlete mental

health. Integrating mental health promotion and prevention into the standard of CIS athlete-care will aid in creating a safe, productive, and thriving student-athlete population.

Preventative activities could target risk factors and early symptoms of mental illness, while promotional efforts could encourage student-athletes to participate in activities that promote positive mental health and reduce stigma associated with mental illness. For example, preventative activities could involve mental health screening as a part of the annual physical health check-up performed at the beginning of the school year, workshops on self-regulation and coping skills, counseling that is relevant to the student-athlete experience, and training for coaches to learn how to create healthy athletic environments without sacrificing competitive edge. Activities promoting mental health could include activities to de-stress, boost mood, and connect with others both inside and outside of the athletic department.

2. Implement counseling services tailored to the unique combination of challenges (e.g., adjustment, development, performance, mental health) that participation in CIS sport presents. As post-secondary institutions are increasingly being recognized as important settings for the promotion of mental health and well-being, we are fortunately beginning to see a shift in thinking in Canada toward a more holistic model of wellness that includes early detection and prevention of mental health difficulties (Clapham et al., 2012). Despite the increasing offering of holistic health care services on post-secondary campuses, student-athletes often hold negative views regarding counseling services (Watson, 2005). Across the NCAA, calls have been made for the implementation of counseling approaches that focus on the holistic development of the student-athlete as a person (Danish & Hale, 1981; Ferrante,

Etzel & Lantz, 1996; Watson & Kissinger, 2011), keeping in mind the unique challenges that university athletes face that are extraneous and additional to those of their non-athlete cohorts. Budgetary concerns remain one of the largest barriers to NCAA institutions providing full-time mental health care to their athletes, and as Canadian post-secondary athletic departments are relatively non-affluent in comparison, designing an affordable and accessible mental health service delivery model will be important in the Canadian context.

Organizational Level: Giving Student-Athletes a Voice

Presently, the individuals who sit on the committees that influence the direction and function of the CIS are coaches and athletic administrators. Although these individuals attempt to convey the struggles and wishes of the student-athletes under their supervision, these needs may be overshadowed by the broader administrative, bureaucratic, and financial concerns of the member institutions they represent. No forum exists for student-athletes to directly influence the governing body under which they reside. Given some of the difficulties faced by student-athletes in this study and others, allowing student-athletes a seat at the “CIS table” may serve to improve their well-being over the lifespan of their career, elevate the competitive level of CIS sport, and encourage elite high-school and CÉGEP athletes to stay at home rather than taking their talents to the NCAA. To this end, it is recommended that the CIS create a standing athlete-wellness committee of which the mandate is to advise the CIS Board of Directors on matters of governance, strategy, and policy development surrounding the holistic health and personal development of student-athletes both in sport and beyond their athletic career. The athlete-wellness committee could give a voice to student-athletes and their advocates at the organizational level, for the purpose of improving the student-athlete experience, better preparing student-athletes for life after sport, and ensuring that CIS sport is a safe and healthy

workplace for all. Some initial student-athlete wellness committee objectives could include: (a) the identification of current best mental health and wellness practices among CIS member institutions, (b) the development of an empirical database surrounding the needs and [mental health] challenges of student-athletes participating in CIS sport, and (c) the identification and integration of outside organizations aligned with the cause of developing future mental health policies and practices.

Chapter 6 - Conclusion

The CIS student-athletes in this study reported moderate to high levels of MHF and vigor, despite also reporting high levels of stress and depressed mood. Overall, these findings did not support our hypothesis that student-athletes would exhibit moderate to low levels of MHF. Research suggests that collegiate athletes have a tendency to over report well-being and deny distress for several reasons, including a fear of the prevailing stigma in athletics that associates mental health challenges with weakness (Delenardo, 2013; Steiner et al., 2010), thus the possibility of over-reporting mental health in the current study must be acknowledged. Although there was an encouraging prevalence of flourishing student-athletes in the current investigation, the majority were categorized as moderately mentally healthy, a status that is often overlooked in the literature. Furthermore, some student-athletes were languishing, which is concerning given the multiple barriers to help-seeking faced by athletes. With calls for a shift towards mental health prevention and promotion, the moderately mentally healthy and languishing deserve closer attention because they are not thriving in their environment (Keyes, 2002) and they may not be reaping the full benefits of their academic and sporting experiences.

It was hypothesized that individual differences such as gender, alcohol use, living situation, year of study, and type of sport would explain variance in student-athletes' MHF across time, however, results did not support this. That being said, gender did help to explain differences in SWB early on the student-athletes' academic/athletic year, whereby women had lower SWB than men. In addition, other variables, namely frequency of maladaptive reactions to stress, mood, self-regulation capacity, and perceptions of coaching climate were significantly associated with student-athlete mental health functioning, which supported our hypotheses. Notably, student-athletes' vigor and depressive mood states were related to all three dimensions

of their well-being. Lastly, counter to our hypothesis, student-athletes' self-regulation capacity remained stable over time, and changes in self-regulation capacity were not significantly related to changes in MHF, stress, mood, and perceptions of coaching climate over time.

In sum, notwithstanding the promising results of this exploratory study, the mental health of university student-athletes should be further investigated and prioritized given multiple reports showing that participation in varsity athletics can increase their vulnerability to experiencing distress (Watson & Kissinger, 2007), and predispose them to developing certain psychiatric disorders (Reardon & Factor, 2010) or exacerbate an existing one (Neal et al., 2013). To this end, a collaborative effort between student-athletes, coaches, support staff, and administrators is required. One of the largest barriers to positive student-athlete mental health is the stigma the athletics community attaches to mental illness, and so, improving and maintaining student-athletes' mental health is a process that will arguably require ongoing attention and care. Therefore, activities focused on promoting and maintaining positive mental health and reducing the mental illness stigma within the athletics community will be important first steps in ensuring student-athlete well-being in the future.

Chapter 7 – Statement of Contributions

This section will summarize contributors who brought this project to fruition. Firstly, Dr. Natalie Durand-Bush, the thesis supervisor, was involved every step of the way, from the project's design and conception, to providing critiques and feedback, to reviewing every part of the thesis; as such, she is a co-author on all manuscripts produced as a result of this research. Secondly, Scott Rathwell aided in the statistical analysis process, including providing input in the interpretation and reporting of results, as such, he is the third named author on both Articles 1 and 2.

Dr. Bradley Young and Dr. Jennifer Brunet, both members of the thesis committee, provided extremely helpful feedback and expertise, especially regarding quantitative data analysis, which strengthened the design and results of the study. Lastly, Ms. Kylie McNeill provided feedback and support at various stages of the project, especially regarding data analysis and the use and interpretation of the MHC-SF.

Lastly, both the CIS and SAMHI were helpful in circulating the survey to the target population. Drew Love, former Director of the CIS and Therese Quigley, the Athletic Director at the University of Western Ontario, wrote letters of support endorsing the study and therefore, were instrumental in allowing the research to gain traction and credibility within the CIS community. SAMHI and its co-founder Samantha Delenardo, were also crucial in promoting the study, leveraging a vast social network to invite eligible student-athletes to participate.

Chapter 8 - References and Appendices

The following list of references comprises references not found in Articles 1 and 2.

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Appendix A

Table 1: Summary of Sample Demographics

Table 1

Summary of Sample Demographics

Gender	Time 1 (N=388)	Time 2 (n=110)
Male	37.6% (n=146)	25.5% (n=28)
Female	62.4% (n=242)	74.5% (n=82)
Alcohol Use		
Non-drinker	7.7% (n=30) ^a	12.7% (n=14)
Non-binger	53.1% (n=206)	64.5% (n=71)
Infrequent binger	24.5% (n=95)	20.6% (n=22)
Frequent binger	5.2% (n=20)	2.7% (n=3)
Living situation		
On-campus (in residence)	17% (n=66)	14.5% (n=16)
Off-campus (with family)	29.4% (n=114)	30.9% (n=34)
Off-campus (without family)	53.6% (n=208)	54.5% (n=60)
Year of study		
1 st year undergraduate	21.9% (n=85)	22.7% (n=25)
2 nd year undergraduate	22.9% (n=89)	19% (n=21)
3 rd year undergraduate	24.5% (n=95)	30% (n=33)
4 th year undergraduate	16.8% (n=65)	18% (n=20)
5 th year undergraduate	9.3% (n=36)	5.5% (n=6)
Graduate	4.6% (n=18)	4.5% (n=5)

Table 1 (continued)

Type of Sport		
Team sport ^b	71.4% (n=277)	65.5% (n=72)
Individual sport ^c	28.6% (n=111)	25.5% (n=38)
Year of sport participation		
First	29.4% (n=114)	27.3% (n=30)
Second	20.4% (n=79)	21.8% (n=24)
Third	24.7% (n=96)	30.9% (n=34)
Fourth	16% (n=62)	12.7% (n=14)
Fifth	9.5% (n=37)	7.3% (n=8)
Previous mental illness diagnosis	12% (n=46)	18%(n=20)

Note. ^a 37 individuals did not provide sufficient data to be classified; ^b Team sport = basketball, football, volleyball, soccer, rugby, ice hockey, field hockey, curling, baseball; ^c Individual sport = athletics, swimming, rowing, badminton, fencing, skiing, squash, wrestling.

