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A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Health and Rehabilitation Sciences
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Canadian Post-Secondary Students, Stress, and Academic Performance – A Socio-Ecological Approach

(Thesis format: Integrated Article)

by

Lisa Nicole Versaevel

Graduate Program in Health and Rehabilitation Sciences

A thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
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London, Ontario, Canada

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Abstract

The purpose of this integrated-article dissertation was to examine stress and health in Canadian post-secondary students. Data from the spring 2013 National College Health Assessment (NCHA) was utilized in study one and two. This dataset is comprised of 34,039 students from 34 self-selected Canadian postsecondary institutions who took part in the NCHA survey. Study one examined the impact of stress, identified stressors and unique factors that were related increased stress. Stress was the most commonly identified impediment to academic performance and 57.6% of students reported more than average stress. Most frequently reported stressors include: academics, finances, and sleep difficulties. Female students, graduate students, Caucasian students, non-international students, or students in a relationship were most likely to have elevated stress levels, as are those with a mental health diagnosis, learning disability, disability, or chronic illness. In study two, NCHA data was analyzed descriptively and structural equation modeling was used to examine the relationship between health behaviours (e.g., physical activity, sleep, and nutrition), stress, and academic performance**.** A total of 13.2 % of students reached Canada's Food Guide Nutrition Guidelines, while 17.2% met Canadian Society of Exercise Physiology's Guidelines for Physical Activity, and 44.8% identified that sleep was not a problem. Overall, 3.3% of students met recommendations for all three health behaviours. Sleep, exercise, and nutrition had a direct effect on stress and academic performance respectively. Stress also had a direct effect on academic performance. All health behaviours demonstrated significant indirect effects, influenced through stress, on academics. Lastly, via focus groups, study three investigated Canadian university students' perceptions of individual and institutional factors that impact health and well-being. Students suggested that stress, health behaviours, accountability, and

social capital affected their individual health. At an institutional level, a supportive campus culture mediates health; leading to engagement, cohesion, and empowerment. A lack of integration related to student health can result in; disconnection, disempowerment, and decreased motivation adversely impact health. Findings from all three studies support a comprehensive approach to addressing stress and overall health of students at post-secondary institutions.

Keywords: Stress, Students, University, Health, Canada

Co-Authorship

While this dissertation is my original work, Dr. Cramp and Dr. Mandich both made substantial contributions to studies one, two, and three. I would like to acknowledge the important contribution of Dr. Anita Cramp, my co-advisor for her ongoing direction, consultation, and feedback during the writing process. Dr. Angie Mandich provided significant guidance, editorial recommendations, and mentorship for the written work of this thesis in its entirety. I would also like to acknowledge Dr. Shauna Burke who contributed significantly to the content of Study 1, and provided feedback on the overall direction of this research. Finally, I would like to recognize Rick Ezekiel for his involvement in study two.

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CHAPTER 1

1 Introduction

1.1 Purpose

The overall purpose of this dissertation was to investigate stress and its relationship to health and well-being in Canadian post-secondary students. To fulfill this purpose, this dissertation contains three separate yet related articles written in integrated article format. Study one and two employed a cross-sectional descriptive design using a quantitative web-based survey, the National College Health Assessment (NCHA). In the months of January to April 2013, the NCHA survey was administered at 34 self-selected Canadian post-secondary institutions. A total of 34,039 students completed the NCHA across Canada. Data from participating schools was then collated to comprise the Canadian Reference Group and used as the data set for studies one and two. Study one investigated stress in Canadian post-secondary students by examining the impact of stress, identifying stressors, and predicting who is more likely to experience stress. The relationship between stress, health behaviours, and academic performance was explored in article two through the use of structural equation modeling. Lastly, study three investigated Canadian university students' perceptions about individual and institutional factors that impact health and well-being. Focus group discussions with 21 students (14 female, 7 male) were conducted and audio recordings were transcribed then analyzed using NVivo software. Given the inter-relationship of the content of each study, there is some overlap in information presented between chapters. This introductory chapter provides the context for the three articles that by discussing the role of Higher Education Institutions, stress as it relates to post-secondary students, and the theoretical orientation

of this dissertation. Following the three articles, the final chapter is a discussion which reviews the major findings of each study, explains the meaning of the findings, and makes suggestions for future research.

1.2 Background

1.2.1 Health in higher education institutions. Students attending post-secondary schools represent a large proportion of the population. In Canada, approximately 1,955,300 students were enrolled in public colleges and universities during the 2010/2011 academic year (Statistics Canada, 2013). In 2004, the American College Personnel Association (ACPA) and the National Association of Student Personnel Administrators (NASPA) jointly released a document entitled "Learning Reconsidered: A Campus-wide Focus on the Student Experience". This benchmarking document advocates for education to include preparation of the *whole* student and posits that learning is a transformative activity that should have both academic and student development goals (ACPA & NSPA, 2004). Although the main goal of a post-secondary institution is to facilitate education and intellectual functioning, scholastic achievements can be optimized by supporting the *whole* student, including their health and well-being. When students are healthy, they are more able to concentrate on their studies and reach their potential (Canadian Association of College and University Student Services [CACUSS] & Canadian Mental Health Association [CMHA], 2013; Canadian Organization of University and College Health, 2014). Because education and health can be conceptualized as interconnected, interdependent, and complimentary; the creation of a campus environment conducive to positive physical and mental health is an institutional responsibility (CACUSS & CMHA, 2013). Within such an approach, the whole campus

is the domain to be addressed, including its environment, organizational structure, policies, and practices (CACUSS & CMHA, 2013).

Post-secondary institutions are unique in that they are communities or settings with established infrastructures that can support overall physical and mental health through a variety of factors such as the campus culture, environment, physical spaces, policies, and procedures (CAUCUS & CMHA, 2013; CMHA BC, 2013). For instance, post-secondary institutions may provide health-related services, such as a medical clinic, counseling, physiotherapy, pharmacy, massage therapy, and lab services. In addition to the abovementioned services, health may be influenced by peer programs, health promotion activities, health media campaigns, and orientation events that occur on post-secondary campuses. The impact of the environment cannot be underestimated as research has demonstrated that inconsistencies in policy and structural/operational issues at post-secondary institutions can have inadvertent academic-related obstacles resulting elevated stress and impeding student success (Bishop, Berryman, Wearmouth, & Clapham, 2012). For example, students have cited that exam and academic scheduling, availability of academic support services, and course design contribute to elevated stress levels and can negatively impact student welfare (Clapham et al., 2012). In addition, each post-secondary institution has a unique culture that provides students with sources of social norms, values, and social identity (McLeroy, Bibeau, Steckler, & Glanz, 1988). The importance of these influences on health is demonstrated through reports from students who suggest that perceived lack of support from university faculty and staff increase their stress (Radcliffe & Lester, 2003). This demonstrates that sense of community and belonging are crucial aspects of campus culture. In summary, post-

secondary institutions play an influential role in supporting or hindering student health, particularly stress and the levels of stress that students experience.

1.2.2 Stress

1.2.2.1 Why study stress in post-secondary students? Although stress can impact the physical and mental health of people of all ages, it is of particular concern for post-secondary students. Results of a national study demonstrated that Canadian post-secondary students experience significant levels of stress (Adlaf, Demers & Gliksman, 2005; Adlaf, Gilksman, Demers, & Newton-Taylor, 2001). For example, more than half (58%) of students from six Ontario universities reported that their stress level is *more than average* or *tremendous*, and that this stress frequently impedes academic performance (Ontario Reference Group, 2009*)*. The transition from high school to post-secondary education is characterized by change, adjustment, and ambiguity relating to disruption of routines, security, predictability, and a loss of sense of control that was established during high school (Bray & Born, 2004; Terenzini, Rendon, & Upcraft, 1997). This transition is complex and often involves several simultaneous stressors such as a new living environment, obtaining personal security (e.g., self-esteem and comfort), building a new social support network, financial concerns, school/personal life balance **(**Chernomas & Shapiro, 2013; Jimenez, Navia-Osorio, & Diaz, 2010; Lo, 2002; Moscaritolo, 2009; Pryjmachuk & Richards, 2007; Sheu, Lin, & Hwang, 2002), and academic pressures (Altiok, 2013; Biron, Brun, & Ivers, 2008; Goff, 2011; Lee & Graham, 2001). Post-secondary students themselves have suggested that there is a strong interrelation of academic, personal, lifestyle, and financial issues that can result in increased stress and a reduction in academic performance (Patterson & Kline, 2008).

Stress can be increased by participation in risky behaviours that are common amongst post-secondary students (Kwan, Faulkner**,** Arbour-Nicitopoulos & Cairney, 2013). For example, it has been found that post-secondary students have high rates of alcohol use, binge drinking (Kingsbury et al., 2014; Moore-Rodríguez et al., 2014; Ward, Lallemand, & De Witte, 2014), unprotected sex (King, Vidourek & Singh, 2014; Pengpid, Peltzer, Mirrakhimov, & Erkin, 2014), and drug experimentation (Bennett & Holloway, 2014; Holloway, Bennet, Perry, & Gorden, 2014; Leinwand, 2007). Post-secondary students also report unhealthy sleep habits, (Curcio, Ferrara & De Gennaro, 2006; Patton, 2002; Viner, 2007), being physical inactive (Haase, Steptoe, Sallis & Wardle, 2004), disordered eating (Cornblatt, 2009), and poor eating habits (American College Health Association, 2009, Ontario University and College Health Association (OUCHA), 2009). Further, if a student is challenged with inadequate stress management skills, limited resilience, lack of social support, or poor mental health; overall health can be compromised (CAUCUSS & CMHA, 2013; Fonagy, 1994; Pittman & Richmond, 2008; Rutter, 2012; Skipworth, 2011;Verger et al., 2009; Walsh, 2007; Werner, 1995). Therefore, an important aspect to supporting students during post-secondary education is to understand the stressors they face and addressing the ways in which stress can be managed.

1.2.2.2 ***Conceptualizing stress.*** Three predominant perspectives used to conceptualize stress have been identified in the literature. These views consider stress to be response-based, stimulus-based, or transaction-based (Hill, 2012). The response-based view, developed and examined by Selye (1956), defines stress from a medical perspective, considering it to be a response of the body to noxious stimuli. Whereas the

stimulus-based view, developed by Holmes and Rahe (1967), defines stress from the perspective of physiological experience as life events that require adjustment or adaptation. Finally, the transaction-based view, described by the Transactional Theory of Stress and Coping (TTSC; Lazarus, 1966; Lazarus & Folkman, 1984), suggests that stress is a dynamic process of giving meaning, adjusting, and coping that resides within the interacting relationship between the person and their environment (Lazarus, 1991). Furthermore, this view recognizes that stress must be understood within the context of the person-environment relationship (Lazarus, 1991). Lazarus' (1966) TTSC suggests that three types of appraisal are the primary mediators of the person-environment interaction. Primary appraisal occurs as the individual judges if a situation is threatening in that the demands of the situation outweigh the available resources. If the situation is perceived as potentially threatening, secondary appraisal occurs in which available coping options or behaviours are considered. Reappraisal refers to a constant evaluation process of considering and modifying earlier primary or secondary appraisals as the situation evolves (Lazarus, 1966). Stressful experiences are ecological in nature, that is, stress is mediated by an individual's appraisal of the stressor and psychological, social, and cultural resources available (Glanz & Schwartz, 2008). There exists commonalities and considerable overlap between the dynamic process of stress in the TTSC and socio-ecological approach to health used in this study. Therefore, the transaction-based definition of stress will be used within this study. Accordingly, stress influences and is influenced by the post-secondary campus environment and impacts social, mental, and physical health and well-being of post-secondary students. In addition to the TTSC,

salutogenesis was a philosophy that informed the conceptualization of stress in these studies.

The salutogenic framework grew and developed from Aaron Antonovsky's (1979) theory of 'sense of coherence'. According to salutogenesis, health exists on a continuum between absence of health (disease) and total health (ease), and focuses on resources and factors responsible for the formation and maintenance of health (Lindström, 2014). Salutogenesis is a stress resource orientated concept suggesting that internal balance is maintained while actively acting and reacting to lifelong influences from of stressors (Centre on Salutogenesis, 2014). Assets for health and well-being include concepts such as self-efficacy, gratitude, thriving, resilience, and learned resourcefulness. Furthermore, this theory can be applied at an individual, group, or societal level (Lindström & Eriksson, 2005). The philosophical underpinnings of this study and the orientation of this work are aligned with salutogenesis. Rather than stress being conceived as a problematic contributor to illness, the focus is on resources (both internal and external) that move students towards health. As opposed to finding ways that alleviate stress and stressors, this work strives to discover ways to empower students to cope with stress, develop resilience, to flourish, and have a secure sense of well-being.

1.2.2.3 ***Causes of stress.*** While Canadian adults report that families, relationships, work, and major life changes represent significant sources of stress (CMHA, 2014), research has identified other specific causes of stress experienced by post-secondary students. Particular stressors experienced by post-secondary students can be related to: stage of life, personal factors, or academics. Stresses related to stage of life include: the need to adapt to increased independence, transition to adulthood, building a new social

support network, changes in relationships with parents, and obtaining personal security (Al-qaisy, 2010; Parker, Summerfeldt, Hogan, & Majeski, 2004). Commonly identified personal sources of stress for post-secondary students include financial concerns, school/personal life balance, and lack of free time (Chernomas & Shapiro, 2013; Jimenez et al., 2010; Lo, 2002; Moscaritolo, 2009; Pryjmachuk & Richards, 2007; Sheu et al., 2002). In addition, working (either part- or full-time) while pursuing education, further exacerbates stress (Al-qaisy, 2010; Magnussen & Amundson, 2003; Parker, Summerfeldt, Hogan, & Majeski, 2004), as are concerns regarding accessing childcare for children of students who are also parents (Pryjmachuk & Richards, 2007). Poor time management and perceived heavy workloads associated with course requirements add a further dimension to the stress experienced by some students (Magnussen & Amundson, 2003). As such, a primary source of stress amongst post-secondary students relates to academics. Academic concerns including exams, workload, and worry about marks have been cited as top sources of stress for some students (Altiok & Üstün, 2013; Goff, 2011; Lo, 2002; Shaban, Khater, & Akku-Zaheya, 2012). Competing for training opportunities and preparation for entry into the professional community are also potential stressors for students pursuing professional degrees (Goff, 2011; Lo, 2002). In a survey of six Ontario universities, students identified that the top three stressors that impact academic performance were: stress (38%), sleep difficulties (26%), and anxiety (26%) (American College Health Association [ACHA], 2009).