Appendix B

Recruitment text provided to Athletic Directors

  Dear coach, The CIS has agreed to assist Ms. Krista Van Slingerland, a Master's Candidate and student-athlete from the University of Ottawa by circulating through our channels an invitation for student-athletes to participate in her study. You are receiving this email because your institution's Research Ethics Board has approved the project and the recruitment of your student-athletes. We have the chance to be part of groundbreaking research that will be used to establish a baseline of Canadian Interuniversity Sport (CIS) student-athletes' mental health functioning, and contribute to generating best practice, policy, and programming knowledge for student-athletes across the country. The purpose of Ms. Van Slingerland's study is to examine CIS student-athlete' mental health functioning, stress, mood states, self-regulation capacity, and perceptions of their coaching climate to determine if they are optimally functioning. By completing a brief online survey in November 2015 and in March 2016, your student-athletes will help to generate a baseline regarding this population's mental health and well-being. Research is being completed in partnership with the Student Athlete Mental Health Initiative (SAMHI, www.samhi.ca), a non-profit organization whose mission is to protect and promote the mental health of CIS student-athletes. This study will include a nationally representative sample and it is hoped that it will contribute to the creation of a mental health policy for the CIS. Please help us by copying and pasting the following text in an email to your student-athletes:	  Cher/chère entraîneur, Le SIC a accepté de faciliter le recrutement d'étudiants-athlètes pour une étude menée par Mme Krista Van Slingerland, une étudiante à la maîtrise et une étudiante-athlète de l'Université d'Ottawa. Vous recevez ce courriel aujourd'hui car le bureau d'éthique de votre université a approuvé le projet et le recrutement de vos étudiants-athlètes. Nous avons la chance de participer à une étude innovatrice qui servira à établir une base de données sur la santé mentale des étudiants-athlètes participant à un sport interuniversitaire canadien (SIC) et mettre en place des pratiques exemplaires, des politiques et des programmes pour les étudiants-athlètes à travers le pays. L'objectif de l'étude menée par Mme Van Slingerland est d'examiner la santé mentale, le stress, l'humeur, la capacité d'autorégulation et les perceptions de l'entraîneur des étudiants-athlètes du SIC afin de déterminer s'ils fonctionnent de façon optimale. En complétant un questionnaire en ligne au mois de novembre 2015 et au mois de mars 2016, ces étudiants-athlètes nous aideront à établir des données de base sur la santé mentale et le bien-être de cette population. Cette recherche est menée en partenariat avec l'Initiative santé mentale pour étudiants-athlètes (ISMÉA, www.samhi.ca), une organisation à but non lucratif dont la mission est de protéger et promouvoir la santé mentale des étudiants-athlètes SIC. Cette étude comprendra un échantillon représentatif à l'échelle nationale et on espère qu'elle contribuera à la création d'une politique sur la santé mentale pour le SIC. Veuillez nous aider en copiant et en collant le texte suivant dans un courriel destiné à vos étudiants-athlètes:
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  Dear CIS student-athlete, You are invited to participate in a national study examining the mental health functioning, stress, mood states, self-regulation, and perceived coaching climate in student-athletes competing in CIS sport. Researchers: This research is being conducted as part of Krista Van Slingerland's Master's thesis under the supervision of Natalie Durand-Bush, Ph.D., School of Human Kinetics, Faculty of Health Sciences, University of Ottawa, kvans097@uottawa.ca or ndbush@uottawa.ca. This study is important because research shows that the unique circumstances of student-athletes can make them more vulnerable to diminished mental health than regular university students. While a considerable amount of work has been done with American student-athletes, relatively little is known about the well-being of CIS athletes. As such, we want to know if CIS student-athletes are optimally functioning or if they are experiencing decreased mental health. It is our hope that this study will help establish a baseline understanding of Canadian student-athlete mental health functioning and contribute to best practice, policy, and programming for student-athletes across the country. Please note that this study is being conducted separately from your academic institution and team/coach. Neither the university's administration nor your team/coach will be aware of the student-athletes participating in this study. Also, there will be no repercussions for those who choose not to participate or who withdraw from the study. If you agree to participate, your involvement will consist of completing a survey pertaining to the aforementioned variables via a secure website at two different time points (November 2015 and March 2016). This will take approximately 15-20 minutes each time. Please click on the following link to access the consent form and take part in this study:	  Cher étudiant-athlète du SIC, Vous êtes invité à participer à une étude nationale examinant la santé mentale, le stress, l'humeur, l'autorégulation et les perceptions de l'entraîneur chez les étudiants-athlètes participant à un sport interuniversitaire canadien (SIC). Chercheurs: Cette étude est menée par Krista Van Slingerland dans le cadre de sa thèse de maîtrise, sous la direction de Natalie Durand-Bush, Ph.D., École des sciences de l'activité physique, Faculté des sciences de la santé, Université d'Ottawa, kvans097@uottawa.ca ou ndbush@uottawa.ca. Cette étude est importante parce que la recherche démontre que les circonstances uniques entourant les étudiants-athlètes peuvent les rendre plus vulnérables à une santé mentale compromise que les étudiants réguliers fréquentant l'université. Bien qu'il y ait des données sur le bien-être des étudiants-athlètes américains, il y en a peu au sujet des athlètes du SIC. Par conséquent, nous voulons connaître si les étudiants-athlètes du SIC fonctionnent de façon optimale ou s'ils présentent une santé mentale réduite. Nous espérons que cette étude servira à établir des données de base afin de comprendre la santé mentale chez les étudiants-athlètes canadiens et mettre en place des pratiques exemplaires, des politiques et des programmes pour les étudiants-athlètes à travers le pays. Veuillez noter que cette étude est menée indépendamment de votre université et de votre équipe/entraîneur. Votre université, votre équipe et votre entraîneur ne seront pas conscients des étudiants-athlètes qui participent à cette étude. De plus, il n'y aura aucune répercussion négative pour ceux qui choisissent de ne pas participer ou qui se retirent de cette étude. Si vous acceptez de faire partie de cette étude, votre participation consistera à remplir un questionnaire à deux reprises (novembre 2015 et mars 2016). Ce questionnaire est relatif aux variables mentionnées ci-haut et est accessible via un site Web sécurisé. Il vous faudra environ 15-20 minutes pour compléter le questionnaire à chaque reprise. Veuillez cliquer sur le lien suivant pour accéder au formulaire de consentement et prendre part à cette étude:
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<https://www.surveymonkey.com/r/HND6L3D>

Appendix C

CIS endorsement letter

Tuesday August 4, 2015

**Office of Research Ethics and Integrity
Tabaret Hall
154 - 550 Cumberland Street
Ottawa, ON, Canada
K1N 6N5**

To whom it may concern,

I am writing on behalf of Canadian Interuniversity Sport (CIS) in support of the research to be conducted over the coming 2015-16 academic and athletic year by Krista Van Slingerland (MA Candidate) and Dr. Natalie Durand-Bush of the University of Ottawa.

The CIS acknowledges and affirms that the study will inquire into the mental health functioning, stress, mood states, coaching climate and self-regulation of athletes competing in CIS sport. The role of the CIS in this study is simply to facilitate the dissemination of electronic invitations to student-athletes of member institutions, inviting them to participate in the research at two time points (October 2015 and March 2016). As the CIS does not have access to the contact information for the athletes under its jurisdiction, email invitations will be sent to the Athletic Directors of all 56 CIS-member schools, asking that these individuals please forward the invite on to their athletes. The CIS will not coerce or pressure any individual to participate, nor will they be responsible for the response rate of the study.

Should you have any questions or concerns, please do not hesitate to contact me.

Sincerely,

Canadian Interuniversity Sport (CIS)
Interim Chief Operating Officer
dlove@universitiesport.ca
613-562-5670



CANADIAN INTERUNIVERSITY SPORT • SPORT INTERUNIVERSITAIRE CANADIEN
801 King Edward, Suite N205 • Ottawa ON Canada K1N 6N5
TEL 613 562 5670 • FAX 613 562 5669
WWW.CIS-SIC.CA



Appendix D
Recruitment Text: SAMHI website

Research suggests that the unique circumstances of student-athletes can make them more vulnerable to diminished mental health than regular university students. Watson and Kissinger (2007) found that the Division 1 intercollegiate athletes in their sample reported lower levels of wellness than did their non-athlete peers. In fact, student-athletes experience mental illness at the same rate as the general university student population, which means one in four will experience distress over their academic and athletic careers. The NCAA is starting to address these problems, will we follow suit in Canada?

The CIS has policies on drug education and doping control, harassment, discrimination, gender equality and eligibility, but no policy currently exists to address the role that Canadian sport governing bodies and coaches play in the mental-health of student-athletes because no research to support such a policy currently exists. Until now. We are conducting a study to establish a baseline understanding of the mental health functioning and well-being of CIS student-athletes, to contribute to best practice, coach education, policy, and programming for student-athletes across the country.