1.2.2.4 ***Impacts of stress – general***. From an academic and health perspective, it is concerning that many post-secondary students report high levels of stress. Stress has been identified as a risk factor in the development of heart and bowel disease, herpes,

substance abuse, and immune functioning (Health Canada, 2014). Stress has also been associated with sleep difficulties and headaches (CMHA, 2014). Stress can contribute to illness directly through physiological effects, or indirectly, through maladaptive health behaviours (Glanz & Schwartz, 2008). Excessive negative stress (or distress) has been found to reduce work effectiveness, contribute to bad habits, and result in negative long-term consequences including; addictions, crime, absenteeism, poor academic performance, school dropout, professional burnout, and career failure (Dusselier, Dunn, Wang, Shelley, & Whalen, 2005). Several studies have highlighted the negative relationship between stress and student success (Flouri & Kallis, 2011), and academic performance (American College Health Association (ACHA), 2009; Cave, 2011; Chow, 2007; Chug & Cheung, 2008; Flook & Fuligini, 2008; Richardson, Abraham, & Bond, 2012; Taylor, Vatthauer, Ruggero & Roan, 2013). Stress has been identified as the foremost impediment to academic performance, outranking the other impediments to learning such as viral infections, sleep disturbances, concerns about family members and friends, and relationship problems (Cave, 2011; Dusselier, Dunn, Wang, Shelley II, & Whalen, 2005; Ontario Reference Group, 2009). Furthermore, academic performance and stress exist in a cyclical relationship, whereby increasing stress can negatively impact academic performance and poor performance then contributes to increased stress (ACHA, 2009; Dusselier, Dunn, Wang, Shelley, & Whalen, 2005; Magnussen, & Amundson, 2003). The significance of negative stress and the importance of effective stress management strategies compel further study about stressors experienced by post-secondary students.

1.2.2.5 ***Impacts of stress – mental health.*** Coping with stress is an essential component of mental health that is relevant to all students. The Canadian Framework for Post-secondary Mental Health suggests that a systematic approach to mental well-being targets three levels: 1. the general student population, 2. students with concerns about coping, and 3. students with mental health issues (CAUCSS & CMHA, 2013). Mental well-being includes the ability to enjoy life, resilience, balance, ability to recognize and develop strengths, and flexibility to express emotions (CMHA, 2014). Balancing stress and recovering from stressful situations are crucial aspects of overall positive mental well-being.

Stress has been identified as a significant contributor to the development of mental health problems. University students are more likely to report mental illness symptoms than non-university students as demonstrated in a survey of mood disorder symptoms. The findings from this survey reported that 42% percent of Ontario university students, compared to 17% of Ontario adults aged 18 to 29 years, reported elevated stress (Adolf, 2005). Consistent with the trend in increasing mental health issues in the general population, research suggests that mental health problems on university campuses are becoming more frequent and more severe (CMHA, 2013; OCHA, 2009; Verger et al., 2009). The significance of mental health in young adults is further illustrated by the fact that suicide accounts for 24% of deaths in 15-24 year olds (Centre for Suicide Prevention, 2012). In addition, more students are taking psychotropic medications and there has been an increase in students experiencing problems with mental health and addictions (Mackean, 2011; Yen, Ko, Yen, Chen, & Chen, 2009). In the largest American epidemiologic study of psychiatric illness (Blanco et al., 2008), the prevalence of mental

illness was highest in the 15 to 21 year old age range. Of students with a mental health diagnosis, up to 86% of such students fail to complete university (Adalf, 2005). One additional issue faced by youth is the stigma associated with mental health issues, which has been identified as one of the major barriers to accessing help (Alemu, 2014). Consistent with trends in the general population, a survey of Canadian youth found that only 25% of youth aged 15 to 24 years access formal or informal supports for self-reported mental health problems (Garinger, 2010; Mackenzie, Erickson, Deane, & Wright, 2014). In recent years, there has been a focus on mental health in post-secondary students, particularly because a connection has been made between mental health and academic success of students (Michel, Drapeau, & Despland, 2003; Mikolajczyk et al., 2008). Research has repeatedly shown that social support and overall mental health are significant predictors of academic achievement (DeBerard, Spielmans, & Julka, 2004). For example, a depressed mood has been negatively correlated with academic performance (Haines, Norris, & Kashy, 1996). Stress exists on a continuum of mental health disorders. Adequate stress management capabilities may promote mental wellness, while chronic or excessive stress can contribute to the development of mental health issues. Stress is inextricably linked to and has significant impact on the mental health of post-secondary students.

1.2.2.6 ***Who experiences stress?*** While research has identified common sources of stress, (Altiok & Üstün, 2013; Al-daisy, 2010; Chernomas & Shapiro, 2013; Dzurec, Allchin, & Engler, 2007; Goff, 2011; Jimenez et al., 2010; Lo, 2002; Magnussen & Amundson, 2003; Moscaritolo, 2009; Parker, Summerfeldt, Hogan, & Majeski, 2004; Pryjmachuk & Richards, 2007; Shaban et al., 2012; Sheu et al., 2002) there is less

research on the characteristics of post-secondary students who experience elevated levels of stress (i.e., more than average stress levels). Within the literature there is a paucity of research on stress in students who have a diagnosed mental health issue such as depression or anxiety (Bitsika & Sharpley, 2012; Ibrahim, Al-Kharboush, El-Khatib, Al-Habib, & Asali, 2013; Saravanan & Wilks, 2014; Skipworth, 2011; Uskun, Kisioglu, & Ozturk, 2008; Walkiewicz, Tartas, Majkowicz, & Budzinski, 2012). For example, Skipworth (2011) studied the relationship between perceived stress and depression in Arizona State University (ASU) students and found that high levels of stress were a significant predictor of depression. This finding is supported by Sawatzky et al. (2012) who examined the extent to which the relationship between adverse stress and depression is mediated by university students' perceived ability to manage their stress. Greater stress management self-efficacy was associated with lower depression scores for students whose stress impeded their academic performance. Saravanan and Wilks (2014) conducted a cross-sectional study with 358 medical students in Malaysia and found that depressed and anxious students experienced more stress and reacted differently to stressors compared to non-depressed and non-anxious students. Stress therefore contributes to depression and anxiety, and that those with mental health disorders are more likely to experience stress.

Several other predictors of stress have been identified in the literature. For example, gender has been shown to impact stress. In a study by Dusselier et al. (2005), which investigated contributors to stress among undergraduate students living in residence, females experienced greater levels of stress than their male counterparts. In this same study, other identifiers of stress included: frequency of experiencing chronic

illness, depression, anxiety disorder, seasonal affective disorder, mononucleosis, and sleep difficulties (Dusselier et al., 2005). It has also been suggested that students from particular programs of study, such as medical school or nursing are more likely to experience elevated stress (Chernomas & Shapiro, 2013; Lee & Kim, 2006; Pryjmachuk & Richards, 2007). In addition to the program of study being a predictor of stress, correlates of stress may vary between program of study. For example, Pryjmachuk & Richards (2007) conducted a cross-sectional survey with 1,362 university nursing students examining stress, depression, and anxiety. Through logistic regression analyses, it was revealed that predictors of stress included self-reported feelings of 'pressure', whether or not respondents had children, scores on a 'personal problems' scale, and the type of coping employed.

A surprising finding about demographic predictors of stress is that international students may be less likely to experience elevated stress than non-international students. In a study comparing 392 international and American students, Misra & Castillo (2004) found that American students reported higher self-imposed stressors and greater behavioural reactions to stressors than international students. Notwithstanding, stress is still an issue for international students. This is demonstrated through a study of 229 international students studying at 17 universities throughout the United States (Duru & Poyrazli, 2007). Elevated stress levels were found in international students who had higher levels of perceived discrimination, as well as lower levels of English language competency and social connectedness (Duru & Poyrazli, 2007).

In additon to demographic factors such as age or international status, personality factors like prefectionism can be a predictor of stress (Chang & Rand, 2000; Rice, Choi,

Zhang, Morero, & Anderson, 2012). For example, Chang & Rand (2000) found that perfectionism is a significant predictor of psychological symptoms with stress, accounting for a significant amount of additional variance in predicting adjustment beyond perfectionism.

1.2.2.7 Managing stress. Establishing positive stress management skills mediate the impacts of stress and also successful adjustment to university among students (Skipworth, 2011). Stress management is important since students who have the capacity to manage stress have the tendency to choose healthier coping strategies and are less likely to engage in risky behaviours, including: excessive alcohol use, poor sleep, unhealthy diet choices, unsafe sex practices, and physical inactivity (Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004). Not only do lifestyle choices and health behaviours impact students during their time at university, they also have long-term implications for future health. For example, physical inactivity, tobacco use, and obesity during young adulthood are important risk factors for poor health assessments twenty years later (Johansson & Sundquist, 1999). Empowering students to develop the capacity to actively manage their stress will set a foundation for increased ability to sustain mental well-being throughout their lifespan (CAUCUSS & CMHA, 2013).

It should not, however, be assumed that students come to university with self-management competencies and coping skills. There often exists an opportunity for development of these abilities and it has been recommended that post-secondary institutions provide "programs and resources to strengthen students' capacity to manage the range of demands they face and find meaning, purpose and satisfaction in their lives as students" (CAUCUSS & CMHA, 2013, p.11).

There exists evidence of many examples of effective stress management interventions. For example, mindfulness-based therapy (MBT) has become an increasingly popular approach to stress reduction that has been extensively studied. Khoury and colleagues (2013) conducted a meta-analysis to evaluate the efficacy of MBT. Based on the 209 included studies, effect size estimates suggested that MBT is a moderately effective treatment for stress (pre-post comparisons [n = 72; Hedge's g = .55]). In addition to mindfulness, Cognitive Behavioural Therapy (CBT) has been found to reduce stress in the student population. Granath and colleagues (2006) conducted a randomized control trial and found that psychological measurements (i.e., self-rated stress and stress behaviour, anger, exhaustion, and quality of life) and physiological measurements (i.e., blood pressure, heart rate, urinary catecholamines, and salivary cortisol) obtained before and after CBT treatment showed medium-to-high effect sizes. Similarly, Acceptance and Commitment Therapy (ACT) has been shown to assist university students improve distress levels. Muto and colleagues (2011) found that moderately depressed, stressed, or anxious international students showed significant improvement after participating in an ACT self-help intervention. Yoga has also been suggested as an effective and sustainable intervention to decrease levels of perceived stress in the student population (Granath, Ingvarsson, von Thiele, & Lundberg, 2006; Milligan, 2006). At one university, yoga for stress management was offered as a complementary alternative therapy resource with reported benefits from student participants (Milligan, 2006). A host of cognitive and behavioural stress management techniques are supported in the literature that can be implemented in post-secondary settings as a means of supporting student mental wellness.

1.2.2.8 Needs assessment of stress in Canadian post-secondary students. The collection and monitoring of reliable student data is necessary to inform health promotion planning. Having current, relevant data about the stressors that students' experience and learning how stress impacts students can enhance campus wide health promotion decisions and prevention service planning (ACHA, 2014). In order for health promotion efforts to be evidence-based, a formal systematic process to acquire accurate information about student health issues is required. A needs assessment process collects and examines information and then utilizes that data to determine priority goals, develop a plan, and allocate funds and resources (Pubic Health Ontario, 2014). There are several compelling reasons to implement a needs assessment related to physical and mental health of Canadian post-secondary students. Most importantly, hearing directly from students allows for an understanding of the significant health priorities of this population. Health promotion is firmly premised on community involvement in the articulation of issues and participation in all stages of the health promotion planning cycle (Doherty & Dooris, 2006). Therefore, the inclusion of student input is paramount in the successful design and implementation of health promotion efforts on campuses. One needs assessment tool, which examines the health issues and needs of post-secondary students, is the National College Health Assessment (NCHA). The NCHA instrument has been widely utilized for the past 15 years as a means of investigating health in the post-secondary context with more than 550 colleges and universities in North America having conducted the survey to date (ACHA, 2014). The NCHA is an internationally recognized research survey that collects data about post-secondary students' health habits, behaviours, and perceptions. The survey consists of 67 questions from broad topic areas

including: health and safety, alcohol, tobacco and drugs, sexual health, mental health and stress, and academic impacts. The survey was developed by an interdisciplinary team of college health professionals, was pilot tested, and underwent reliability and validity testing (Leino, 2000).

The NCHA survey is organized and administered through the American College Health Association (ACHA) for a fee. If an institution opts for online administration, the ACHA sends a link to the survey to participants and collects responses. Four to six weeks after the closing of the survey, institutions are supplied with an Executive Summary Report and raw data. Between January and April 2013 a contingent of 34 Canadian universities implemented this survey tool on their campuses. Of the 34 participating schools, 32 schools used either random sampling techniques or surveyed all students, and also gave permission to be included in the Canadian dataset. Data from these 32 schools were pooled together and used to comprise the Canadian Reference Group, which consists of 34,039 students. An application was made and granted by the ACHA to utilize data related to the research questions in studies one and two. Therefore, the focus of this dissertation concentrated on stress and mental health-related questions contained within the NCHA survey from the Canadian Reference Group. It should be noted that one limitation of the NCHA survey is that neither stress, nor academic performance were operationally defined for students who completed the survey. It is therefore possible that variation in the interpretation of these constructs amongst study participants.

Although conducting a needs assessment is a crucial aspect of health promotion planning and development, this should not be done in isolation. Needs assessments are

part of frameworks and models that aid program planners, policy makers, and evaluators with analyzing situations, designing health programs, and providing a structure for systematically applying theories and concepts (Gielen, McDonald, Gary, & Bone, 2008). It is therefore recommended that needs assessments be used in concert with intervention planning and evaluation in one overarching framework (Gielen, McDonald, Gary & Bone, 2008). Evidence and information from the NCHA serves as a preliminary needs assessment and provides a foundation on which to continue health promotion planning on Canadian post-secondary campuses.

1.3 Theoretical Orientation

Effective health promotion requires alignment of research with a firm theoretical base, as theories guide research design, data collection, and interpretation results (Alderson, 1998). The theoretical and conceptual underpinnings of this dissertation are grounded in the Social Ecological Model of Health Behaviour (Stokols, 1992).

1.3.1 Socio-ecological model. The Socio-Ecological Model (SEM) is a comprehensive framework for discerning determinants of health whereby it is believed that behaviour effects and is effected by social, institutional, and cultural contexts (McLeroy et al., 1988). Originally pertaining to the interrelationships between organisms and their environments, the term ecology has roots in biology (Sallis, Owen, & Fisher, 2008). Subsequently, ecological and social-ecological models of human behaviour have evolved over a number of decades with contributions from the fields of sociology, psychology, public health, and economics (Stokols, 1992). The Social-Ecological Model developed out of the work of a number of prominent researchers. For instance, in 1979, Bronfenbrenner's Ecological Systems Theory focused on the relationship between

individuals and their environment. In 1988, McLeroy's Ecological Model of Health Behaviours introduced a classification system that included five different levels of influences on health behaviour (intrapersonal, interpersonal, institutional, community and public policy). More recently, Stokols's Social Ecology Model of Health Promotion (1992, 2003) identified the core assumptions that underlie the social-ecological model. Contributions from these and other researchers have evolved into what is referred to today as the Social-Ecological Model.