Help us by clicking on the following link to complete a brief survey at two different time points (October 2015 and March 2016): <https://www.surveymonkey.com/r/HND6L3D>. By investing 15-20 minutes of your time each time, you will be paving the way for future student-athletes to enjoy healthy and successful university athletic and academic careers, thereby elevating the level of competition within Canadian sport and improving student-athlete quality of life.

Appendix E

Recruitment Text: SAMHI social media platforms

PEOPLE ALSO LIKE


Acadia Athletics
 College & University


Canadian Interuniversity Sport / ...
 Sports League


CWHL
 Sports League

LIKED BY THIS PAGE >


Stephen Amell


Bell Let's Talk


CAAWS

English (UK) · English (US) · Français (France) · Español · Português (Brasil)



Student Athlete Mental Health Initiative - SAMHI
Published by Sam Delly · 10 November 2015 ·

Cher étudiant-athlète du SIC!

Étant donné le nombre restreint de données au sujet de la santé mentale des étudiants-athlètes du SIC en comparaison aux données d'étudiants-athlètes américaines, nous souhaitons établir des données de base afin de comprendre et protéger votre santé mentale et ainsi mettre en place des pratiques exemplaires, des politiques et des programmes pour vous.

Participez à cette étude nationale au sujet de la santé mentale chez les étudiants-athlètes du SIC, qui fait partie du projet de thèse de Maîtrise de notre co-fondatrice Krista! Cela prendra seulement 10 à 15 minutes! Vous pouvez également nous aider en partageant cette publication afin qu'elle fasse le tour du pays!

<https://www.surveymonkey.com/s/VQ2GTQ3>



Are you a CIS student athlete? | Êtes-vous un étudiant-athlète du SIC?

You are invited to participate in a national study examining the mental health functioning, stress,...

SURVEYMONKEY.COM

728 people reached
Boost post

Like
Comment
Share

THIS WEEK

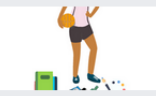
15
Post Reach

5
Post Engagement

0
Website Clicks

0 of 0
Response Rate

14 days
Response Time



Athletic Identity: Understa...
samhi.ca
Athlete Identity plays an important role in understanding the

Appendix F

Consent form: Time 1 (November, 2015), English

Title of study: Mental health functioning, stress, and mood states in Canadian Interuniversity Sport (CIS) student-athletes: Investigating the role of self-regulation and perceptions of coaching climate

Researchers: This research is being conducted as part of Krista Van Slingerland's Master's thesis under the supervision of Natalie Durand-Bush, Ph.D., School of Human Kinetics, Faculty of Health Sciences, University of Ottawa.

Dear CIS student-athlete,

You are invited to participate in a national study examining the mental health functioning, stress, mood states, self-regulation, and perceived coaching climate in student-athletes competing in CIS sport. This study is important because research shows that the unique circumstances of student-athletes can make them more vulnerable to diminished mental health than regular university students. While a considerable amount of work has been done with American student-athletes, relatively little is known about the well-being of CIS athletes. As such, we want to know if CIS student-athletes are optimally functioning or if they are experiencing decreased mental health. It is our hope that this study will establish a baseline understanding of Canadian student-athlete mental health functioning and contribute to best practice, policy, and programming for student-athletes across the country.

To be eligible to participate, you must be competing in the CIS during the 2015-2016 season and you must meet the academic requirements to compete in university sport (i.e., in accordance with CIS Eligibility Policy 40.10). Although you may not be competing due to an injury, you must still be attending practices and contributing to team functions to be able to participate in this study.

If you agree to participate, your involvement will consist of completing a survey at two time points (November 2015 and March 2016). This survey pertains to the aforementioned variables and can be accessed via a secure website. You will be asked to provide your official university email upon completion of the survey in November so that the researchers may send you an invitation to participate in March 2016. You will be asked to provide the same email upon completion of the survey in March so that the researchers may link your responses submitted in November and March. You are always free to withdraw from the study at any time; participation at Time 1 does not obligate you to participate at Time 2. Completion of the survey will take approximately 15-20 minutes each time.

BENEFITS

By participating in this research, you will increase our understanding of the level of functioning of student-athletes in Canadian university sport. The literature suggests that university students

are at risk of experiencing mental health problems due to elevated distress and low coping skills. Student-athletes must cope with many stressors in addition to those faced by their non-athlete peers. This study will not only bring the mental health and well-being of CIS athletes to light, it will help determine if the skill of self-regulation could help students stay healthy throughout their university career. Furthermore, it will examine the impact of the climate created by coaches, and hopefully this will improve coach education, best practice, and policy.

POTENTIAL RISKS

Some questions in the survey may be sensitive and cause discomfort, but you may refuse to answer them. You are also free to withdraw from this study at any point without adverse consequences. Should you feel that external support would be beneficial or required, you may seek support from your campus counseling services, or contact one of the resources outlined at the end of this form.

ETHICS

This research project has been approved by the Research Ethics Board of the University of Ottawa. Your participation is completely voluntary, and you may withdraw from the study at any time and/or refuse to answer questions without any negative consequences. Should you wish to withdraw your responses after you have submitted them, simply email the lead researcher, Krista Van Slingerland at any point during the study and your responses will be deleted from the database.

Your responses will remain anonymous and confidential. Any physical data such as printed statistical reports will be safely kept in Dr. Durand-Bush's laboratory in a locked cabinet. Electronic data will be saved on Dr. Durand-Bush's password protected computer. All of the data will be conserved for 5 years after completion of the project, after which it will be destroyed. As with any online surveys, the data collected through Survey Monkey will be stored in the company's database indefinitely, even after Dr. Durand-Bush cancels her account subscription. However, Survey Monkey has a strict privacy policy: "Your survey data is owned by you. We don't sell your responses to anyone or use them for purposes unrelated to you or our services". Since the survey is hosted through an American company, the data could be subject to the U.S. Patriot Act, which allows American authorities to access to it. In order to minimize the risk of security breaches and to help ensure your confidentiality, we recommend that you use standard safety measures such as signing out of your account, closing your browser and locking your screen or device when you are no longer using them or when you have completed the study. The information that you share may be used by Krista Van Slingerland and Dr. Durand-Bush in conference presentations and publications in scientific journals, however, your anonymity is guaranteed at all times. As a participant, you must be able to read English or French - the questionnaires are available in both official language. Please print a copy of this consent form and the mental health resources listed below for your records.

If you wish to participate please read the following instructions before clicking on the link to access the survey:

Once you begin completing the survey, you may scroll back and forth without losing responses. However, you must submit your responses before exiting the website, otherwise they will not be

saved. As such, please ensure that you have 20-30 minutes available to complete the survey before starting. If you are unable to finish for any reason, you will have to start over using the link you received.

It would be greatly appreciated if you could complete the survey at your earliest convenience. However, we recognize that you are very busy and you may require more time. For this reason, we have set a two-week deadline from the date you receive this email invitation to complete it.

If you have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON, K1N 6N5; Tel.: (613) 562-5387; Email: ethics@uottawa.ca

Thank you for your time and participation. Don't hesitate to contact the researchers should you have additional questions.

Sincerely,

Krista Van Slingerland (MA candidate)
Natalie Durand-Bush (PhD)
Faculty of Health Sciences, University of Ottawa, Ottawa, Ontario, Canada

Choose one of the two options and click "Next / Suivant" at the bottom of the page

TO BEGIN

- o I have read the above information and would like to PARTICIPATE in this study [click here].
- o I would like to WITHDRAW from this study [click here].

Mental health resources in your area:

British Columbia

Canadian Mental Health Association Crisis Line – serves the entire east Kootenay region, from Golden to the Alberta and USA borders

24-hour crisis line: 1-800-667-8407

Fraser Valley Regional Crisis Line – serves Mission, Abbotsford, Chilliwack, Agassiz/Harrison, Hope, Yale and Boston Bar

24-hour crisis line: 1-877-820-7444

Crisis Centre for Northern BC – serves all of Northern BC north of Quesnel

Youth line (4-11pm): 250-564-8336

24-hour crisis line: 1-888-562-1214

Alberta

Distress Centre Calgary – serves Calgary and surrounding area

24-hour crisis line: (403) 266-4357

The Support Network Distress Line – serves Edmonton and surrounding areas
(780) 482-HELP

St. Paul & District Crisis Centre – serves all Alberta and Northeastern Saskatchewan

24-hour crisis line: 1-800-263-3045

Crisis Intervention & Suicide Prevention Centre of BC – serves Vancouver, North Vancouver city & district, Bowen Island, West Vancouver and Burnaby

24-hour crisis line: 604-872-3311 Province-Wide British Columbia

24-hour crisis line: 1-800-SUICIDE

Saskatchewan

Mobile Crisis Service – serves Saskatoon

24 hour crisis line: (306) 933-6200

Prince Albert Mobile Crisis Unit

24-hour crisis line: (306) 764-1011

Regina Mobile Crisis Services

24 hour crisis line: (306) 525-5333

Manitoba

Mobile Crisis Unit (MCU) – serves Brandon and Assiniboine regions

24-hour crisis line: 1-888-379-7699

Klinic Community Health Centre – serves Winnipeg

24-hour crisis line: 1-888-322-3019

Ontario

Hamilton

905-522-1477

Kingston

Distress line: 613-544-1771

London & District:

Mental health crisis line: 519-433-2023

Ottawa & Region

Distress line: 613-238-3311

Toronto

Distress line: 416-408-4357

Waterloo Region

Distress line: 519-745-1166

Windsor & Essex County

Distress line: 519-256-5000

Quebec

Centre de prevention 24/7: 1-866-277-3553

New Brunswick

Chimo Helpline – serves all of New Brunswick, bilingual, 24 hours

Provincial toll-free crisis line: 1-800-667-5005

Fredericton area: 450-HELP

Nova Scotia

Feed Nova Scotia

24-Hour Youth crisis line: 1-800-420-3240

Mental Health Mobile Crisis Team – serves the Capital District, Halifax, Dartmouth Bedford

20-hour (9am-5am) crisis line: 902-4298167; toll free: 1-888-429-8167

Prince Edward Island

24-hour province-wide bilingual service: 1-800-218-2885

Newfoundland & Labrador

Mental Health Crisis Centre – serves Newfoundland and Labrador, 24-hour crisis line: 1-888-737-4668

Formulaire de consentement: Temps 1 (novembre, 2015), français

Titre de l'étude: Santé mentale, stress et humeur chez les étudiants-athlètes qui sont membres du Sport interuniversitaire canadien (SIC): le rôle de l'autorégulation et des perceptions face à l'entraîneur

Chercheurs: Cette étude est menée par Krista Van Slingerland dans le but de satisfaire les exigences de sa thèse de maîtrise, sous la direction de Natalie Durand-Bush, Ph.D., École des sciences de l'activité physique, Faculté des sciences de la santé, Université d'Ottawa.

Cher étudiant-athlète du SIC,

Vous êtes invité à participer à une étude nationale examinant la santé mentale, le stress, l'humeur, l'autorégulation et les perceptions face à l'entraîneur chez les étudiants-athlètes participant à un sport interuniversitaire canadien (SIC). Cette étude est importante parce que la recherche démontre que les circonstances uniques entourant les étudiants-athlètes peuvent les rendre plus vulnérables à une santé mentale compromise que les étudiants réguliers fréquentant l'université. Bien qu'il y ait des données sur le bien-être des étudiants-athlètes américains, il y en a peu au sujet des athlètes du SIC. Par conséquent, nous voulons connaître si les étudiants-athlètes du SIC fonctionnent de façon optimale ou s'ils présentent une santé mentale réduite. Nous espérons que cette étude servira à établir des données de base afin de comprendre la santé mentale chez les étudiants-athlètes canadiens et mettre en place des pratiques exemplaires, des politiques et des programmes pour les étudiants-athlètes à travers le pays.

Afin de pouvoir participer, vous devez être inscrit au SIC pendant la saison 2015-2016 et vous devez rencontrer les exigences du SIC au niveau du plan des études (i.e., selon les règlements d'admissibilité énumérés dans la politique 40.10). Si vous ne participez pas aux compétitions car vous êtes blessé, vous devez tout de même être présent aux entraînements et contribuer aux activités de l'équipe afin d'être admissible à cette étude.

Si vous acceptez de faire partie de cette étude, votre participation consistera à remplir un questionnaire à deux reprises (novembre 2015 et mars 2016). Ce questionnaire est relatif aux variables mentionnées ci-haut et est accessible via un site Web sécurisé. On vous demandera de fournir votre compte courriel universitaire officiel à la fin du questionnaire que vous complétez au mois de novembre afin que les chercheurs puissent vous envoyer une invitation à participer au mois de mars 2016. On vous demandera de fournir le même courriel au mois de mars afin que les chercheurs puissent associer vos réponses fournies au mois de novembre et au mois de mars. Vous pouvez toujours vous retirer de cette étude à tout moment; votre participation en novembre vous n'oblige pas à participer au mois de mars. Il vous faudra environ 15-20 minutes pour compléter le questionnaire à chaque reprise.

BÉNÉFICES

En participant à cette étude, vous nous aiderez à mieux comprendre le niveau de fonctionnement des étudiants-athlètes pratiquant un sport universitaire canadien. La littérature suggère que les étudiants universitaires avec un niveau de stress élevé et de faibles aptitudes d'adaptation peuvent vivre des problèmes de santé mentale. Les étudiants-athlètes doivent gérer de nombreuses demandes additionnelles comparativement aux étudiants qui ne sont pas athlètes.

Cette étude mettra au point la santé mentale et le bien-être des athlètes du SIC ainsi que le rôle des aptitudes d'autorégulation. De plus, l'étude visera l'impact de l'environnement créé par les entraîneurs, ce qui pourrait contribuer à leur formation, leur pratique, et une politique sur la santé mentale.

RISQUES POTENTIELS

Certains énoncés provenant du questionnaire pourraient causer de l'inconfort, mais vous pouvez choisir de ne pas y répondre. Vous êtes également libre de vous retirer de cette étude à tout moment sans conséquences. Si vous sentez qu'un soutien externe vous serait bénéfique ou nécessaire, vous pouvez consulter les services de counseling sur votre campus ou les ressources incluses à la fin de ce document.

ÉTHIQUE

Ce projet de recherche a reçu l'approbation du Bureau d'éthique et d'intégrité de la recherche de l'Université d'Ottawa. Votre participation est entièrement volontaire et vous pouvez vous retirer de l'étude à tout moment et/ou refuser de répondre à des questions sans conséquences négatives. Si vous désirez vous retirer de l'étude, veuillez sil-vous-plaît en aviser la chercheuse principale Krista Van Slingerland par courriel et vos réponses seront supprimées de la base de données.

Vos réponses resteront anonymes et confidentielles. Toutes données physiques, telles que les rapports statistiques imprimés, seront conservées de façon sécuritaire dans le laboratoire du Dr. Durand-Bush dans une armoire fermée à clef. Les données électroniques seront sauvegardées sur l'ordinateur du Dr. Durand-Bush qui est protégé par un mot de passe. Toutes les données seront conservées pendant 5 ans après la fin de ce projet, après quoi elles seront détruites. Comme toutes données recueillies en ligne, les données recueillies par l'intermédiaire de Survey Monkey seront sauvegardées dans la base de données de la compagnie indéfiniment, même après que le Dr. Durand-Bush annule son compte. Cependant, Survey Monkey a une politique de confidentialité stricte: « Les données que vous avez fournies vous appartiennent. Nous ne partageons pas vos réponses et ne les utilisons pas pour des raisons non liées à vous ou à nos services ». Du fait que Survey Monkey est une compagnie américaine, les données peuvent être sujettes au U.S. Patriot Act, qui permet aux autorités américaines d'y accéder. Afin de minimiser les risques de bris de sécurité et assurer la confidentialité, nous vous recommandons d'utiliser des mesures de sécurité de base telles que fermer votre session, fermer votre navigateur et verrouiller votre écran ou votre appareil lorsque vous ne l'utilisez plus ou lorsque vous avez complété le questionnaire. Les informations que vous partagez pourront être utilisées par Krista Van Slingerland et le Dr. Durand-Bush pour des présentations et des publications dans des journaux scientifiques. Cependant, votre anonymat est garanti à tout moment. En tant que participant, vous devez pouvoir lire en anglais ou en français; le questionnaire est disponible dans les deux langues officielles. Veuillez imprimer une copie de ce formulaire de consentement ainsi que la liste des ressources de santé mentale énumérées ci-dessous pour vos dossiers.

Si vous désirez participer, veuillez lire les instructions suivantes avant de cliquer sur le lien ci-dessous pour accéder au questionnaire:

Une fois que vous commencez à remplir le questionnaire, vous pouvez avancer ou retourner en arrière sans perdre vos réponses. Cependant, vous devez soumettre vos réponses avant de fermer

le site Web, sinon, elles ne seront pas sauvegardées. Dès lors, assurez-vous d'avoir 20 à 30 minutes à votre disponibilité pour remplir le questionnaire avant de commencer. Si vous ne pouvez pas terminer pour quelque raison que ce soit, vous devrez recommencer en utilisant le lien que vous avez reçu.

Nous apprécierions si vous pouviez remplir le questionnaire dès que possible. Cependant, nous reconnaissons que vous êtes très occupé et que vous aurez peut-être besoin de plus de temps. Pour cette raison, nous avons déterminé une date limite de deux semaines à partir de la date à laquelle vous recevez cette invitation par courriel pour remplir le questionnaire en ligne.

Pour tout renseignement sur les aspects éthiques de cette recherche, veuillez vous adresser au Responsable de l'éthique en recherche, Université d'Ottawa, Pavillon Tabaret, 550, rue Cumberland, pièce 154, (613) 562-5387 ou ethics@uottawa.ca.