1.3.2 Core principles of the socio-ecological model. There are four core principles of the socio-ecological model (Stokols, 1992). First, health behaviours are seen to be influenced by multiple factors. Efforts to change behaviours are based on an understanding of interrelationship between the levels of SEM, and interventions are more efficacious when they target multiple components. Second, environments are considered to be multidimensional and complex. Social or physical environments can be described as containing a variety of features or attributes and actual or perceived qualities. It is important to identify relevant potential influences at each level. Third, human-environment interactions can be described at varying levels of organization. The socio-ecological model focuses on the individual as well as multiple influences at the small group, organizational, community, or population levels. The fourth core principal is that individuals and their environments have reciprocal relationships. The social, physical, and policy environments influence the behaviour of the individual, while at the same time the behaviour of the individual, group or organization also impact the environment (Glanz, Rimer, & Viswanath, 2008).

1.3.3 Components of the social-ecological model. There are a number of versions of the social-ecological model, all of which use slightly different classifications of environmental influences. For the purposes of this paper, Stokol's (1992) social-ecological model will be used. This model includes four levels of influence: individual factors, the social environment, physical environment, and public policy (Stokol, 1992). *Individual factors* include: knowledge, attitudes, behaviours, beliefs, motivation, skills, and demographic characteristics. The *social environment* refers to relationships, culture, and society with which individuals engage, such as family, peers, professionals (e.g., doctors, teachers, etc.). The *physical environment* is comprised of natural and built physical spaces and includes factors such as weather, geography, accessibility to facilities such as parks and gymnasiums, public transportation, and safety. *Public policy* refers to legislation, regulations, or policies that affect individuals, including formal and informal rules or procedures. Examples include: education policies, health policies, and workplace policies. Refer to Figure 1, for a diagrammatic representation of the SEM. According to this diagram, the layers of influence start with the individual at the innermost circle, who is surrounded by differing levels of environmental influences (Bronfenbrenner 1994). This concept is illustrated as a series of overlapping circles, with each circle representing a different layer or component of the model. All levels of the social-ecological model are thought to impact the behaviour of the individual (Stokols, 1996).

1.3.4 Application of the socio-ecological model. The socio-ecological model informed the approach to studying stress in this thesis. Accordingly stress was conceptualized to be influenced by individual, interpersonal and environmental factors in a dynamic and ongoing manner. As suggested in SEM, policy, legislation, and

organizational contexts within which individuals are engaged can also impact stress. Given the interactional nature of the relationship between individuals and their environment, stress is both a determinant of health and consequence of daily life (Lazarus, 1991). Therefore, the overall goal of this thesis was to understand stress among post-secondary students from a SEM perspective. Study one focused on the individual level (e.g., demographic characteristics). Careful consideration was given to which factors to include in the logistic regression model that predicted who is more likely to experience stress. Factors selected for analysis were done so from a lens of practical applicability that would enable knowledge from this study to target post-secondary students. For example, GPA was not included as a demographic characteristic as there would be limited ability to address this distinct group. Study two was also positioned at the individual level of the SEM, but focuses on health behaviours. Although post-secondary students engage in a myriad of health behaviours the focus of this study was on physical activity, sleep and nutrition. While alcohol intake, smoking, drug use and unprotected sex are relevant issues for post-secondary the approach to these behaviours is typically one of harm reduction. Consistent with salutogenesis a conscious choice was made to focus on behaviours that empower students to be actively contributing to their overall-well-being. Further, physical activity, sleep, and nutrition were chosen because these are modifiable behaviours and are also subject to multi-level influence. For example; athletic facilities, food outlets on campus, hours of operation of the library, are all institutional factors that impact student participation in physical activity, nutrition, and sleep; respectively.

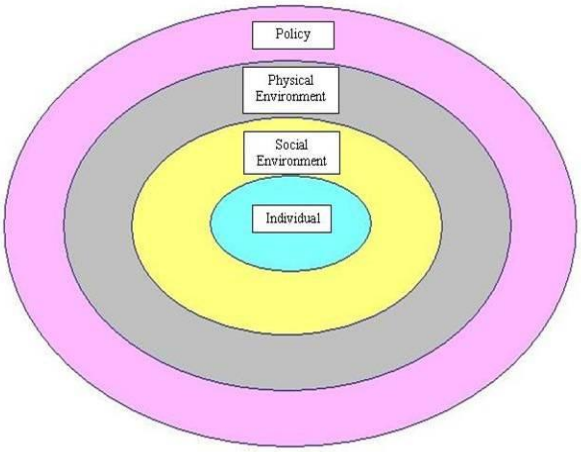

Figure 1. Levels of Influence in the Socio-Ecological Model **(**Stokol, 1992).

Study three considered the impact of individual, social, physical environments and policy have on stress and overall well-being. Understanding of stress was expanded by considering components of social and physical environments and policy that were barriers or facilitators of stress. Consideration of multi-level influences framed the development of the question guide that was used in the focus groups as well as with the analyses that followed.

1.4 Conclusion

Higher education institutions play a significant role in the promotion of health in post-secondary students. Stress is an issue that needs to be addressed on post-secondary campuses as it has the potential to impact the physical and mental well-being of students as well as their academic success. Study 1 examined a large-scale Canadian dataset in order to better understand stress levels of post-secondary students. Study 1 also augments limited research by helping to identify which students are at risk for elevated stress. Study 2 of this dissertation contributes to emerging literature by exploring the relationship between stress, academic performance, and health behaviours (e.g., nutrition, sleep, physical activity) using structural equation modeling. At the time of this writing, no studies could be identified that explicitly examined Canadian students' perceptions about interpersonal and organizational influences on health and well-being. To address this gap, the purpose of study 3 was to engage students in articulating individual and institutional factors that impact health and well-being, and was framed within a socio-ecological approach. This scholarly work considers the individual, the social setting, and the environment as factors influencing health behaviours, stress levels, and academic success of Canadian post-secondary students.

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CHAPTER 2

2 An investigation of Stress among Canadian Post-Secondary Students

2.1 Background

Although stress can impact the mental health and well-being of people of all ages, it is of particular concern for post-secondary students. Results of a national study demonstrate that Canadian post-secondary students experience significant levels of stress (Adlaf, Demers, & Gliksman, 2004; Adlaf, Gliksman, Demers, & Newton-Taylor, 2001). For example, more than half (58%) of students from six Ontario universities reported that their stress level is *more than average* or *tremendous*, and that this stress frequently impedes academic performance (American College Health Assessment, 2009). Stress is a significant issue for post-secondary students with many implications. Excessive negative stress (or distress) has been found to reduce work effectiveness, contribute to bad habits, and result in negative long-term consequences including: addictions, crime, absenteeism, poor academic performance, and school dropout (Dusselier et al., 2005). Conversely, published research finds that the impact of stress is mediated by having established positive coping strategies. Students who have the capacity to manage stress choose healthier coping strategies and are less likely to engage in risky behaviours like alcohol use, poor sleep, unhealthy diet choices, unsafe sex practices, and physical inactivity (Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004). Development of stress management skills in students can promote lifelong positive coping.

While Canadians adults report that families, relationships, work, and major life changes represent significant sources of stress (Crompton, 2011), research has identified

other specific causes of stress experienced by post-secondary students. Particular stressors experienced by students can be related to stage of life, personal factors, or academics. Stresses related to stage of life include: the need to adapt to increased independence, transition to adulthood, building a new social support network, changes in relationships with parents, and obtaining personal security (Al-qaisy, 2010; Parker, Summerfeldt, Hogan, & Majeski, 2004). Commonly identified personal sources of stress for post-secondary students consists of financial concerns, school/personal life balance, and lack of free time (Chernomas & Shapiro, 2013; Jimenez, Navia-Osorio, & Diaz, 2010; Lo, 2002; Moscaritolo, 2009; Pryjmachuk & Richards, 2007; Sheu, Lin, & Hwang, 2002).

In addition, working, either part- or full-time, while pursuing education, further exacerbates stress (Al-Qaisy, 2010; Parker et al., 2004; Magnussen & Amundson, 2003), as do concerns about childcare for those students who are also parents (Pyrmachuk & Richards, 2007). For students pursuing professional degrees, competing for training opportunities and preparation for entry into the professional community are also potential stressors (Goff, 2011; Lo, 2002).

Time management and perceived heavy workloads associated with course requirements add a further dimension to stress experienced by some students (Magnussen & Amundson, 2003). As such, a primary source of stress amongst post-secondary students relates to academics. Stress has been identified as the foremost impediment to academic performance, outranking other impediments to learning such as viral infections, sleep disturbances, concerns about family members and friends, and relationship problems (Cave, 2011; CMHA, 2014; Dusselier, Dunn, Wang, Shelley, & Whalen,

2005). Academic concerns; which consist of exams, workload, and worry about marks; have been cited as top sources of stress for some students (Altiok, 2013; Goff, 2011; Lo, 2002; Shaban, Khater & Akhu Zaheya, 2012). Receiving poor grades, not achieving desired grades, or failing to meet family expectations can leave students feeling inadequate and at risk for depression (Dzurec, Allchin, & Engler, 2007). While stage of life, personal, or academic stressors may be experienced, students report that the cumulative effect and interaction of these interrelated stressors further contribute to unhealthy levels of stress (Patterson & Kline, 2008).

While research has identified sources of stress, (Al-qaisy, 2010; Parker, Summerfeldt, Hogan, Majeski, 2004; Chernomas & Shapiro, 2013; Jimenez et al., 2010; Lo, 2002; Moscaritolo, 2009; Pryjmachuk & Richards, 2007; Sheu et al., 2002; Magnussen & Amundson, 2003; Goff, 2011; Altiok, 2013; Shaban, Khater, & Akhu-Zaheya, 2012; Dzurec, Allchin, & Engler, 2007) there is less research on the characteristics of the students who experience elevated stress. The published research on this topic tends to focus on students with a mental health diagnosis, such as depression or anxiety, (Bitsika, & Sharpley, 2012; Ibrahim, Al-Kharboush, El-Khatib, Al-Habib, & Asali, 2013; Saravanan & Wilks, 2014; Walkiewicz, Tartas, Majkowicz, & Budzinski, 2012; Uskun, Kisioglu & Ozturk, 2008) or on students from a specific program of study like nursing or medicine (Chernomas & Shapiro, 2013; Prymachuk & Richards, 2007; Lee & Kim, 2002). Other demographic characteristics that have been investigated in the literature include international students, (Rice, Choi, Zhang, Morero & Anderson, 2012; Duru & Poyrazli, 2007) or students living in residence (Dusselier et al., 2005). In order to address the stress in post-secondary students and plan stress management programs

effectively, it is important to understand which specific students to target. Therefore, this research aimed to expand the current understanding of stress among Canadian post-students by investigating a multitude of socio-demographic or personal factors that potential impact stress. Using a national sample, the primary purpose of this study was to identify personal factors and demographic characteristics of those who are more likely to experience above average levels of stress. In addition, much of the published research on stress in post-secondary students has been conducted in countries other than Canada (Al-Dubai, Al-Naggar, Alshagga & Rampal, 2011; El-Gilany, Abdel, Amr & Hammad, 2008; Hamaideh, 2012; Moussa & Bates, 2011; Hamdan-Mansour & Dawani, 2008; Pengpid, Peltzer, Mirrakhimov, & Erkin, 2014; Schmidt, 2012; Ulla Díez, & Pérez-Fortis, 2010; Zaroff, Wong, Ku, &Van Schalkwyk, 2014). Therefore, this study also aimed to explore perceived stress levels, common sources of stress, and the impact of stress on academics from a Canadian context.

2.2 Methods

In the months of January to April 2013, the National College Health Assessment (NCHA) survey was administered at 34 self-selected Canadian post-secondary institutions. Of the 34 participating schools, 32 schools used either random sampling techniques or surveyed all students, and also gave permission to be included in the Canadian dataset. Data from these 32 schools were pooled together and were used to comprise the Canadian Reference Group used in the current study.

2.2.1 Participants and recruitment. The Canadian Reference Group consists of 34,039 students from 32 Canadian post-secondary institutions. Ninety-four percent of participating institutions are publicly funded. Forty-seven percent of schools had 20,000

students or more, while 22% had between 5,000-9,999, and 10,000-19,999 students. Each university created their own recruitment campaign to encourage postsecondary students to complete the survey. Recruitment strategies included posters, social media campaigns, mass emails, campus media, use of PowerPoint slides within classes, and advertising on LCD TVs on campus. See Appendix A for a sample recruitment poster. In addition, some schools opted to include participation incentives such as entry into a draw to win gift certificates to the campus bookstore or an iPad.

2.2.2 Procedure. Since 34 Canadian institutions participated, there was variation in survey methods, with some surveying all students and others making a random selection. All schools used a web-based format by e-mailing students an invitation to participate. Appendix B contains a sample letter of information from Western University. E-mail communication is the primary method by which post-secondary institutions communicate with students; therefore, post-secondary students have e-mail capability, access to the internet, and experience using e-mail. The survey was accessed via a confidential and secure website and students were offered the option of unsubscribing and subsequently being removed from the mailing list. Additional reminder messages were sent via e-mail to further encourage completion of the survey. A sample non-responder letter is provided in Appendix C. All participating institutions applied and obtained ethical approval from their respective research ethics boards (see Appendix D). After closing of the survey, raw and aggregate data were collated by the American College Health Association (ACHA). The 32 Canadian institutions that surveyed all students or used random sampling techniques were included in the Canadian

Reference Group. Permission to use the Canadian reference group data was requested by the authors of the survey and granted by the ACHA and is included in Appendix E.

2.2.3 Instrument. The NCHA is a nationally recognized research survey administered through the ACHA (2014). A sample survey is provided in Appendix F. The survey collects data about students' health habits and behaviours. More specifically, it was designed to investigate risk and protective behaviours, perceived norms, and incidence and prevalence of a variety of health problems/conditions that impact academic performance and retention (ACHA, 2014). The NCHA consists of 67 questions spanning the following content areas: health and safety, alcohol and substance use, sexual health, mental health, and academic impacts. More than 825,000 students at 550 post-secondary institutions in North America have completed the survey. For the purpose of this study, data were extracted from questions relating to socio-demographic information, stress, and impediments to academic performance from the Canadian Reference Group.

2.2.4 Socio-demographic questions. Respondents provided demographic information such as age, ethnicity, gender, type of student (undergraduate or graduate), international status, place of residence, work for pay, experience of mental health disorder, disability, and chronic illness. Question NQ 65 asked "Do you have any of the following?" The response options included: ADHD, chronic illness, deafness/hearing loss, learning disability mobility/dexterity disability, partial sightedness/blindness, psychiatric condition, speech or language disorder, or other disability. To measure whether a student had a mental health diagnosis, a new variable was created combining those who responded *yes* to having a psychiatric condition (NQ65) and those who answered *yes* to having a diagnosed mental health condition (NQ31). To identify

students with a learning disability, a new dichotomous variable with response options 'yes' or 'no' was created by combining those who responded *yes* to having ADHD or learning disability (NQ65) and those who answered *yes* to having a diagnosis of ADHD (NQ31). A variable was also created to identify students who experienced physical disabilities, by combining responses from students who indicated that they had any of the following conditions; deafness/hearing loss, mobility/dexterity disability, partial sightedness/blindness, speech or language disorder, or other disability (NQ65).