Merci pour votre temps et votre participation. Veuillez communiquer avec nous si vous désirez des renseignements additionnels.

Sincèrement,

Krista Van Slingerland (candidate MA)

Natalie Durand-Bush (PhD)

École des sciences de l'activité physique, Université d'Ottawa, Ottawa, Ontario, Canada

AVANT DE COMMENCER

o J'ai lu les informations ci-dessus et je souhaite PARTICIPER à cette étude [cliquer ici].

o Je souhaite me RETIRER de cette étude [cliquer ici].

Ressources de santé mentale dans votre région:

Colombie-Britannique

Canadian Mental Health Association Crisis Line – dessert toute la région est de Kootenay, de Golden aux frontières de l'Alberta et des E-U

Ligne de crise disponible en tout temps: 1-800-667-8407

Fraser Valley Regional Crisis Line – dessert Mission, Abbotsford, Chilliwack, Agassiz/Harrison, Hope, Yale et Boston Bar

Ligne de crise disponible en tout temps: 1-877-820-7444

Crisis Centre for Northern BC – dessert tout le nord de la C.-B. au nord de Quesnel

Ligne de crise pour les jeunes (4-11pm): 250-564-8336

Ligne de crise disponible en tout temps: 1-888-562-1214

Crisis Intervention & Suicide Prevention Centre of BC – dessert Vancouver, le nord de la ville de Vancouver, Bowen Island, l'ouest de Vancouver et Burnaby

Ligne de crise disponible en tout temps: 604-872-3311

Pour toute la province de la Colombie-Britannique

Ligne de crise disponible en tout temps: 1-800-SUICIDE

Alberta

Distress Centre Calgary – dessert Calgary et environs

Ligne de crise disponible en tout temps: (403) 266-4357

The Support Network Distress Line – dessert Edmonton et environs
(780) 482-HELP

St. Paul & District Crisis Centre – dessert toute la province d’Alberta et le nord-est de la Saskatchewan

Ligne de crise disponible en tout temps: 1-800-263-3045

Saskatchewan

Mobile Crisis Service – dessert Saskatoon

Ligne de crise disponible en tout temps: (306) 933-6200

Prince Albert Mobile Crisis Unit

Ligne de crise disponible en tout temps: (306) 764-1011

Regina Mobile Crisis Services

Ligne de crise disponible en tout temps: (306) 525-5333

Manitoba

Mobile Crisis Unit (MCU) – dessert les régions de Brandon et Assiniboine

Ligne de crise disponible en tout temps: 1-888-379-7699

Klinic Community Health Centre – dessert Winnipeg

Ligne de crise disponible en tout temps: 1-888-322-3019

Ontario

Hamilton

905-522-1477

Kingston

Ligne de crise disponible en tout temps: 613-544-1771

London et région

Mental health crisis line: 519-433-2023

Ottawa et région

Ligne d’écoute: 613-238-3311

Sudbury & Région

1-866-856-9276

Ligne de crise: 1-877-841-1101

Toronto

Ligne d’écoute: 416-408-4357

Région de Waterloo

Ligne d’écoute: 519-745-1166

Comté de Windsor et Essex
Ligne d'écoute: 519-256-5000

Québec

Centre de prévention 24/7: 1-866-277-3553

Nouveau- Brunswick

Ligne d'entraide Chimo – dessert tout le Nouveau-Brunswick, bilingue, disponible en tout temps
Ligne d'écoute téléphonique provinciale sans frais: 1-800-667-5005
Région de Fredericton: 450-HELP

Nouvelle-Écosse

Mental Health Mobile Crisis Team – dessert le Capital District, Halifax, Dartmouth, Bedford
Ligne d'écoute disponible en tout temps: 902-4298167; sans frais: 1-888-429-8167

Île-du-Prince-Édouard

Service provincial bilingue disponible en tout temps: 1-800-218-2885

Terre-Neuve et Labrador

Mental Health Crisis Centre – dessert Terre-Neuve et Labrador
Ligne d'écoute disponible en tout temps: 1-888-737-4668

Appendix G
Invitation to Participate at Time 2 – Link to Questionnaire and Consent (EN/FR)

Hello CIS student-athletes!

Thank you for agreeing to participate for a second and final time in the **Canadian Interuniversity Sport (CIS) Student-Athlete Mental Health Survey!**

We are conducting a second round of data collection so that we may compare your mental health and related indices at two times during your seasons and academic year. I'd like to offer my sincerest thanks for taking the time to complete these surveys. **Please click on the link below to access the survey:**

<https://www.surveymonkey.com/r/NKHS8HJ>

Sincerely,

Krista Van Slingerland

Bonjour chers étudiants-athlètes du SIC!

Merci d'avoir accepté de participer à cette deuxième et dernière partie du Sondage sur la santé mentale des étudiants-athlètes du Sport Interuniversitaire Canadien (SIC)!

Nous en sommes à la deuxième étape de collecte de données qui nous permettra de comparer nos indicateurs de santé mentale à deux différents moments de votre saison et année scolaire. Je vous remercie grandement pour le temps que vous avez investi pour compléter ces questionnaires.

Veuillez cliquer sur le lien suivant pour accéder au sondage:

<https://www.surveymonkey.com/r/NKHS8HJ>

Sincèrement,

Krista Van Slingerland

Appendix H
Demographic Questionnaire (EN/FR)

1. Gender:

- ☐ Male
- ☐ Female
- ☐ You don't have an option that applies to me. I identify as (please specify)_____

2. Age: _____

3. Primary language: French ☐ English ☐ Other ☐ Please specify _____

4. Ethnicity:

- ☐ English Canadian
- ☐ French Canadian
- ☐ Aboriginal
- ☐ British
- ☐ German
- ☐ Scottish
- ☐ Irish
- ☐ Dutch
- ☐ Scandinavian
- ☐ Asian
- ☐ Russian
- ☐ East Indian
- ☐ Chinese
- ☐ African
- ☐ Arab
- ☐ South American
- ☐ Caribbean
- ☐ Eastern European
- ☐ Southern European
- ☐ Other (please specify) _____

5. Marital status:

- ☐ Single
- ☐ In a relationship
- ☐ Married
- ☐ Separated
- ☐ Divorced
- ☐ Widowed

6. Number of dependent children under 18 years of age (indicate 0 if you have no children):

7. At what academic institution do you currently study (e.g., University of Ottawa)?

8. In what university program are you currently enrolled (e.g., Human Kinetics, Psychology, Biology)?: _____

9. Please indicate your year of study (as considered official by your academic institution):

- ☐ First year undergraduate
- ☐ Second year undergraduate
- ☐ Third year undergraduate
- ☐ Fourth year undergraduate
- ☐ Fifth year undergraduate
- ☐ Master's
- ☐ PhD

10. How many courses are you taking/registered in each semester this year?

Fall 2015 semester _____

Winter 2016 semester _____

Spring/Summer 2016 semester _____

11. How many hours per week do you typically dedicate to:

- a. studying / doing homework for your courses _____
- b. training / competing for your sport _____
- c. working (if you have a job) _____

12. Please classify your living situation as one of the following:

- ☐ On-campus (in residence)
- ☐ Off-campus (with family)
- ☐ Off-campus (without family)

13. In what CIS sport(s) are you competing in this year? (e.g., badminton [doubles], badminton [singles], basketball, cross-country, curling, fencing, figure skating, football, hockey, rugby, soccer, swimming, track, volleyball, wrestling)

Sport 1: _____

Sport 2: _____

14. In what year of athletic eligibility are you currently competing?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5

15. Please check one or more items based on what currently best describes you:

- ☐ Starter
- ☐ Non-starter
- ☐ Starter / non-starter do not apply to me
- ☐ I do not know if I'm a starter or non-starter
- ☐ Redshirt (I am not using a year of eligibility this season)
- ☐ Injured

15a. If injured, please indicate the type and date of injury (ex. broken ankle - September 5, 2012): _____

16. What is the gender of your head coach, or the coach with whom you have the most contact?

Male ☐ Female ☐

17. Please identify the five greatest stressors you experience as a university student-athlete (consider the dual role you play, the demands you face, and the resources / coping skills you have when answering):

- 1.
- 2.
- 3.
- 4.
- 5.

18. Please identify one 7-day period (Monday to Sunday) during each semester (Fall and Winter) when you perceive your workload as a student-athlete to be the greatest (ex. Fall: October 12-18, 2014; Winter: March 7-13, 2015):

Fall: _____

Winter: _____

19. When answering the following questions, please keep in mind the definition of “a drink”, which consists of either:

12 oz (360 ml) bottle (or can) of beer

4 oz (120 ml) glass of wine

12 oz (360 ml) bottle (or can) of cooler

1.25 oz (37 ml) shot of liquor, straight or in a mixed drink

19a. When did you last have a drink?

- ☐ a. Never
- ☐ b. Not in the past year
- ☐ c. Within the last year, but more than 30 days ago
- ☐ d. Within 30 days, but more than 1 week ago
- ☐ e. Within the last week

If you answered d. or e. in the previous question, please answer the following:

19b. On how many occasions have you had a drink of alcohol in the past 30 days?