2.2.5 Stress. The NCHA specifically asks about stress levels through the question: "Within the last 12 months, how would you rate the overall level of stress you have experienced?" (NQ37). Response options included: no stress, less than average stress, average stress, more than average stress, and tremendous stress. For the purpose of the analysis, data were re-coded into two categories: non-problematic stress (i.e., no stress, less than average stress, average stress) and problematic stress (i.e., more than average or tremendous stress). This categorization was thought to reflect if students perceived their stress as being significant and for analysis purposes stress was analyzed as a dichotomous variable.

2.2.6 Stressors. Stressors were assessed by the following question: "Within the last 12 months have any of the following been traumatic or very difficult of you to handle?" (NQ33). Participants could select one or more of the following stressors: academics, career-related issues, death of a family member or friend, family problems, intimate relationships, other social relationships, finances, health problem of a family member or partner, personal appearance, personal health issue, or sleep difficulties.

2.2.7 Academic impacts. The question relating to academic impacts asked, "Within the last 12 months, have any of the following affected your academic performance?" (NQ45). There were 31 response options (e.g., alcohol use, attention deficit and hyperactivity disorder, depression, finances, roommate difficulties, stress etc.), with response options including: this did not happen to me/not applicable; I have experienced this issue but my academics were not affected; I received a lower grade on an exam or important project; I received a lower grade in the course; I received an incomplete or dropped the course; significant disruption in thesis, dissertation, research, or practicum work. Responses were then dichotomized to reflect academics not being affected (i.e., this did not happen to me/not applicable, I have experienced this issue but my academics have not been affected) or academics affected (i.e., received a lower grade on an exam or important project; or received a lower grade in the course or received an incomplete or dropped the course; or significant disruption in thesis, dissertation, research, or practicum work).

2.2.8 Validity and reliability. The ACHA conducted reliability and validity analyses using spring 2009 and spring 2010 results (Leino, 2000). Reliability analyses demonstrated moderate-to-strong results in the evaluation of grouped or scaled items. Repeated reliability analyses demonstrated strong consistency over the two survey periods. Construct validity analyses showed consistency over two survey periods with different colleges/universities (Leino, 2000).

2.2.9 Data Analysis. Data were analyzed descriptively using SPSS statistical software (Version 20). Frequency data was represented in percentages to describe the sample, stress levels, and stressors experienced by students. Multiple logistic regression

was used to predict who was more likely to experience elevated stress. Because of the significance associated with having a mental health diagnosis (Bitsika, & Sharpley, 2012; Ibrahim, Al-Kharboush, El-Khatib, Al-Habib & Asali, 2013; Saravanan & Wilks, 2014; Uskun, Kisioglu & Ozturk, 2008; Walkiewicz, Tartas, Majkowicz, & Budzinski, 2012), this characteristic was entered first (block 1). Personal factors were grouped and subsequently entered, with learning disability, disability (other), and chronic illness added as block 2. Subsequently, demographic covariates (e.g., age, type of student, international status, place of residence, relationship status, work for pay, ethnicity) were entered into block 3. Missing data were excluded from the analysis subset.

2.3 Results

A total of 34,039 students from 32 Canadian universities participated in the survey. The mean response rate was 20% and median was 19%. This response rate fits within the expected rate of 15-20% for web-based surveys (Fielding, Lee, & Blank, 2008; NCHA, 2014). Average age of the respondents was 22.89 years (*SD* = 5.88). Participants were primarily Caucasian (70.1%), female (67.1%), single (82.2%), full-time (92.5%), undergraduate (84.1%) students who were living off-campus (76.3%). Table 1 presents demographic data.

2.3.1 Stress levels. As demonstrated in Figure 1, responses from the question about level of stress (NQ37) indicated that 1.1% of students reported no stress, 7.0% experienced less than average stress, 34.5% reported average stress, 45.5 % reported more than average stress, and 12.1% indicated they experienced tremendous stress.

Table 1

Demographic Characteristics of Respondents in Sample (n =33,164)

Demographic Characteristic	Sample (%)	N
Gender		
Male	30.9	10,519
Female	67.6	22,995
Age		
18-22 years old	65	22,114
23 years or older	34	11,517
Type of Student		
Undergraduate	84.1	28,115
Graduate/professional school	14.5	4,834
International Students	10.5	3,497
Place of residence		
Residence	15.3	5,077
Off-campus	76.3	28,542
Relationship Status		
In a relationship	51.1	17,379
Not in a relationship	47.6	16,205
Work for Pay		
Do not work for pay	47.7	16,248
Work for pay	50.6	17,203
Ethnicity		

Caucasian	70.1	22,535
Non-Caucasian	29.9	11,504
Physical/Mental Health		
Mental Health Diagnosis	18.9	6,421
Learning Disability	6.8	2,423
Other Disability	7.0	1,922
Chronic Illness	5.0	1,692

*missing values excluded

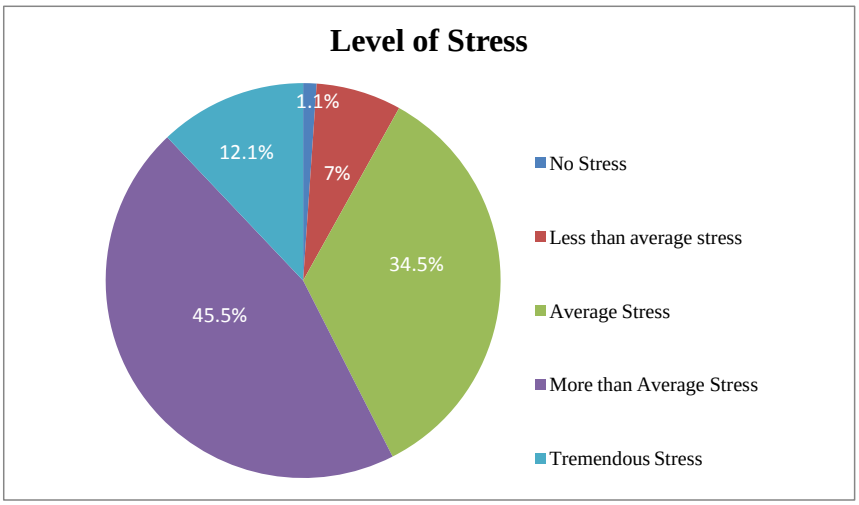

Figure 1. Level of Stress Reported by Canadian Post-Secondary Students (*n* = 33,164)

2.3.2 Stressors. The top five stressors reported by students (all of which were reported to be traumatic or difficult to handle in the last 12 months) included academics (56.7%), finances (36.8%), sleep difficulties (31.9%), intimate relationships (31.9%), and career-related issues (30.9%). Refer to Figure 2.

2.3.3 Stress impact on academic performance. As previously noted, 31 possible conditions that could impact upon academic performance were listed in the survey. Some students indicated that they did not experience the condition, or that they experienced the condition but it did not impact their academics. To most accurately represent those who were affected, this question was analyzed by including only those who experienced the condition. Figure 3 presents all possible impediments to academic performance plotted by percent of the population who reported experiencing the condition, and percent of those who reported experiencing the condition with academic impact. Therefore, conditions falling in the top right quadrant of the graph were most frequently experienced and most likely to impact academics. Conditions that fell in the bottom right quadrant were most frequently experienced in the student population, but were less likely to impact academic performance. Conditions in the top left quadrant were not experienced frequently, but when they were experienced, had a high chance of impacting academics. In the bottom left quadrant are conditions that were not frequently experienced and did not tend to impact academics. Stress was the most frequently experienced condition (68.7%), and of the students who experienced stress, 46% reported that academic performance was impacted as a result. Fifty-three percent of students experienced sleep difficulties, and of those, 47.3% reported that academics were adversely impacted due to lack of sleep. Of the 54% of students who experienced a

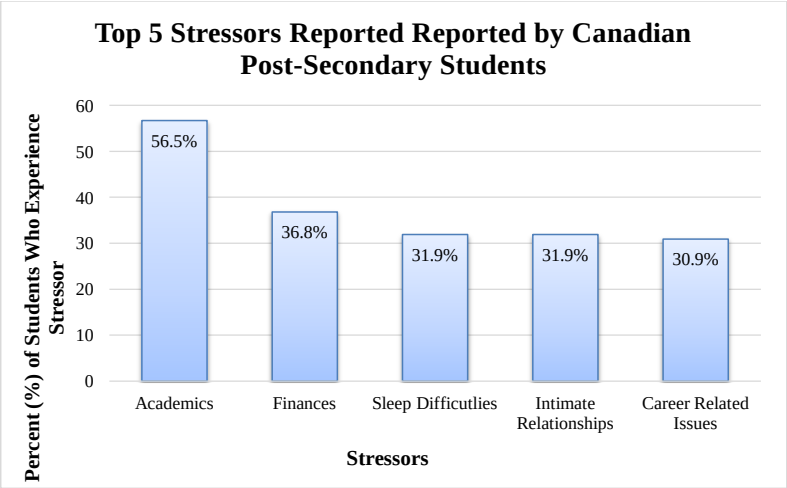

Figure 2. Top Five Stressors Reported by Canadian Students (*n* = of 33,164)

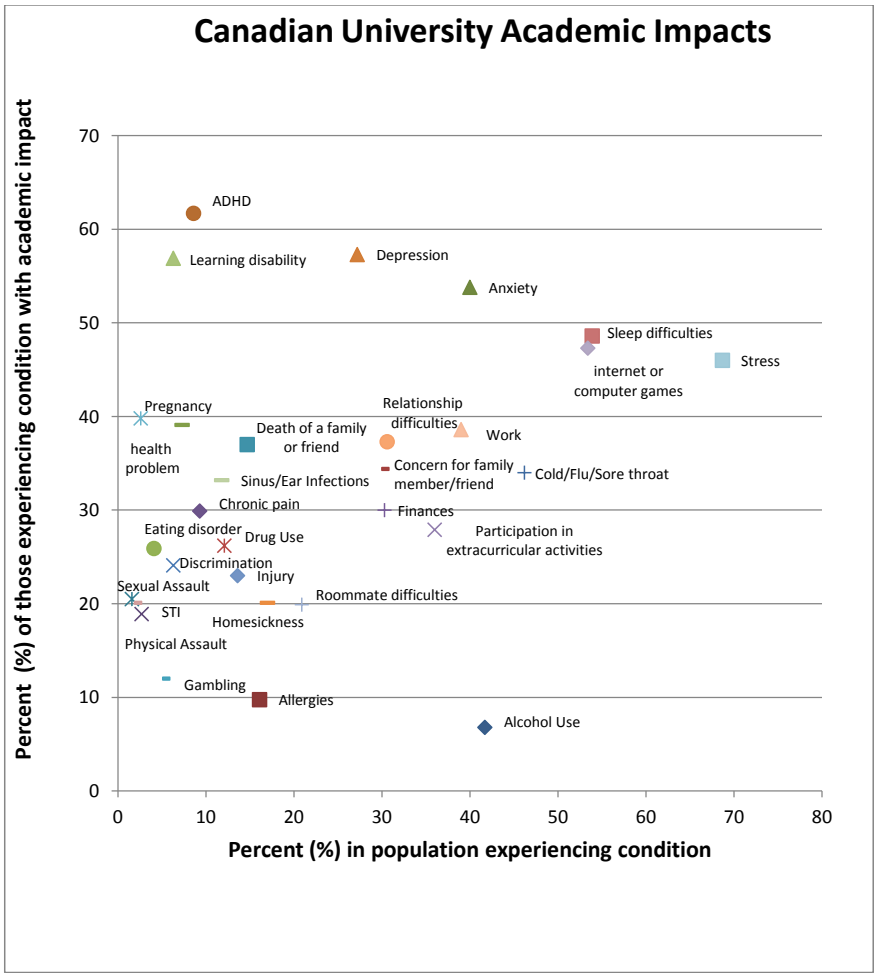

Figure 3. Possible impediments to academic performance plotted by percent of the Canadian Student population who experienced a variety of issues (n = 33,164)

problem with internet use/computer games, 48.6% reported adverse academic impacts. Although ADHD and learning disabilities were not highly reported problems (8.6% and 6.3 %, respectively), when they were experienced they reportedly had a negative impact on academics (61.7% and 56.9%, respectively).

2.3.4 Stress profile. A logistic regression model was created to identify the personal characteristics of university students who reported more than average/tremendous stress levels. The following variables were entered as possible predictors in the logistic regression: mental health diagnosis, learning disability, other disability, chronic illness, gender, ethnicity, relationship status, type of student, work for pay, international students, relationship status, and place of residence. Results associated with the logistic regression are presented in Table 2. After controlling for other predictors in the model, there were nine significant predictors included: mental health diagnosis, gender, international student status, learning disability, other disability, chronic illness, age, relationship status, and type of student. Those with a mental health diagnosis were more than three times as likely to have elevated stress (OR = 3.01, $p < .01$) than those without a mental health diagnosis. Females (OR = .93, $p < 0.1$) and non-international students (OR = 1.40, $p < 0.1$) were approximately 1.5 times more likely than males and international students, respectively, to report increased stress. Having a learning disability (OR = .74, $p < 0.1$) or any other disability (OR = .73, $p < 0.1$) was associated with an increase in the odds of reporting increased stress levels by almost 30%, while those with a chronic illnesses (OR = .58, $p < 0.1$) had an almost 35% increase in the odds of reporting more than average stress. Graduate students had increased stress levels of 14% when compared to undergraduate students. Students over the age of 23 years (OR = .93, $p < 0.1$) had

significantly higher stress levels (i.e. 7%) than those 22 years of age or under, as did students who reported being in a relationship (OR = .93, $p < 0.1$). The test of the full model against a constant-only model was statistically significant, indicating that the predictors reliably distinguished between those with more than average stress and those with average or less than average stress $X^2(3) = 97.437$, $p = .00$.

Table 2

Logistic Regression Predicting More than Average or Tremendous Stress (n = 33,164)

					95% CI	
Variable	Beta	SE	p value	OR	LL	UL
Mental Health Diagnosis	1.10	0.35	0.00*	3.01	2.81	3.22
Learning Disability	-.21	0.05	0.00*	.82	.74	.90
Disability	-.21	.056	0.00*	.81	.73	.90
Chronic Illness	-.42	0.61	0.00*	.66	.58	.74
Gender						
Female	-0.43	0.26	0.00*	1.53	1.46	1.61
Male						
Age						
17-22	-0.73	.031	0.02*	.93	.88	.99
23+						
Type of Student						
Undergraduate	-0.15	0.40	0.00*	.86	.80	.93
Graduate						
Non-International Student	0.41	0.40	0.00*	1.51	1.40	1.64
Relationship Status						
Not In Relationship	-0.74	.025	.00*	.93	.89	.97
In Relationship						

Note. SE = standard error; OR = odds ratio (i.e., indicates the likelihood of having more than average or tremendous stress); CI = confidence interval; LL = lower limit; UL = upper limit; * $p <$ .05.

2.4 Discussion

In this study, the prevalence, impact, and experience of stress reported by university students from 32 Canadian post-secondary institutions were examined. Consistent with previous research (Adlaf, 2005 ACHA, 2009), the majority of Canadian post-secondary students experience high levels of stress. In this study, 57.6% of respondents reported that their stress was more than average or tremendous. In addition, stress was the most frequently cited reason for academic performance being negatively impacted (38.6%). Congruous with published literature (Cave, 2011; Dusselier et al., 2004; Magnussen & Amundson, 2003), this research verifies the cyclical relationship between stress and academic performance. For many students, stress leads to lower academic performance and poor academics leads to increased stress. Stress is therefore an important issue for Canadian post-secondary students and should be prioritized by key stakeholders. For example, university administrators, faculty members and student service providers, play a critical role in addressing systemic causes of stress and supporting their students in building capacity to manage stress. At a national level, advocacy efforts should focus on the recognition of post-secondary students as group with distinct needs and health concerns.

One focus of this study was to explore the personal characteristics (i.e., 'profile') of Canadian post-secondary students who experience increased stress. Unique socio-demographic predictors of stress in post-secondary students were identified. By

targeting students who are more likely to experience elevated stress, health promotion efforts at post-secondary institutions can address students whose mental well-being may be threatened. This study confirms previously published literature (Bitsika & Sharpley, 2012; Ibrahim, Al-Kharboush, El-Khatib, Al-Habib, & Asali, 2013; Saravanan & Wilks, 2014; Uskun, Kisioglu, & Ozturk, 2008; Walkiewicz, Tartas, Majkowicz, & Budzinski, 2012), suggesting that students who have a mental health diagnosis, a learning disability, any other disability, and/or chronic illnesses experience elevated stress. Female students are more likely to experience elevated stress, as are those post-secondary students over the age of 23 years. Although published literature suggests that international students experience elevated stress (Duru & Poyrazli, 2007; Rice, Choi, Zhang, Morero, & Anderson, 2012), findings from this study conflict with this, and therefore bears further exploration. Another unexpected finding was the impact of relationships on stress. Students in relationships were more likely to experience elevated stress, with intimate relationships being reported as the third highest reported stressor by Canadian post-secondary students. While this research yielded preliminary descriptive findings about the impact of relationships on stress and well-being, it is recommended that additional research confirms and expands understanding of these complexities.

There are many transitions and challenges faced by post-secondary students when pursuing further education. Lack of knowledge surrounding how to cope with distress or a lack of effective coping strategies can be detrimental to student health, and may result in limited adaptation to university life as well as poor academic performance and decision-making (Loi, Spencer, & William, 2004). Given the prevalence of stress and the adverse impact of stress in post-secondary students identified in this study, the

development of effective coping strategies is important; particularly as research has demonstrated that individuals who adapt early to university life have higher perceptions of self-worth and academic competence (Loi et al., 2004), are more likely to use safe sex practices, and are more physically active (Skipworth, 2006).

Findings from this study highlight the importance of proactively helping students learn to manage their stress. Without adequate stress management skills, support, or mental wellness, academics may be impacted and mental health issues may develop (Pittman & Richmond, 2008). In fact, research has shown that stress and poor mental health are significant contributors for the 30% of university students who drop out before completing a degree (Radcliffe & Lester, 2003). Equally interestingly, students who adapt to university are less likely to experience depression later on in their university experience (Friedlander, Reid, Shupak, & Cribbie, 2007). Mirwaldt and colleagues (2012) have highlighted that irrespective of gender and age, greater stress management self-efficacy was associated with lower depression scores for students whose stress impedes their academic performance. Skipworth (2011) also provides empirical evidence to support the notion that a significant relationship exists between perceived stress and depression among university students. Suicide currently ranks as the second leading cause of death (after automobile accidents) among Canadian university students (CMHA, 2014; Mackean, 2014), which further emphasizes the importance of effective stress management and promotion of mental well-being. The university setting is an optimal environment in which to learn stress management skills, improve resiliency, and encourage and promote positive health behaviours and personal development. Improving student health literacy (i.e., the ability to access, comprehend and, evaluate health

information (Pubic Health Agency of Canada, 2014) is an important aspect of overall stress management (Loi et al., 2004). Therefore, post-secondary institutions can support their students through providing education and programming related to stress management.

2.4.1 Limitations. This study has several limitations. In terms of study design, its cross-sectional nature precludes causation. Despite the large number of participants included in the study, potential sampling issues include the self-selected nature of the sample. Arguably, the participants who completed the survey have varying motivation to do so and divergent perceptions about their health. Furthermore, given the high number of female respondents and a higher than expected average age of student respondents, the findings may not be representative of the entire university student population. Concerns also exist about potential social desirability bias, as participants may have responded to items in ways that they felt the researchers wanted. While most survey questions were asked about recall over a 12 month period, this length of time may have led to answers that were not representative of student's actual experience. Inherent to online administration of surveys are concerns with administration, technical issues (such as hardware/software configurations, network performance, etc.), and measurement error as a result of respondents' motivation, computer literacy, abilities, and privacy concerns (Fielding et al., 2008). Lastly, neither stress nor academic performance were not operationally defined for students who completed the survey, therefore variation in the interpretation of these question might exist.

2.4.2 Conclusions. This study highlights that amongst post-secondary students, stress is inherent, significant, and adversely impacts academic performance. While the

elimination of stress is an impossible goal, there exists an opportunity for students to develop coping skills and for systems within post-secondary institutions to promote and support healthy environments that enable students to achieve their full potential. This study identified that stress significantly impacts student experience. Therefore, it is important for post-secondary institutions to prioritize and engage in strategic planning inclusive of health and wellness needs of students, with a specific focus on stress. Creating a campus environment that supports students in addressing stress levels can contribute to the achievement of an optimal health status, thereby enabling students to maximize their intellectual functioning and scholastic achievements.

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CHAPTER 3

3 Stress, Physical Activity, Sleep, Nutrition and Academic Performance in Canadian Post-Secondary Students: A Path Analysis

3.1 Background

Research has revealed that Canadian post-secondary students experience significant levels of stress (Adlaf, Demers, & Gliksman, 2004; Adlaf, Gliksman, Demers, & Newton-Taylor, 2001). Approximately 60% of Ontario post-secondary university students report that their stress levels are *more than average* or *tremendous* (American College Health Association [ACHA], 2009). These higher than normal levels of stress are attributed to impending assignment and exam deadlines, long hours spent in class, demanding workload, achieving desired grades, and meeting family expectations (Altiok, 2013; Dzurec, 2007; Goff, 2011; Lo, 2002; Shaban, Khater, & Akhu-Zaheya, 2012). Other contributors to elevated stress levels include: financial concerns, school/personal life balance, lack of free time (Chernomas & Shapiro, 2013; Jimenez, Navio-Orsorio, Diaz, 2010; Lo, 2002; Moscaritolo, 2009; Pryjmachuk & Richards, 2007; Sheu, Lin, & Hwang, 2002), insufficient time management skills (Magnussen & Amundson, 2003), working while perusing education (Al-qaisy, 2010), and preparation for entry into the professional community (Goff, 2011; Lo, 2002).

The reporting of higher than normal levels of stress among postsecondary students is concerning from both an academic and health perspective. Academically, stress has been associated with reduced work effectiveness, absenteeism, and school drop-out (Dusselier, Dunn, Wang, Shelley & Whalen, 2005). In addition, several studies have highlighted the negative relationship between stress, student success (Flouri & Kallis,

2011), and academic performance (Cave, 2011; Chow, 2007; Chug & Cheung, 2008; Flook & Fuligini, 2008; National College Health Assessment [NCHA], 2013; Richardson, Abraham, & Bond, 2012; Taylor, Vatthauer, Bramoweth, Ruggero, & Roan, 2013). For example, negative effects of general stress (r^{+}= .13, 95% CI [.19- .06]) and academic stress (r^{+} = .12, 95% CI [.21-.02]) were identified in a meta-analysis as correlates to GPA (Richardson, Abraham, & Bond, 2012). Furthermore, academic performance and stress exist in cyclical relationship whereby increasing stress can negatively impact academic performance and poor performance then contributes to increased stress (ACHA, 2009; Dusselier, Dunn, Wang, Shelley, & Whalen, 2005; Magnussen, & Amundson, 2003). Thus, failure to cope with potential stressors can negatively impact students' academic performance.

Post-secondary students' stress levels can further be increased by engaging in risky behaviours (Kwan, Faulkner, Arbour-Nicitopoulos, & Cairney, 2013). For example, it has been noted that post-secondary students have high rates of alcohol use, binge drinking (Kingsbury, Gibbons, & Girrard, 2014; Moore-Rodríguez et al., 2014; Ward, Lallemand, & De Witte, 2014), unprotected sex (King, Vidourek, & Singh, 2014; Pengpid, Peltzer, Mirrakhimov, & Erkin, 2014), and drug experimentation (Bennett & Holloway, 2014; Holloway Bennet, Parry, & Gorden, 2014; Leinwand, 2007). In addition, post-secondary students also report unhealthy sleep habits, (Curcio, Ferrara, & De Gennaro, 2006; Patton & Viner, 2007), being physical inactive (Haase, Steptoe, Sallis, & Wardle, 2004), disordered eating (Cornblatt, 2009), and poor eating habits (ACHA, 2009; Ontario University and College Health Assocation [OUCHA], 2009). Many of these health behaviours are modifiable and are therefore of interest to

health promoters. Engaging in healthy behaviours such as regular physical activity, good sleep hygiene, and proper nutrition have all been found to positively impact stress levels (Busch et al.,, 2014; Ruthig, Marrone, Hladkyj, & Robinson-Epp, 2011) and academic performance (George, Dixon, Stansal, Gelb, & Pheri, 2008; OUCHA, 2009;).

3.1.2 Physical activity. Engaging in regular physical activity is a crucial component of leading a healthy lifestyle with a clear role in the management of stress (Canadian Society for Exercise Physiology [CSEP], 2014). Not only does physical activity directly reduce stress (CESP, 2014), there are a number of indirect effects as well. For example, regular physical activity has been linked to increased feelings of energy, reduced depressive symptoms, increased self-confidence and self-perception, improved mental well-being, and increased social engagement and feelings of empowerment; all of which help decrease stress ; Busch et al., 2014; Gondoh et al., 2009; Long & Flood, 1993; Singh, Uijdewilligen, van Mechelen, & Chinapaw, 2012; Trudeau, 2010). Although research consistently demonstrates that physical activity is associated with reductions in stress (Alexandratos, Barnett, & Thomas, 2012; Gondoh et al., 2009), evidence about the relationship between physical activity and academic performance is less clear and inconsistent. For example, Trockel, Barnes, and Egget (2000) found that strength training, and Rettinger (2011) found that moderate-to-vigorous physical activity, were associated with postivite academic performance. However, Brennan (2006) found no statistically significant difference between exam scores and academic performance of female students who exercise regularly. One review that included 14 articles on physical activity and academic performance concluded that despite short-term improvements in academic performance as a result of physical activity (such as on concentration), long-

term improvement of academic achievement are not well substantiated (Taras, 2005). Raspberry and colleagues (2011) conducted a review that included 50 studies on the relationship between four school-based physical activity contexts and academic performance. Within these studies, the relationship between physical activity and academic performance was positive (50.5%), while 48% of the time the relationship was not statistically significant. Although research literature exploring physical activity and stress, and physical activity and academic performance exists, there is limited research that specifically investigates these three variables in concert. In fact, the current literature search revealed only one study that examined the relationship of physical activity and stress on GPA (Rettinger, 2011). Results from this study found that stress was higher in females and lower with every hour of sleep achieved. Higher GPAs were related to total energy expenditure and step counts, whereas stress was associated with lower GPA (Rettinger, 2011). The current study explains the relationship between stress, physical activity, and academic performance and will add to the emerging literature base.

3.1.3 Sleep. Post-secondary students often experience sleep patterns that leave them chronically sleep deprived (Curcio, Ferrara, & De Gennaro, 2006; Patton & Viner, 2007). This is not surprising given that post- secondary students are more likely to have shortened total sleep time, erratic sleep/wake schedules, late bed and rise times, and poor sleep quality in comparison to non-post-secondary students (Wolfson & Carskadon's, 2003). In a study involving 380 university students in the United Kingdom, one fifth of the sample reported that they 'sometimes' or 'very often' experience disordered sleep (El Ansari & Stock, 2010). Furthermore, over 40% of Ontario post-secondary students from six universities self-reported that sleep habits are problematic (ACHA, 2009). The

relationship between sleep and stress is complex, as stress is a predisposing, precipitating, and perpetuating factor in sleep difficulties. For example, a cross-sectional study involving 1,025 college students revealed that poor sleep quality is associated with higher levels of stress and students with elevated emotional and academic stress experienced negative impacts on sleep (Lund, Reider, Whiting, & Prichard, 2010). While research has focused on the effects of sleep on academic performance in younger adolescents (ages 12-17 years), the study of sleep in the post-secondary population is not as robust (Crowley, Acebo, & Carskadon, 2007). Existing studies on sleep among post-secondary students are complicated by variation in the measurement of academic performance. School achievement has been measured by using different parameters, such as GPA (Trockel et al., 2000), or self-report to measure (ACHA, 2009; Noland, Price, Drake, & Telljohann, 2009). Further, the role of lack of sleep on memory capacity, learning, and ability to pay attention, all of which are important contributors to academic performance, is not clear (Abdulghani et al., 2014; Noland, Price, Dake, & Telljohann, 2014). As the relationship between sleep, stress, and academic performance is not well understood, additional research is needed.

3.1.4 Nutrition. Healthy nutrition plays a role in the academic success of post-secondary students (Dog, 2010; George, Dixon, Stansal, Gelb, & Pheri, 2014). It has been demonstrated that students who have average grades above 90% are more likely to consume milk, vegetables, and fruit daily than were those who reported lower grades (MacLellan et al, 2008). Often, post-secondary students do not meet daily recommendations for nutrition intake, and it has been estimated that daily consumption levels are approximately 1 serving of fruit, 1.5 servings of vegetables, 0.5 serving of low-

fat dairy, and 1.4 servings of whole grains (Strong, Parks, Anderson, Winett, & Davy, 2008; Poddar, et al., 2009). Lack of access to adequate food and iron deficiency are additional issues that can potentially impact learning in post-secondary students (Taras, 2005). In one study that investigated the effects of healthy nutrition on academic performance, skipping breakfast and irregular dietary patterns were found to be significantly associated with poorer grades in nursing students (Chen & Liao, 2002). The finding that consuming breakfast is related to improved academic performance has been replicated by other researchers (Adolphus, Lawton, & Dye, 2013; Hoyland, Dye, & Lawton; Trockel et al., 2000). Although nutrition is thought to play a role in academic performance, its relationship to stress is less clear. Nutrition research in this population tends to focus on eating disorders, binge eating, and obesity, rather than stress itself. For instance, Sulkowski and colleagues (2011) found that students, who used certain coping techniques like avoidant coping, were more likely to experience stress and binge eating (Sulkowski, Dempsey, & Dempsey, 2011). It is possible that good nutrition plays a role in stress management since nutrition can have a positive impact on students through social inclusion, self-reliance, self-determination, and healthy body image (Dietitians of Canada, 2012). In fact, Chilean college students who self-reported having lunch and fruits and vegetables each day had a higher likelihood (*OR* between 1.33 and 1.40) of being classified as "very happy" (Piqueras, Kuhne, Vera-Villarroel, van Straten, & Cuijpers, 2011). Although limited research exists, nutrition appears to influence stress and academic performance among post-secondary students.