- ☐ 1 to 2 occasions
- ☐ 3 to 5 occasions
- ☐ 6 to 9 occasions
- ☐ 10 or more occasions

19c. If you are male: Think back over the last two weeks, how many times have you had **five** drinks or more in a row?

- ☐ None
- ☐ Once
- ☐ Twice
- ☐ Three or more

19d. If you are female: Think back over the last two weeks, how many times have you had **four** drinks or more in a row?

- ☐ None
- ☐ Once
- ☐ Twice
- ☐ Three or more

20. Have you been previously diagnosed with a mental illness (ex. depression, anorexia nervosa, bipolar disorder, anxiety disorder, attention deficit disorder, obsessive-compulsive disorder, alcohol abuse) by a medical professional (ex. psychologist, psychiatrist, physician)?

- ☐ Yes
- ☐ No

If yes, please indicate the mental illness(es) and the date (month and year) you were diagnosed (ex. depression, October 2013) if you feel comfortable doing so:

21. Are you currently taking medication to treat a mental illness?

- ☐ Yes
- ☐ No

Questionnaire démographique
(le genre masculin fut utilisé afin d'alléger le texte)

1. Sexe:

- ☐ Masculin
- ☐ Féminin
- ☐ Vous n'avez pas d'option qui s'applique à mon cas. Je m'identifie comme étant (veuillez spécifier)_____.

2. Âge: _____

3. Première langue: Français ☐ Anglais ☐ Autre ☐ Veuillez spécifier : _____

4. Ethnicité:

- ☐ Canadien anglophone
- ☐ Canadien francophone
- ☐ Autochtone
- ☐ Anglais
- ☐ Allemand
- ☐ Écossais
- ☐ Irlandais
- ☐ Néerlandais
- ☐ Scandinave
- ☐ Asiatique
- ☐ Russe
- ☐ Indien de l'Est
- ☐ Chinois
- ☐ Africain
- ☐ Arabe
- ☐ Sud Américain
- ☐ des Caraïbes
- ☐ Européen de l'Est
- ☐ Européen du Sud
- ☐ Autre (veuillez spécifier) _____

5. État civil:

- ☐ Célibataire
- ☐ En couple
- ☐ Marié
- ☐ Séparé
- ☐ Divorcé
- ☐ Veuf

6. Nombre d'enfants à charge de moins de 18 ans (indiquez 0 si vous n'avez pas d'enfants):

7. À quelle université et dans quel programme êtes-vous inscrit présentement?

Université (ex. Université d'Ottawa): _____

Programme (ex. sciences de l'activité physique, psychologie, biologie): _____

8. Veuillez spécifier votre année d'études officielle selon votre institution:

- ☐ Premier cycle – première année
- ☐ Premier cycle – deuxième année
- ☐ Premier cycle – troisième année
- ☐ Premier cycle – quatrième année
- ☐ Premier cycle – cinquième année
- ☐ Maîtrise
- ☐ Doctorat

9. Combien de cours suivez-vous ou à combien de cours êtes-vous inscrits à chaque session cette année?

Session d'automne 2015 _____

Session d'hiver 2016 _____

Session de printemps/été 2016 _____

10. Combien d'heures par semaine dédiez-vous généralement à:

- a. étudier / faire vos devoirs pour vos cours: _____
- b. vous entraîner / faire de la compétition pour votre sport: _____
- c. travailler (si vous avez un emploi): _____

11. Veuillez choisir la catégorie qui correspond le mieux à votre situation de logement:

- ☐ Sur le campus (en résidence)
- ☐ Hors-campus (avec votre famille)
- ☐ Hors-campus (sans votre famille)

12. Dans quel(s) sport(s) du SIC participez-vous en ce moment?

Sport 1: _____ (ex. athlétisme, badminton [double], badminton [simple], basketball, cross-country, curling, escrime, football, hockey, lutte, natation, patinage artistique, rugby, soccer, volleyball)

Sport 2 (le cas échéant): _____

13. Combien d'années d'admissibilité avez-vous complété présentement?

- ☐ moins d'une année
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5

14. Veuillez cocher une ou plusieurs des cases suivantes décrivant votre situation actuelle:

- ☐ Joueur partant
- ☐ Joueur non partant
- ☐ Joueur partant / non partant ne s'applique pas à moi
- ☐ Je ne sais pas si je suis un joueur partant ou non partant
- ☐ "Redshirt" (vous n'utilisez pas une année d'admissibilité cette saison)
- ☐ Blessé

Si vous êtes blessé, veuillez spécifier le type et la date de votre blessure (ex. ligament croisé antérieur – 5 septembre 2012): _____

15. Quel est le sexe de votre entraîneur-chef ou celui avec lequel vous êtes le plus en contact?

Homme ☐ Femme ☐

16. Veuillez identifier vos cinq plus grandes sources de stress en tant qu'étudiant-athlète à l'université (en formulant votre réponse, pensez au double rôle que vous jouez, les demandes auxquelles vous faites face, vos aptitudes et les ressources à votre disposition):

- 1.
- 2.
- 3.
- 4.
- 5.

17. Veuillez identifier une période de sept jours (lundi à dimanche) durant chaque semestre (automne et hiver) pendant laquelle vous croyez que votre charge de travail en tant qu'étudiant-athlète est la plus élevée (ex. automne: 12 au 18 octobre, 2014; hiver: 7 au 13 mars, 2015).

Automne: _____

Hiver: _____

18. Lorsque vous répondrez aux questions suivantes, gardez en tête les définitions suivantes d'une consommation d'alcool:

Bouteille (ou cannette) de bière de 12 oz (360 ml)

Verre de vin de 4 oz (120 ml)

Bouteille (ou cannette) de *cooler* de 12 oz (360 ml)

Shooter de spiritueux, mélangé ou non, de 1.25 oz (37 ml)

18a. À quand remonte votre dernière consommation d'alcool?

- ☐ a. Jamais
- ☐ b. Aucune dans la dernière année
- ☐ c. Durant la dernière année, il y a plus de 30 jours
- ☐ d. Durant les 30 derniers jours, il y a plus d'une semaine
- ☐ e. Au cours de la dernière semaine

Si vous avez répondu d. ou e. à la question 18a, veuillez répondre aux questions suivantes:

18b. À combien de reprises avez-vous consommé de l'alcool dans les 30 derniers jours?

- ☐ 1 à 2 reprises
- ☐ 3 à 5 reprises
- ☐ 6 à 9 reprises
- ☐ 10 reprises ou plus

18c. Si vous êtes un homme: Dans les deux dernières semaines, à combien de reprises avez-vous pris cinq consommations d'alcool ou plus de suite?

- ☐ Jamais
- ☐ Une fois
- ☐ Deux fois
- ☐ Trois fois ou plus

18d. Si vous êtes une femme: Dans les deux dernières semaines, à combien de reprises avez-vous pris quatre consommations d'alcool ou plus de suite?

- ☐ Jamais
- ☐ Une fois
- ☐ Deux fois
- ☐ Trois fois ou plus

19. Avez-vous déjà été atteint d'un trouble mental (ex. dépression, anorexie, trouble bipolaire, trouble anxieux, trouble du déficit de l'attention, trouble obsessionnel compulsif, troubles liés à l'alcool) attesté par un diagnostic ou par une évaluation effectuée par un professionnel habilité (ex. psychologue, psychiatre, médecin)?

- ☐ Oui
- ☐ Non

Si oui, veuillez indiquer le(s) trouble(s) mental(aux) ainsi que la date (mois et année) à laquelle vous avez reçu le diagnostic (ex. dépression, octobre 2013): _____

20. Prenez-vous présentement des médicaments pour traiter un trouble mental?

- ☐ Oui
- ☐ Non

Appendix I
Adult Mental Health Continuum Short Form (MHC-SF)
Keyes, 2002 (English)

During the past month, how often did you feel...	NEVER	ONCE OR TWICE	ABOUT ONCE A WEEK	ABOUT 2 OR 3 TIMES A WEEK	ALMOST EVERY DAY	EVERY DAY
1. happy						
2. interested in life						
3. satisfied with life						
4. that you had something important to contribute to society						
5. that you belonged to a community						
6. that our society is a good place, or is becoming a better place for people like you						
7. that people are basically good						
8. that the way our society works makes sense to you						
9. that you liked most parts of your personality						
10. good at managing the responsibilities in your daily life						
11. that you had warm and trusting relationships with others						
12. that you had experiences that challenged you to grow and become a better person						
13. confident to think or express your own ideas and opinions						
14. that your life has a sense of direction and meaning to it						

MHC-SF - français (Statistics Canada, 2012)