3.2 Purpose and Hypotheses

There is empirical evidence demonstrating that a myriad of factors impact academic success. A systematic review and meta-analysis that reported on the impact of correlates on GPA included (Richardson, Abraham, & Bond, 2012): 3 demographic factors, 5 measures of cognitive capacity, and 42 other correlates from 5 domains (i.e., personality traits, motivational factors, self-regulatory leaning strategies, students' approaches to learning, and psychosocial contextual influences on academic performance) found that the strongest correlate was performance self-efficacy followed by grade goal and high school GPA. Although this study included many potential impacts on academic performance, sleep, physical activity, and nutrition were not included as correlates in the analysis. Further we were unable to identify a study that attempted to explain the relationships across sleep, physical activity, nutrition, stress, and academic performance (Chow, 2007; Trockel et al., 2000). Therefore, the purpose of this study was to: 1) provide descriptive information about physical activity, sleep, and nutrition in Canadian post-secondary students, and 2) to investigate the directional relationships between academics, stress, and health behaviours (i.e., physical activity, sleep, and nutrition) among Canadian post- secondary students.

Relationships between variables in this study could be investigated through multivariate multiple regression or through path analysis. Path analysis separates direct effects and indirect effects through a medium variable while regression analysis considers direct effects only. Path analysis was appropriate for use in this study as it; allows for the investigation of more than one dependent variable at a time, allows for variables to be a predictor and an outcome within the same model, assumes a unit variance for all the

variables to allow the comparison of the magnitudes of each variable included, and decompose the sources of the correlations among the dependent variables. Findings from this study will contribute to emerging research literature by exploring potential factors influencing academic performance in Canadian post-secondary students that have not been extensively studied. In addition, this study begins to provide an understanding of the mechanisms through which health behaviours impact students. Identification of indirect effects allows the complex relationships to be broken down.

It is hypothesized that sleep, nutrition, and physical activity will be negatively related with stress. It is further hypothesized that stress will be negatively associated with academic performance. Lastly, it is hypothesized that measures of sleep, nutrition, and physical activity will both directly and indirectly influence academic performance (a relationship explained by stress).

3.3 Methods

In the months of January to April 2013, the NCHA survey was administered through the ACHA at 34 self-selected Canadian postsecondary institutions. The NCHA is an internationally recognized survey that has been administered at more than 550 post-secondary institutions in North America (ACHA, 2014). The NCHA collects data about students' health habits and behaviours. More specifically, it was designed to investigate risk and protective behaviours, perceived norms, and prevalence of a variety of health problems/conditions that impact students' academic performance and retention (ACHA, 2014). Of the 34 participating schools, 32 schools used either random sampling techniques or surveyed all students, and also gave permission to be included in the

Canadian dataset. Data from these 32 schools were pooled together and used to comprise the Canadian Reference Group utilized in the current study.

3.3 1 Participants and recruitment. The Canadian Reference Group consists of 34,039 students from 32 Canadian post-secondary institutions. Ninety-four percent of participating institutions are publicly funded, where 47% had 20,000 students or more, 22% had between 5,000-9,999 and 10,000-19,999 students, respectively. Each university created their own recruitment campaign to encourage postsecondary students to complete the survey. Example recruitment strategies included: posters, social media campaigns, mass emails, campus media, use of PowerPoint slides within classes and advertising on LCD TVs on campus. In addition, some schools opted to include participation incentives such as entry into a draw to win gift certificates to the campus bookstore or an iPad.

3.3.2 Procedure. All participating institutions applied to and obtained ethical approval from their respective research ethics boards. The invitation to participate in the study was distributed to students through e-mail. Students who agreed to participate in the study accessed the survey online via a confidential and secure website. Students not agreeing to participate in the survey were offered the option of unsubscribing and subsequently being removed from the mailing list. Between one and three reminder messages were sent via e-mail to further encourage completion of the survey. After closing of the survey, data were collated by the ACHA. Permission to use the Canadian reference group data was requested by the authors of the survey and granted by the ACHA.

3.3.3 Instrument. The NCHA consists of 67 questions spanning the following content areas: health and safety, alcohol and substance use, sexual health, mental health,

and academic impacts. For the purposes of this study, the following demographic questions were included in descriptive analyses: gender (NQ47), year in school (NQ51), international status (NQ55), and place of residence (NQ58). Five other measures were identified that best reflected constructs of interest in this study: nutrition (NQ28), sleep (NQ43), physical activity (NQ67), stress (NQ37), and academic performance (NQ63).

3.4 Measures

3.4.1 Physical activity. Question NQ67 of the NCHA asked how many minutes of moderate-to-vigorous physical activity, in 10 minute increments, students had engaged in over the last 7 days. Respondents selected one of the following: < 30 minutes, 30-60 minutes, 61-90 minutes, 91-150 minutes, or > 150 minutes (American College Health Association – National College Health Assessment II [ACHA-NCHA], 2013). For descriptive statistic purposes, a new dichotomous variable was developed. According to CSEP (2012) recommendations, students who answered that they engaged in >150 minutes per week of physical activity were categorized as 'meeting exercise requirements', while those who reported < 150 minutes 'did not meet requirements'.

3.4.2 Sleep. Question NQ43 of the NCHA asked if students experienced problems with sleepiness (e.g., feeling sleepy, struggling to stay awake) during their daytime activities. Response options included: no problem at all, a little problem, more than a little problem, a big problem, and a very big problem (ACHA-NCHA II, 2013). For descriptive analyses, a new dichotomous variable was developed where those who responded that sleep was 'more than a little problem', 'a big problem' and 'a very big problem' were considered to have problematic sleep. Those who reported 'no problem at all' or 'a little problem' were classified as having non-problematic sleep. According to

the National Sleep Foundation (2014), sleep needs vary based on age and the individual. Given that an "ideal" amount of sleep cannot be identified due to variation amongst individuals, for the purposes of this study students who were classified as having non-problematic sleep were considered to having 'adequate sleep' (e.g., meeting sleep guidelines), while those who identified problematic sleep were considered to having 'inadequate sleep' (e.g., identified as not meeting sleep guidelines).

3.4.3 Nutrition. Question NQ28 of the NCHA asked how many servings of fruits and vegetables students typically consumed per day. Response options included: 0 servings per day, 1-2 servings per day, 3-4 servings per day, or 5 or more servings per day (ACHA-NCHA II, 2013). A new dichotomous variable (e.g., meeting or not meeting recommendations for fruit and vegetable) was created for descriptive statistic purposes. Based on Health Canada guidelines (Health Canada Food Guide, 2014), students who responded with 5 or more servings of fruits and vegetables per day were considered to be 'meeting recommendations for fruit and vegetable intake", while those who responded with less than 5 servings per day were considered 'not to be meeting recommendations for fruit and vegetable intake'.

3.4.4 Stress. Question NQ37 of the NCHA asked, "Within the last 12 months, how would you rate the overall level of stress you have experienced?" Response options included: no stress, less than average stress, average stress, more than average stress, and tremendous stress (ACHA-NCHA II, 2013). For descriptive statistic purposes, a new dichotomous variable was developed where stress was coded as 'non-problematic stress' (e.g., including response options: no stress, less than average stress, average stress) and 'problematic stress' (e.g., more than average stress or tremendous stress).

3.4.5 Academic performance. Question 63(NQ 63) asked respondents "What is your approximate cumulative grade average"? Response options included: A, B, C, D/F, and N/A (ACHA-NCHA II 2013). This variable was re-coded by excluding participants who selected N/A. To maintain variability, this variable was analyzed using the remaining 4 response options.

3.5 Data Analysis

A two-phased approach to data analysis was taken. First, descriptive statistics were calculated using SPSS (version 20). Subsequently, path analysis with MPlus (version 7) software package was conducted to examine the relationships between identified variables of interest.

3.5.1 Phase 1: Descriptive statistics. Descriptive statistics were calculated based on demographic factors of interest (e.g., gender, year in school, international student status, and place of residence) and whether students were meeting recommendations for sleep, exercise, and nutrition according to the dichotomous variables previously described. Under each of these categories, mean level of stress and standard deviation was calculated. Correlations between the independent variables of interest (i.e. physical activity, sleep, and nutrition) were analyzed. Missing data were excluded from the analysis subset.

3.5.2 Phase 2: Path Analysis. Data were prepared for reading in MPlus software package using SPSS. Missing data were re-coded with discrete values (999) to enable easy identification of missing data in the analysis stage. Listwise deletion was used for all participants who had missing values under any of the measures. As a result, 875 participants were eliminated from the analysis due to missing values, leaving a total

sample size of 33,164. Path analysis was conducted on manifest variables of interest in MPlus. A literature review demonstrated that significant relationships between both direct and indirect measures of health behaviours, stress, and academic performance were expected. Given the hypothesis-driven nature of the inquiry, a saturated model was used to test relationships between all variables of interest in this study. Goodness of fit was assessed using the chi-squared (χ^2) statistic, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the standardized root mean square residual (SRMR), and the weighted root mean residual (WRMR). Goodness of fit was assessed with the following significant value cut-offs: $\chi^2 < .05$, RMSEA $\leq .05$, CFI $\geq .95$, SRMR $< .08$, and WRMR $\geq .95$ (Hoyle, 2011; Kline, 2010; Yu, 2002). Since the model identified in this analysis was saturated, it was expected to identify perfect model fit.

3.6 Results

3.6.1 Descriptive statistics. A total of 32,443 students from 32 Canadian universities were included in the analysis. Although response rates varied between institutions, the overall response rate was 20.4% (ACHA, 2013). The average age of respondents was 22.3 years (SD = 5.48). Participants were primarily Caucasian (70.1%), female (67.1%), full-time (92.5%), undergraduate (84.1%) students who were living in off-campus housing (45.9%). Overall, only 3.3% of students met requirements for all three health behaviours (i.e., physical activity, nutrition, and sleep). Students who met guidelines for all three health behaviours were more likely to be female (3.2%), graduate students (5.4%), and lived off-campus (3.8%). Furthermore, the number of international students who met all requirements (2%) was lower than non-international students (3.1%). CSEP's guidelines for physical activity were met by 17.2% of students. Fifty-

Table 1

Percentage of Students Meeting Physical Activity, Nutrition, and Sleep Guidelines by Demographic Category (n = 33,164)

Demographic Category	Sample	Meeting Physical Activity	Meeting Nutrition	Sleep Not a Problem	Meeting All Recommendations
Gender:					
Male	30.9	22.0	10.9	53.5	3.0
Female	67.6	15.3	14.3	60.0	3.2
Year of Study:					
1	20.5	15.4	11.0	50.1	2.5
2	20.4	15.9	11.8	52.1	2.7
3	19.7	17.0	13.4	54.7	3.3
4	16.9	18.1	13.2	57.4	3.4
5	6.6	18.6	13.8	57.4	3.2
Graduate/professional school	14.5	21.7	18.3	65.2	5.4
International Students	10.5	11.9	7.9	60.5	2.0
Place of residence					
Residence	15.3	15.5	10.4	50.6	2.6
Off-campus	45.9	19.1	12.4	52.1	3.8
Home	30.4	15.7	14.1	57.9	2.7

five percent of students identified that sleep was a problem and 13% of students reached Canada's Food Guide Nutrition Guidelines for fruit and vegetable intake. Table 1 presents demographic information. This table includes demographics of the sample,

and demographics of those who met Canada food guide fruit and vegetable intake, CESP's physical activity guidelines and those who identified that sleep was not a problem.

Stress levels were highest (e.g., 3.88/5) in students who identified that sleep was a problem, followed by those who did not meet the physical activity guidelines or did not meet all guidelines (3.62/5), respectively. Table 2 contains the correlation matrix for the health behaviours (sleep, physical activity and nutrition), stress and academic performance.

Table 2. Correlation between health behaviours, stress and academic performance in Canadian Post-Secondary Students (n=32,443)

	Nutrition	Stress	Sleep	Physical Activity	Academic Performance
Nutrition	**1.00**	0.001	-0.84	.317	-.176
Stress	.001	**1.00**	.347	-.044	.058
Sleep	-.084	.347	**1.00**	-.097	.129
Physical Activity	.317	-.044	-.097	**1.00**	-.097
Academic Performance	-.176	.058	.129	-.097	**1.00**

3.6.2 Path Analysis. Figure 1 presents an integrated model that covers both the direct and indirect effects between sleep, physical activity, nutrition, sleep, and academic performance and summarized the relationships between the variables.

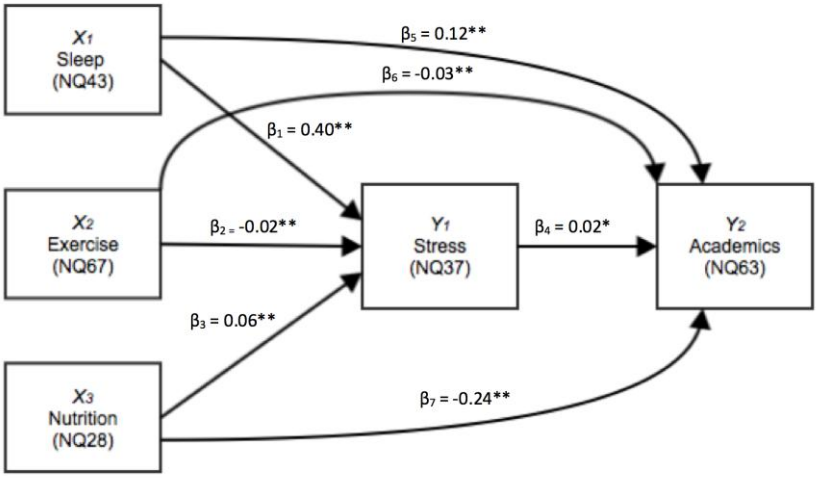

*Figure 1***.** Manifest Path Model indicating relationships between Health Behaviours, Stress and Academic Performance in Canadian Post-Secondary Students (Standardized Solution, N = X. * indicates significant effects at $p < .05$; ** indicates significant effects at $p < .001$.

3.6.2.1 Manifest path analysis results – model fit. As anticipated, the saturated model tested in this example had zero degrees of freedom and yielded perfect fit according to all tests for goodness of fit. Since all variables yielded a direct effect on academic performance, the model was not restricted, and relationships between variables of interest within the saturated model were explored.

3.6.2.2 Manifest path analysis – Direct effects identified in the model

Sleep had a direct effect on stress ($\beta_1 = 0.401$, $z = 68.18$, $p<.050$, $\beta_1^{standardized} = 0.379$), as did physical activity ($\beta_2 = -0.02$, $z = -4.14$, $p<.05$, $\beta_2^{standardized} = -0.024$) and nutrition ($\beta_3 = 0.06$, $z = 6.536$, $p<.05$, $\beta_3^{standardized} = 0.038$). Stress also had a significant direct effect on academic performance ($\beta_4 = 0.02$, $z = 3.41$, $p<.05$, $\beta_4^{standardized} = 0.023$). In addition to all health behaviours measures having a significant effect on stress, they also had a significant direct effect on academic performance. The direct effect of sleep on academic performance was significant ($\beta_5 = 0.12$, $z = 17.58$, $p<.05$, $\beta_5^{standardized} =0.114$), as was the effect of physical activity on academic performance ($\beta_6 = -0.03$, $z = -6.62$, $p<.005$, $\beta_6^{standardized} = -0.042$) and nutrition ($\beta_7 = 0.24$, $z = -27.30$, $p<.000$, $\beta_7^{standardized} = -0.173$). These results are presented in Table 3.

Table 3.

Manifest Path Analysis on Variables of Interest – Direct Effects from Model (n = 32,443)

	Parameter Identification	Parameter Estimate	SE	Est. SE	*p*	Standardized Parameter Estimate
Effects on Stress (NQ37)						
Sleep (NQ43)	β1	0.40	0.01	68.18	.000*	0.379
Physical Activity (NQ67)	β2	-0.02	0.00	-4.14	.000*	-0.024
Nutrition (NQ28)	β3	0.06	0.01	6.536	.000*	0.038
Effects on Academics (NQ63)						
Stress (NQ37)	β4	0.02	0.01	3.41	0.014*	0.023
Sleep (NQ43)	β5	0.12	0.01	17.58	0.000*	0.114
Physical Activity (NQ67)	β6	-0.03	0.00	-6.62	0.000*	-0.042
Nutrition (NQ28)	β7	-0.24	0.01	-27.30	0.000*	-0.173

Note. SE = standard error; Est. SE = estimated standard error; *$p < .05$

3.6.2.3 Manifest path analysis – Indirect effects identified in the model. In addition to having a direct effect on academic performance, health behaviours were found

to indirectly impact academic performance in a relationship that is mediated by stress. All health behaviours demonstrated significant indirect effects, through stress, on academics including sleep ($\beta_1 \square \beta_4 = 0.01$, $z = 3.44$, $p < .05$, $\beta_1 \square \beta_4^{standardized} = 0.000$), physical activity ($\beta_2 \square \beta_4 = 0.000$, $z = 2.646$, $p < .008$, $\beta_2 \square \beta_4^{standardized} = 0.01$), and nutrition ($\beta_3 \square \beta_4 = 0.001$, $z = 3.043$, $p < .002$, $\beta_3 \square \beta_4^{standardized} = 0.001$). See Table 4.

Table 4.

Manifest Path Analysis on Variables of Interest – Indirect Effects from Model (n = 32,443)

	Parameter Identification	Parameter Estimate	SE	Est. SE	*p*	Standardized Parameter Estimate
Effects on Academics (NQ63)						
Sleep (NQ43)	$\beta_1 \square \beta_4$	0.01	0.00	3.44	.001*	0.000
Physical Activity (NQ67)	$\beta_2 \square \beta_4$	0.00	0.00	2.646	.008*	0.001
Nutrition (NQ28)	$\beta_3 \square \beta_4$	0.001	0.00	3.043	.002*	0.001

Note. SE = standard error; Est SE = estimated standard error. * $p < .05$

3.7 Discussion

This study investigated not only the relationship between health behaviours (nutrition, physical activity and sleep) and academic performance, but also the inter-relationships between health behaviours and stress and academic performance. It was predicted that sleep, nutrition, and physical activity would be negatively related with stress; that stress

would have a negative impact on academic performance; and that of sleep, nutrition, and physical activity will both directly and indirectly influence academic performance.

3.7.1 Stress. Consistent with previous research (Dusselier et al., 2005), this study demonstrated that stress had an adverse effect on academic performance. It is noteworthy, that the standardized beta value between stress and academic performance indicated a weak negative relationship. This result could indicate that academic performance could be influenced through other factors not included in the analysis. Notwithstanding, findings from this study align with previous research demonstrating that students with elevated stress levels are more likely to eat poorly, be physically inactive, and have sleep problems (Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2005). In addition, stress mediated indirect effects across all health behaviours and academic performance, thereby demonstrating the interrelationship between physical activity, sleep, and nutrition with academic performance. Confronted with so many new stressors, the use of healthy coping mechanisms is paramount in ensuring academic performance for Canadian post-secondary students (Podstawksi, Gornik, & Kolankowska, 2013).

3.7.2 Physical activity. Findings from this study suggest that physical activity has a positive effect on academic performance; a finding consistent with previous studies (Rettinger, 2011; Trockel et al.,, 2000). A possible explanation of this finding is that students who participate in regular physical activity may be more likely to engage in other health behaviours, or have well-developed coping skills that those who do not. This is substantiated by the significant correlation between physical activity and nutrition that was demonstrated in this study. Students with established coping skills will typically

have a sense of self-efficacy, and are thus less likely to suffer the negative impact of stress reactions (Bandura, 1991; Foresight Mental Capital and Wellbeing Project, 2008).

3.7.3 Sleep. Sleep was identified as a problem by 55% of Canadian post-secondary students in this study. As expected, problematic sleep had a direct effect on stress levels and academic performance as well as an indirect effect on academic performance, influenced by stress. Similar to Lund, Reider, Whiting and Prichard (2010), students who reported that sleep was a problem had higher levels of stress. The interrelationship between stress and sleep is substantiated by the present paper's results which indicated that mean levels of stress were highest (e.g, 3.88/5) in students who identified that sleep was a problem. Further, the magnitude of the effect of sleep was 0.40, indicating a strong relationship to academic performance.

Comparable to Singleton and Wolfson (2009), who reported that reduced sleep duration and daytime sleepiness were significant predictors of GPA in college students, this study also found negative associations between sleep and academic performance. The finding that sleep directly and indirectly affected academic performance bears further evidence to support the interrelationship between sleep, stress, and academic performance. Given the number of post-secondary students who report sleep is problematic, health promotion efforts on post-secondary campuses should be made to target improving sleep habits of students. Interestingly, students themselves have suggested that they are interested in receiving information from their academic institution about sleep (ACHA, 2013). Sleep interventions for students can be beneficial as they have demonstrated to have long-term positive effects on sleep efficiency and quality (Orzech, Salafsky, & Hamilton, 2011; Van Straten & Cuijpers, 2009).

3.7.4 Nutrition. Only 13% of students reached Canada's Food Guide Nutrition Guidelines for fruit and vegetable intake; a finding consistent with results from other studies (Strong, Parks, Anderson, Winett, & Davy, 2008; Poddar, et al., 2009). As expected, and given its corroboration with previous studies (Dog, 2010; George, Dixon, Stansal, Gelb, & Pheri, 2014; Maclellan et al, 2008), nutrition was found to be related to academic performance. The standardized beta value for the relationship between nutrition and academics was higher than expected when compared to that of physical activity and sleep. This could possibly be explained by a confounding relationship between sleep and nutrition. Students who identify that sleep is not problematic are more likely to be awake in the morning, and therefore eat breakfast. The direct relationship between nutrition and academic performance could also reflect that students who have good nutrition habits are more likely to have other positive habits which effect academic performance. It was also found that nutrition was related to stress, although the standardized beta value demonstrated a weak negative relationship. This questionable relationship warrants further investigation.

3.7.5 Limitations. One limitation of this study is that its cross-sectional and correlation-based design does not allow for causal inference to be made. Although a standardized questionnaire was used, the self-report nature of this survey, the self-selection of participants and social desirability bias are limitations. Furthermore, most survey questions asked about recall over a 12 month period; a length of time which may have led to answers that were not representative of student's actual experiences at the time. Inherent to online administration of surveys are concerns regarding administration; technical issues (e.g., hardware/software configurations, network performance, etc.); and

measurement error as a result of respondents' motivation, computer literacy, abilities, and privacy concerns (Fielding, Lee, & Blank, 2008).

Data from all institutions, demographic groups and health behaviours was pooled for analysis purposes. Inherent to this approach, clustering within the data set may have occurred and not been identified. Lastly, the measures in the NCHA were not necessarily designed with the intention of identifying relationships between significant measures through manifest path analysis or about meeting respective guidelines for physical activity, sleep, and nutrition. Additionally, neither stress nor academic performance, were operationally defined for students who completed the survey, leading to potential variation in interpretation about these constructs.

3.7.6 Implications and future directions. The most significant finding in this study is the magnitude of the association between sleep and stress, and sleep and academic performance. Health promotion efforts on post-secondary campuses often target alcohol use, smoking cessation, and sexually transmitted infection prevention; however, in light of results of this study and previous research (Abdulghani, et al., 2014; Lund et al., 2010; Trockel et al., 2000), a focus on sleep hygiene is also necessary. In addition to health promoters; health clinic staff, counselors, residence life staff, and university administrators need be aware of the potential impact that sleep has on stress and academic performance. Doing so, these key individuals will be better equipped to develop institutional supports that address students' sleep-related issues and concerns.

The impact of stress is mediated by having established positive coping strategies; therefore, an opportunity exists to support academic success of students by building their capacity to manage stress. Future research should continue to explore the mediators and

barriers to participation in positive health behaviours and to explore feasible and practical strategies that will engage students in physical activity, healthy nutrition, and positive sleep hygiene.

This study highlighted priority groups to whom health education and health promotion interventions should be directed. Specifically, students living in residence, first and second year undergraduate students, as well as international students were least likely to meet requirements for physical activity, sleep, and nutrition. It would be beneficial for future research to further explore demographic and personality factors that are associated with participation in health behaviours.

3.7.7 Conclusion. This study highlights the impact that sleep, physical activity, and nutrition have on stress and academic performance among Canadian post-secondary students. These results can inform university administrators and health promoters about factors that impact students' academic performance. Creating a campus environment that supports students in managing stress, eating nutritiously, being physically active, and getting adequate sleep will enable students to maximize their intellectual functioning and scholastic achievements.

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CHAPTER 4

4 Perceptions of Individual and Institutional Factors that Impact Health and Well-Being in Canadian University Students – A Qualitative Inquiry

4.1 Background

The transition from high school to postsecondary education can be a stressful period in a young adult's life. This time period is characterized by change, adjustment, and ambiguity relating to disruption of routines, security, predictability and a loss of sense of control that was established during high school (Bray & Born, 2004; Terenzini, Rendon, & Upcraft, 1997). This complex transition often involves a new living environment, obtaining personal security (i.e., self-esteem and comfort), building a new social support network, financial concerns, school/personal life balance **(**Chernomas &

Shapiro, 2013; Jimenez et al., 2010; Lo, 2002; Moscaritolo, 2009; Pryjmachuk & Richards, 2007; Sheu et al., 2002), and academic pressures (Altiok, 2013; Biron, Brun, & Ivers, 2008; Goff, 2011; Lee & Graham, 2001). All of these factors can potentially impact a student's health and well-being (Gall, Hyans, & Bellerose, 2000). Additionally, student health can be compromised by engaging in risky health behaviours (Kwan et al., 2013). For example, it has been noted that post-secondary students have high rates of alcohol use, binge drinking (Kingsbury, Gibbons, & Gerrard, 2014; Moore-Rodríguez et al., 2014; Ward, Lallemand, & De Witte, 2014), unprotected sex (King, Vidourek, & Singh, 2014; Pengpid, Peltzer, Mirrakhimov, & Erkin, 2014) and drug experimentation (Bennett & Holloway, 2014; Holloway, Bennett, Parry, & Gordon, 2014; Leinwand, 2007). Further, post-secondary students demonstrate unhealthy sleep habits, (Curcio, Ferrara, & De Gennaro, 2006; Patton, 2002; Viner, 2007), physical inactivity (Haase, Steptoe, Sallis, & Wardle, 2004), disordered eating (Cornblatt, 2009), and poor eating habits (American College Health Association [ACHA], 2009; OUCHA, 2009). In addition to the aforementioned issues, if a student is challenged with inadequate stress management skills (Pittman & Richmond, 2008; Skipworth, 2011), limited resiliency (Fonagy, 1994; Rutter, 2012; Walsh, 2007; Werner, 1995), lack of social support (Verger et al., 2009), or poor mental health (CAUCUSS & CMHA, 2013), successfully navigating the transition to post-secondary education can be compromised. Failing to adjust to the transition and/or engaging in risky and unhealthy practices not only negatively impacts overall health and well-being (Patterson & Kline, 2008), but also academic performance as well (Cave, 2011; Flouri & Kallis, 2011; National College Health Assessment [NCHA], 2013; Taylor, Vatthauer, Ruggero, & Roan, 2013).

Consequently, this a priority issue for post-secondary students and requires further attention.

While there has been a paucity in research understanding specific individual-level determinants of health and health behaviours among postsecondary students (e.g., alcohol use: Mallett et al., 2013; Nichter, Carkoglu, & Lloyd-Richardson, 2010; smoking: Berg et al, 2010; Brown, Carpenter, & Sutfin, 2011; nutrition: LaCaille, Dauner, Krambeer, & Pedersen, 2011; Kicklighter, Koonce, Rosenbloom, & Commander, 2010; sexual health: Owen, Rhoades, Stanley, & Fincham, 2010; Bachtel, 2013, mental health: ACHA, 2014; CACUSS & CMHA BC, 2013; and internet usage: Junco, Heiberger, & Loken, 2011; George & Dellasega, 2011; Mobreno, Jelenchick, & Christakis, 2013), there is limited research investigating the impact of the school environment on student health. In addition to individual-level factors playing a role in health and well-being, diverse and inter-related factors such as the environment, community, culture and broader society also have influence on overall well-being (McLeroy, Norton, Kegler, Burdine, & Sumaya, 1988). The Social Ecological Model (SEM) of health behaviour is a comprehensive framework for discerning determinants of health, whereby behaviour affects and is affected by: individual factors (i.e., knowledge, attitudes, behaviours, beliefs, motivation, skills, and demographic characteristics), the social environment (i.e., relationships, culture, and society in which individuals engaged), the physical environment (i.e., natural and built physical spaces), and policy (i.e., legislation, regulations, procedures, or policies; Bronfenbrenner, 1994). According to the theoretical principles of SEM, post-secondary institutions play a significant role in student health and health-related behaviours (Sallis, Owen, & Fisher, 2008; Townsend & Foster, 2011).

For example, a post-secondary institution provides sources of social norms, values, and social identity (McLeroy, Bibaue, Steckler, & Glanz, 1988). Further, environmental influences, physical spaces, facilities, policies, procedures, and organizational culture can all impact overall student well-being (CACUSS and CMHA BC, 2013). It has been demonstrated that inconsistencies in policy and structural/operational issues at post-secondary institutions can have inadvertent academic-related obstacles resulting in elevated stress and impediments to student success (Bishop, Berryman, Wearmouth, Peter, & Clapham, 2012). . Furthermore, students have cited that within the university context; exam and academic scheduling, availability of academic support services, and course design can negatively impact student well-being (Clapham et al., 2012). Students have also reported they are adversely affected by perceived lack of support from university faculty and staff (Radcliffe & Lester, 2003). Only one study could be identified which investigated institutional influences on student health (Patterson & Kline, 2008). This study examined the role of student services in creating a healthy post-secondary campus by conducting focus groups with students, phone interviews with post-secondary administrators, and e-mail surveys to Canadian Association of College and University Student services members. Students reported that health and counseling services provided by the institution play an important role in addressing health issues, while administrators identified that resources and space issues were barriers (Patterson & Kline, 2008). While this study provided valuable information about health challenges and service usage, the focus was on student services. Although access to health-related services is a crucial aspect in supporting student health, environmental influences on health and well-being are multifaceted (Stokols, 1996).