<i>Au cours du dernier mois, à quelle fréquence vous êtes-vous senti</i>	Jamais	Une fois ou deux	Environ 1 fois par semaine	Environ 2 ou 3 fois par semaine	Presque tous les jours	Tous les jours
	0	1	2	3	4	5
1. heureux						
2. intéressé par la vie						
3. satisfait à l'égard de votre vie						
4. que vous aviez quelque chose d'important à apporter à la société						
5. que vous aviez un sentiment d'appartenance à une collectivité (comme un groupe social, votre quartier, votre ville, votre école)						
6. que notre société devient un meilleur endroit pour les gens comme vous						
7. que les gens sont fondamentalement bons						
8. que le fonctionnement de la société a du sens pour vous						
9. que vous aimiez la plupart des facettes de votre personnalité						
10. que vous étiez bon pour gérer les responsabilités de votre quotidien						
11. que vous aviez des relations chaleureuses et fondées sur la confiance avec d'autres personnes						
12. que vous vivez des expériences qui vous poussent à grandir et à devenir une meilleure personne						
13. capable de penser ou d'exprimer vos propres idées et opinions						
14. que votre vie a un but ou une signification						

Appendix J
Student-Life Stress Inventory (Gadzella, 1991; English)

Rate your overall level of stress as 1=Mild, 2=Moderate, 3=Severe _____

This inventory contains statements dealing with student-athlete life stress. Read it carefully and respond to each statement as it is relating to you as a student-athlete. Use the following to indicate your experiences:

1=Never, 2=Seldom, 3=Occasionally, 4=Often, 5=Most of the time

I. STRESSORS:

A. As a student-athlete:

1. I have experienced frustrations due to delays in reaching my goal
2. I have experienced daily hassles which affected me in reaching my goals
3. I have experienced lack of sources (money for car, books, etc.)
4. I have experienced failures in accomplishing the goals that I set
5. I have not been accepted socially (become as social outcast)
6. I have experienced dating frustrations
7. I feel I was denied opportunities in spite of my qualifications

B. I have experienced conflicts, which were:

8. Produced by two or more desirable alternatives
9. Produced by two or more undesirable alternatives
10. Produced when a goal had both positive and negative alternatives

C. I have experienced pressures:

11. As a result of competition (on grades, work, sport, relationships with significant other and/or friends)
12. Due to deadlines (papers due, payments to be made, etc.)
13. Due to an overload (attempting too many things at one time)
14. Due to interpersonal relationships (family and/or teammate/friend's expectations, work responsibilities)

D. I have experienced:

15. Rapid unpleasant changes
16. Too many changes occurring at the same time
17. Changes which disrupted my life and/or goals

E. As a person:

18. I like to compete and win
19. I like to be noticed and loved by all
20. I worry a lot about everything and everybody
21. I have a tendency to procrastinate (put off things that have to be done)
22. I feel I must find a perfect solution to the problems I undertake

23. I worry and get anxious about taking tests

II. REACTIONS TO STRESORS:

F. During stressful situations, I have experienced the following:

- 24. Sweating (sweaty palms, etc.)
- 25. Stuttering (not being able to speak clearly)
- 26. Trembling (being nervous, biting finger-nails, etc.)
- 27. Rapid movements (moving quickly from place to place)
- 28. Exhaustion (worn out, burned out)
- 29. Irritable bowels, peptic ulcers, etc.
- 30. Asthma, bronchial spasms, hyperventilation
- 31. Backaches, muscle tightness (cramps), teeth grinding
- 32. Hives, skin itching, allergies
- 33. Migraine headaches, hypertension, rapid heartbeat
- 34. Arthritis, overall pains
- 35. Viruses, colds, flu
- 36. Weight loss (can't eat)
- 37. Weight gain (eat a lot)

G. When under stressful situations, I have experienced:

- 38. Fear, anxiety, worry
- 39. Anger
- 40. Guilt
- 41. Grief, depression

H. When under stressful situation, I have:

- 42. Cried
- 43. Abused others (verbally and/or physically)
- 44. Abused self
- 45. Smoked excessively
- 46. Was irritable towards others
- 47. Attempted suicide
- 48. Used defense mechanism
- 49. Separated myself from others

I. With reference to stressful situations, I have:

- 50. Thought and analyzed how stressful the situations are
Thought and analyzed whether the strategies I used were most effective

Inventaire du stress vécu par les étudiants (Gadzella, 1991, traduit en français)

Veillez indiquer votre niveau de stress général: 1=Faible, 2=Modéré, 3=Sévère _____

Cette liste contient des énoncés relatifs au stress des étudiants-athlètes. Lisez-les avec attention et répondez à chaque énoncé tel qu'il vous décrit en tant qu'étudiant-athlète. Utilisez les termes suivants pour indiquer ce que vous ressentez:

1=Jamais, 2=Rarement, 3=Occasionnellement, 4=Souvent, 5=La plupart du temps

I. STRESSEURS:**A. En tant qu'étudiant-athlète:**

1. J'ai ressenti de la frustration dû au retard dans l'atteinte de mes objectifs
2. J'ai des soucis quotidiens qui interviennent dans l'atteinte de mes objectifs
3. J'ai vécu un manque de ressources (argent pour ma voiture, livres, etc.)
4. J'ai vécu des échecs quant à l'atteinte des objectifs que je me suis fixés
5. Je ne me sens pas accepté socialement (mis au ban de la société)
6. J'ai ressenti de la frustration quant à ma vie amoureuse
7. Je sens qu'on m'a refusé des opportunités malgré mes qualifications

B. J'ai vécu des conflits, qui étaient:

8. Produits par deux ou plus alternatives désirables
9. Produits par deux ou plus alternatives indésirables
10. Produits lorsqu'un objectif avait à la fois des alternatives positives et négatives

C. J'ai ressenti de la pression dûe:

11. À la compétition (notes, travail, sport, relations avec partenaire et/ou amis)
12. Aux échéanciers (devoirs à remettre, paiements à effectuer, etc.)
13. À la surcharge (essaie de faire trop de choses à la fois)
14. Aux relations interpersonnelles (attentes de la famille et/ou co-équipiers/amis, responsabilités au travail)

D. J'ai vécu:

15. Des changements désagréables rapides
16. Trop de changements en même temps
17. Des changements qui ont dérangé ma vie et/ou mes objectifs

E. En tant que personne:

18. J'aime la compétition et gagner
19. J'aime me faire remarquer et aimer par tous
20. Je me soucie beaucoup de tout et de tous
21. J'ai tendance à procrastiner (remettre les choses à faire au lendemain)
22. Je sens le besoin de trouver une solution parfaite aux problèmes que je soulève

23. J'ai des soucis et je vis de l'anxiété face aux examens

II. RÉACTIONS FACE AUX STRESSEURS:

F. Face à des situations stressantes, j'ai ressenti ou j'ai vécu les choses suivantes:

- 24. Transpiration (mains moites, etc.)
- 25. Bégaiement (impossibilité de parler clairement)
- 26. Tremblement (nervosité, rongement d'ongles, etc.)
- 27. Mouvements rapides (déplacement rapide d'un endroit à un autre)
- 28. Épuisement (éreinté, vidé)
- 29. Côlon irritable, ulcère gastroduodénal, etc.
- 30. Asthme, bronchospasmes, hyperventilation
- 31. Mal de dos, tension ou raidissement des muscles (crampes), grincement des dents
- 32. Urticaire, démangeaisons de la peau, allergies
- 33. Migraines, maux de tête, hypertension, tachycardie
- 34. Arthrite, douleurs généralisées
- 35. Virus, rhume, grippe
- 36. Perte de poids (n'arrive pas à manger)
- 37. Prise de poids (mange trop)

G. Lors de situations stressantes, j'ai ressenti:

- 38. Peur, anxiété, souci
- 39. Colère
- 40. Culpabilité
- 41. Peine, dépression

H. Lors de situations stressantes, j'ai ou je me suis:

- 42. Pleuré
- 43. Maltraité d'autres personnes (verbalement et/ou physiquement)
- 44. Maltraité moi-même
- 45. Fumé excessivement
- 46. Été désagréable envers les autres
- 47. Tenté un suicide
- 48. Utilisé des mécanismes de défense
- 49. Éloigné des autres

I. Face à des situations stressantes, j'ai:

- 50. Réfléchi et analysé à quel point ces situations sont stressantes
Réfléchi et analysé si les stratégies que j'ai utilisées furent les plus efficaces

Appendix K
Profile of Mood States – Short Form (POMS-SF)
Shacham, 1983, adapted from McNair, Lorr, & Droppleman, 1981 (English)

Read each word/statement below. Decide how you've been feeling, in respect to the word/statement in the past week and select the appropriate statement, "Not at all", "A little", "Moderately", "Quite a Lot" or "Extremely" to indicate how you're feeling.

Tense
Angry
Worn Out
Unhappy
Lively
Confused
Peeved
Sad
Active
On Edge
Grouchy
Blue
Energetic
Hopeless
Uneasy
Restless
Unable to Concentrate
Fatigued
Annoyed
Discouraged
Resentful
Nervous
Miserable
Cheerful
Bitter
Exhausted
Anxious
Helpless
Weary
Bewildered
Furious
Full of Pep
Worthless
Forgetful
Vigorous
Uncertain about things
Bushed

Profil de l'humeur - Version abrégée
(Shacham, 1983, validé en français par Fillion et Gagnon, 1999)

Veillez lire chaque énoncé ci-dessous. Pour chacun d'eux, sélectionnez un des 5 termes suivants qui correspond le mieux à la façon dont vous vous êtes senti lors de la dernière semaine:

“Pas du tout”, “Un peu”, “Modérément”, “Beaucoup” ou “Extrêmement”.

Tendu
Fâché
Éreinté
Malheureux
Animé
Confus
Irrité
Triste
Actif
Sur les nerfs
Grognon
Mélancolique
Énergique
Sans espoir
Mal à l'aise
Agité
Incapable de me concentrer
Fatigué
Agacé
Découragé
Rancuneux
Nerveux
Misérable
Joyeux
Amer
Épuisé
Anxieux
Impuissant
Abattu
Perplexe
Furieux
Dynamique
Sans valeur
Oublieux
Vigoureux
Incertain
Vidé

Appendix L
Adolescent Self-Regulation Inventory (Moilanen, 2007, English)

Rate how true each statement is by selecting one of the following:

Not at all true for me; Not very true for me; Neither true nor untrue for me;
Somewhat true for me; Really true for me

1. It's hard for me to notice when I've had enough (sweets, food, etc.)
2. When I'm sad, I can usually start doing something that will make me feel better
3. If something isn't going according to my plans, I change my actions to try and reach my goal
4. I can find ways to make myself study even when my friends want to go out
5. I lose track of the time when I'm doing something fun
6. When I'm bored I fidget or can't sit still
7. It's hard for me to get started on big projects that require planning in advance
8. I can usually act normal around everybody if I'm upset with someone
9. I am good at keeping track of lots of things going on around me, even when I'm feeling stressed
10. When I'm having a tough day I stop myself from whining about it to my family or friends
11. I can start a new task even if I'm already tired
12. I lose control whenever I don't get my way
13. Little problems detract me from my long-term plans
14. I forget about whatever else I need to do when I'm doing something really fun
15. If I really want something, I have to have it right away
16. During a dull class, I have trouble forcing myself to start paying attention
17. After I'm interrupted or distracted, I can easily continue working where I left off
18. If there are other things going on around me, I find it hard to keep my attention focused on whatever I'm doing
19. I never know how much more work I have to do
20. When I have a serious disagreement with someone, I can talk calmly about it without losing control
21. It's hard to start making plans to deal with a big project or problem, especially when I'm feeling stressed
22. I can calm myself down when I'm excited or all wound up
23. I can stay focused on my work even when it's dull
24. I usually know when I'm going to start crying
25. I can stop myself from doing things like throwing objects when I'm mad
26. I work carefully when I know something will be tricky
27. I am usually aware of my feelings before I let them out
28. In class, I can concentrate on my work even if my friends are talking
29. When I'm excited about reaching a goal, it's easy to start working towards it
30. I can find a way to stick with my plans and goals, even when it's tough
31. When I have a big project, I can keep working on it
32. I can usually tell when I'm getting tired or frustrated
33. I get carried away emotionally when I get excited about something
34. I have trouble getting excited about something that's really special when I'm tired
35. It's hard for me to keep focused on something I find unpleasant or upsetting
36. I can resist doing something when I know I shouldn't do it

Questionnaire d'auto-évaluation pour adolescent (Moilanen, 2007, traduit en français)

Veuillez évaluer de quelle manière les énoncés suivants sont vrais
en sélectionnant l'un des choix suivants:

Pas du tout vrai pour moi; Pas réellement vrai pour moi; Ni vrai ni faux pour moi; Plutôt vrai pour moi; Réellement vrai pour moi

1. Il m'est difficile de savoir quand j'en ai eu assez (friandises, nourriture, etc.)
2. Lorsque je suis triste, je peux habituellement entreprendre quelque chose qui m'aide à me sentir mieux
3. Si quelque chose ne se déroule pas selon mes plans, je change mes actions afin d'essayer d'atteindre mon objectif
4. Je trouve les moyens d'étudier même quand mes amis veulent sortir
5. Je perds la notion du temps quand je fais quelque chose d'amusant
6. Quand je m'ennuie, je gigote ou je n'arrive pas à rester en place
7. Il m'est difficile d'entreprendre de gros projets qui nécessitent que je planifie à l'avance
8. Je peux généralement agir de façon normale avec les gens si je suis fâché contre quelqu'un
9. J'arrive bien à gérer beaucoup de choses à la fois, même si je suis stressé
10. Quand j'ai une journée difficile, j'évite de m'en plaindre à ma famille ou mes amis
11. Je peux commencer une nouvelle tâche même si je suis déjà fatigué
12. Je perds mes moyens quand les choses ne se déroulent pas à ma façon
13. Les petits problèmes me détournent de mes plans à long terme
14. J'oublie que j'ai à faire quand je fais quelque chose de très amusant
15. Si je veux vraiment quelque chose, je dois l'avoir tout de suite
16. Si une classe est ennuyeuse, j'ai du mal à me forcer à y prêter attention
17. Après avoir été interrompu ou distrait, je peux facilement continuer à travailler là où je me suis arrêté
18. Si d'autres choses se déroulent autour de moi, il m'est difficile de garder mon attention sur ce que je fais
19. Je ne sais jamais combien de travail il me reste à faire
20. Lorsque je suis réellement en désaccord avec quelqu'un, je peux en parler calmement sans perdre contrôle
21. Il m'est difficile de commencer à faire des plans pour gérer un gros projet ou un problème, particulièrement quand je me sens stressé
22. J'arrive à me calmer lorsque je suis excité ou énervé
23. Je peux rester concentré sur mon travail même s'il est ennuyeux
24. Je sais généralement quand je vais commencer à pleurer
25. Je peux me restreindre de faire des choses comme lancer des objets quand je suis fâché
26. Je travaille minutieusement quand je sais que quelque chose est complexe
27. Je suis généralement conscient de mes sentiments avant de les exprimer
28. En classe, j'arrive à me concentrer sur mon travail même si mes amis parlent
29. Lorsque je suis excité à l'idée d'atteindre un objectif, il m'est facile de commencer à y travailler
30. Je réussis à trouver une façon de respecter mes plans et mes objectifs, même quand c'est difficile
31. Quand j'ai un gros projet, je parviens à continuer à y travailler
32. J'arrive généralement à savoir lorsque je suis fatigué ou frustré
33. Je me laisse emporté émotionnellement lorsque je suis excité à l'idée de quelque chose

- 34. Lorsque je suis fatigué, j'ai du mal à être tout excité à l'idée de quelque chose qui me tient à coeur
- 35. Il m'est difficile de rester focalisé sur quelque chose que je trouve désagréable ou bouleversant
- 36. Je peux me restreindre de faire quelque chose quand je sais que je ne devrais pas le faire

Appendix M
Sport Climate Questionnaire (SCQ, Baard, Deci, & Ryan, 2000; English)

	1 Strongly Disagree	2	3	4 Neutral	5	6	7 Strongly Agree
1. I feel that my coach provides me choices and options							
2. I feel understood by my coach							
3. I am able to be open with my coach while engaged in athletics							
4. My coach conveyed confidence in my ability to do well in athletics							
5. I feel that my coach accepts me							
6. My coach makes sure I really understood the goals of my athletic involvement and what I need to do							
7. My coach encourages me to ask questions							
8. I feel a lot of trust in my coach							
9. My coach answers my questions fully and carefully							
10. My coach listens to how I would like to do things							
11. My coach handles people's emotions very well							
12. I feel that my coach cares about me as a person							
13. I don't feel very good about the way coach talks to me							
14. My coach tries to understand how I see things before suggesting a new way to do things							
15. I feel able to share feelings with my coach							

Questionnaire sur le climat sportif (Baard, Deci, & Ryan, 2000, traduit en français)

	1 Fortement d'accord	2	3	4 Neutre	5	6	7 Fortement en désaccord
1. Je sens que mon entraîneur me donne des choix et des options							
2. Je sens que mon entraîneur me comprend							
3. Je peux être ouvert avec mon entraîneur lorsque que je pratique mon sport							
4. Mon entraîneur a démontré de la confiance en mes capacités de réussir dans mon sport							
5. Je sens que mon entraîneur m'accepte							
6. Mon entraîneur s'assure que je comprends bien l'objectif de mon implication et ce que je dois faire dans mon sport							
7. Mon entraîneur m'encourage à poser des questions							
8. J'ai beaucoup confiance en mon entraîneur							
9. Mon entraîneur répond entièrement et attentivement à mes questions							
10. Mon entraîneur est à l'écoute de la façon dont je voudrais faire les choses							
11. Mon entraîneur gère très bien les émotions des gens							
12. Je sens que mon entraîneur se soucie de moi en tant que personne							
13. Je n'aime pas trop la façon dont mon entraîneur me parle							
14. Mon entraîneur essaie de comprendre comment je vois les choses avant de suggérer une nouvelle manière de les faire							
15. Je sens que je peux faire part de mes sentiments à mon entraîneur							