To the researchers' knowledge, no studies have explicitly examined Canadian students' perceptions about the multiple interpersonal and organizational levels of influences on health and well-being. Therefore, the purpose of this study was to engage students in articulating individual and institutional factors that impact health and well-being. That this study was framed within a socio-ecological approach, informed multiple levels of influence, which identified health priorities and informed resource allocation towards improving health and well-being amongst students. By qualitatively examining participants' views and perceptions of factors that contribute to health and well-being, in addition to exploring the opportunities and challenges to maintaining health, post-secondary institutions will gain insight about student expectations and become aware of how to further enhance the health of their students.

4.2 Methodology

Constructivist grounded theory was selected as the qualitative interpretative approach in the design, data collection, and analysis of the study (Strauss & Corbin, 1990). Constructivist grounded theory consists of a fluid, interactive, and open-ended research process, with the goal of constructing theories grounded in the data (Hennink, Hutter, & Bailey, 2011; Patton, 2002). It is an inductive approach to theory generation, which uses "analytic interpretations of data to focus further data collection, which [is used] in turn to inform and refine [the] developing theoretical analyses" (Charmaz, 2003, p. 250). This methodology also fits the research question, which was broad enough to provide flexibility and freedom for in depth analysis (Strauss & Corbin, 1998). This study sought a deeper understanding of students' perceptions of health, and constructivist grounded theory proved helpful in answering the research questions with "ingenuity and

incisiveness" (Charmaz, 2006, p.15). In line with a constructivist epistemological paradigm, the perspectives of participants are understood as relative to time, society, and culture (Mills, Bonner, & Francis, 2006). Focus groups were chosen as the method of data collection because they provide a unique opportunity for in-depth exploration of issues, and they also provide a context for a group of relatively homogenous participants to freely express their beliefs and ideas (Carey, 2012; Hennink, Hutter, & Bailey, 2011). The interaction between the researcher and the research participants was utilized to encourage possibilities for meaning to be constructed from them (Charmaz, 2006; Mills et al., 2006). In addition, focus groups provided an opportunity to observe group interaction and to examine shared knowledge (Kitzinger, 1995).

4.2.1 Sampling and recruitment. This study was conducted at a large university in Ontario, Canada. Consistent with naturalistic inquiry, this research was conducted in the same setting in which students learn, experience, and possibly live. Because the setting is an integral aspect of the inquiry, by conducting the focus groups on campus, the researcher was better able to understand the students' experiences (Marshall & Rossman, 1999). To participate in the study, students had to be a registered post-secondary at the post-secondary institution. In keeping with grounded theory, convenience sampling was used and participants were purposefully selected to provide the information needed to answer the research questions (Maxwell, 2012; Patton, 2002; Strauss & Corbin, 1997, 1998). The researcher contacted various student services located on campus and provided staff at these services with a letter of information, an explanation of the data collection procedures, and posters. Connection with these gatekeepers was pursued to negotiate a relationship with each service and to gain entry and cooperation for collecting

data (Patton, 2002). Recruitment strategies included advertising through posters placed at student services and elsewhere around campus as well as social media. See Appendix H for a copy of the poster. When students expressed an interest to participate, their name was added to a list, and when a sufficient number of participants had been identified, the students received an invitation to attend a focus group. To facilitate theoretical sampling, snowball sampling was also employed with participants in focus groups to recommend classmates or friends for future groups. Saturation was addressed by not only examining when categories were saturated but also, by exploring the context of each category. Given that there is potential for new ideas to continually emerge when exploring data, saturation was defined by reaching a point during which additional data did not add anything to the overall theory. This occurred after the fourth focus group.

Four focus groups were conducted from January to March 2014. Groups consisted of three to eight participants each. Ages of student participants ranged 18 to 23 years old (mean = 20.76, *SD* = 1.58). Participants in the groups were mostly female students (*n* = 14) who lived off campus (*n* = 16). With respect to year in school, three students were in first year, while four students were in second or third year. Fourth year students and graduate students were the most highly represented (*n* = 5), while only one fifth year student participated. No international or part-time students participated in the focus groups. Table 2 presents an overview of participant demographic characteristics

4.2.2 Data collection. Consistent with grounded theory methodology, the overall research question and focus group questions were designed to be flexible, sensitive, and open to the breadth of students' experiences. A semi structured question guide was developed with a purpose of encouraging dialogue with students about their experiences

with health, perceptions, definitions, challenges, supports, and access to health-related services on campus. Questions were open-ended and went from general to more specific to prompt general discussion. Three general types of questions were asked, including: 1. engagement, 2. exploration, and 3. exit questions. Table 1 contains the question guide. Input on the question guide was sought from members of the research team and professionals in the student services department. The first focus group was used as a pilot, with questions being reviewed and further refined based on the session. While the question guide provided a systematic approach to questioning and a framework for discussion, in keeping with grounded theory methodology, additional questions were spontaneously added during each group based on the discussion to maintain an iterative process (Hutchison, Johnston, & Breckon, 2010).

4.2.3 Focus groups. All focus groups were similar in format and structure, and were held within the central student space, on campus. Each focus group lasted 60-90 minutes. At the beginning of the focus group, the purpose of the study was reviewed. Participants were provided with a letter of information about the study, and completed a basic demographic form and informed consent form. These are provided in Appendix I, Appendix J, and Appendix K, respectively. Prior to the session commencing, issues of voluntary participation and confidentiality were discussed. Focus group sessions were audio taped and a member of the research team led the discussion. An additional source of data came from the interaction between members in the group discussion and group members and the facilitator. A research team member took field notes and recorded

Table 1

Focus Group Question Guide

Question Type	Questions
Engagement	What does health mean to you?
	What helps or hinders you from making healthy lifestyle choices?
Exploration	Health can refer to physical, social, mental, spiritual and financial aspects. Given this broad definition, how does Western support health and well-being?
	What could Western improve to support health and well-being?
	What does a healthy campus look like?
Exit	Is there anything else you would like to say about how to make Western a healthier campus?

observations of group interactions. Ethics approval was granted through the Research Ethics Board for this study (see appendix L).

4.2.4 Reflexive notes. In qualitative research, the researcher plays an integral role, as the instrument for data collection and analysis (Carey, 1995; Marshall & Rossman, 1999; Strauss & Corbin, 1998). Given the significant impact of the researcher, reflexive notes are a tool that ensures a consciousness of the influence of the researcher on the research (Charmaz, 2006). Throughout the research process, the reflexive notes were utilized to record thoughts about what was occurring in the data, to develop ideas,

and to make comparisons between data, categories, and concepts (Hennink, Hutter, & Bailey, 2011). In addition, these notes enabled the researcher to reflect on the research process, previous experiences, assumptions, and relevant ideas. Reflexive note-taking was undertaken to help the researcher stay involved in the analysis and to increase the level of abstraction of ideas (Charmaz, 2006). Reflexive notes were integral to the overall research process and were incorporated into data collection and data analysis.

4.2.5 Data analysis. Data analysis in grounded theory is a process of abstracting and reducing data from focus groups into categories which are then used to build a theory (Strauss & Corbin, 1998). This required the researcher to examine the students' responses to develop categories, make comparisons, vary possibilities, and consider alternative explanations (Creswell, 2012; Strauss & Corbin, 1998). In order to meet this goal, audiotape recordings were transcribed verbatim; transcripts and data observation notes were then analyzed using initial, focused, axial, and theoretical coding. NVivo software version 10 was used to store and organize categories derived from the data. As the research progressed, categories derived from the data were synthesized and analyzed to generate a tentative theory of health and wellness on a post-secondary campus.

Given the potential to compromise the iterative nature of grounded theory, focus group data was not coded or analyzed by attribute, group member, or focus group (Hutchison, Johnston, & Breckon., 2010). Henceforth, focus group transcripts were not analyzed seperately, rather transcripts were imported into the software program Nvivo and were formatted to be auto coded by question. In the initial stage of coding the transcripts were systematized into core conceptual categories with parent node containers, through this process a master list of codes was developed. Through initial

coding core conceptual categories were defined and gaps were identified at an early stage in the research process. Within initial coding, line-by-line coding was utilized to explore nuances, remain open to the data, and ensure that the meanings of the participants' ideas were captures in their narratives (Charmaz, 2006). Thoughts, comparisons, and connections were recorded to maintain connection to the analysis and to aid with data analysis being more concrete and manageable (Carey, 1995). Through focused coding, it was decided which initial codes made the most analytic sense to categorize the data (Charmaz, 2006). Axial coding was then used to connect subcategories to categories by sorting, synthesizing, and organizing the large amounts of data (Charmaz, 2006). To maintain a constructivist stance, axial coding was used cautiously, with a focus on examining relationships between concepts, identifying higher order dimensions such as processes, contexts, and outcomes related to the data (Hutchison et al., 2010). Finally, theoretical coding clarified the analysis and identified relationships between categories (Charmaz, 2006). Within NVivo, matrix coding queries, exploration of relationship nodes, and model building tools were all used during theoretical coding and contributed to theory development. NVivo allowed for the creation of a node structure in which concepts were organized. These tools in NVivo were utilized to aid conceptual clarity and early micro-analysis (Bazeley, 2007). All analytical codes and categories were identified from the data itself rather than reconceived codes, and the analysis of categories was undertaken at each stage of analysis (Hutchison, Johnston, & Breckon, 2010).

4.2.6 Quality considerations. The nature of a constructivist qualitative research requires that data collection, analysis, and process of constructing theories is grounded in

the data itself and the researcher's subjectivity (Charmaz, 2006; Morrow, 2005). Trustworthiness of this study was addressed in a number of ways: through attention to subjectivity, adequacy of data, and adherence to diverse strategies (Morrow, 2005). Subjectivity was addressed by checking for representativeness of the data as a whole and then coding categories. Inductive coding also demonstrated consistency and credibility of the research (Rubin & Rubin, 2011). Narrative data was analyzed using constant comparison allowing the researcher to refine and specify questions as the research progressed. As well, particular attention was paid to inconsistencies in the narrative. Subjectivity and sensitivity within the data were achieved by remaining open to participants' voices, and continually checking with participants to ensure derived interpretations were accurate (Mills, Bonner, & Francis, 2006). Maintaining an attitude of skepticism resulted in the categories, hypotheses, and questions being compared between different focus groups (Strauss & Corbin, 1998). Further, the researcher neither knew of, nor had contact with possible participants prior to focus groups.

Memos, and peer debriefing between can be utilized to identify similarities and differences within the data and to create a consistent coding frame (Jayasekara, 2012). After each coding session in NVivo, a memo or reflexive note was written to capture thoughts and insights, thereby, supporting an inductive approach. Memos were reviewed during each level of coding (initial, focused, and theoretical). Peer de-briefing was incorporated by working with a colleague who had impartial views of the study. Through the process of peer debriefing; overemphasized and under emphasized points, vague descriptions and biases of the researcher were identified and reviewed. Team meetings were utilized to reconstruct the meanings of participants and discuss possible

interpretations. The researcher and research assistant participated in analyst triangulation by creating coding summaries which were discussed during team meetings. These strategies helped to co-construct the student experience, infuse greater subjectivity, and reduce researcher bias. Adequacy of the data was addressed by using a variety of data sources, such as field notes, a reflexive diary, and focus group transcripts (Morrow, 2005). Data was also compared and contrasted through memo-writing and field notes (Miles & Hubberman, 1994). NVivo facilitated this through the creation of a reflexive diary, and memo structure that was able to be modified as analysis developed (Hutchison et al., 2010). Further, the memo function provided an indication of when categories had reached saturation and/or when theoretical saturation had occurred (Hutchison et al., 2010). Internal validity was addressed through the selection of specific quotes that illustrated participants' ideas, and face validity is inherent in the use of focus groups (Jayasekara, 2012).

4.3 Results

From the transcripts and field notes, a list of initial codes was compiled. Initial coding allowed for the identification of anchors that allowed the key pointes of data to be organized. The initial codes were reviewed and condensed into groups based on similar content. Table 3 presents the core categories that emerged from initial coding, which included individual healthy lifestyle issues, campus culture, and accessibility. Subsequently broad groups of similar concepts were used to generate theory. This was completed by linking subcategories and through constant comparison. A distinction between individual-level influence and institutional influences emerged as a significant conceptual categorization (see table 4).

Table 2

Demographic Characteristics of Focus Group Participants (n = 21)

Demographic Characteristic	Sample Size (%)	N
Gender		
Male	33.3	7
Female	66.7	14
Age		
18	9.5	2
19	14.3	3
20	14.3	3
21	33.3	7
22	9.5	2
23	19.1	4
Enrollment Status		
Full time	100	21
Part time	0	0
Place of Residence		
Residence	14.8	3
Off Campus	9.5	2
Home	76.2	16

Table 3

Initial and Focused Coding Summary

Initial Codes	Code Groupings	Category
Individual behaviours, nutrition, sleep, exercise, maintenance, daily routine, extracurricular, socialization, recreation, risky behaviours, , abilities, personal choices, physical health	Personal Health Behaviours	Healthy Lifestyle
Mental health , stress, stress management, emotional health	Mental Well-Being	Campus Culture
Management and prioritizing, balance (academics and extracurricular), time	Balance	
Sense of belonging, attitude, campus culture, support mechanisms, community cohesion, layout of spaces, atmosphere, policy (supportive)	Inclusive	
Faculty/student interaction, engagement, student experience, extracurricular	Student Engagement	
Healthy food, mental health services, academic counseling, university services, professors, counseling, green spaces, recreation services,	Services	Accessibility
Physical ability patient cantered dare, scheduling conflicts, awareness of Support services, physical and structural, policy, technical barriers accountability for actions,	Navigating System	
Affordability (income qualification)	Affordability	

Table 4

Theoretical Coding Summary

Issues	Attributes	Target Population
Accessibility	Opportunities Challenges	University Level Individual Level
Engagement/Culture	Opportunities Challenges	Individual Level University Level
Individual Health Behaviours	Opportunities Challenges	Individual Level

As the theory developed, the multi-dimensional nature of categories evolved, and interrelationships between concepts became more sophisticated. Through the process of theoretical coding we moved from a general conceptualizing of the constructs identified by focus group participants to exploring the contexts and processes that were related to these constructs.

Through the creation of a model we were able to give meaning to increasingly complex observations (Hutchinson et al., 2010). For example, students had positive experiences on campus that contributed to well-being. The concept of thriving was identified and captured the linkages and contributions to a supportive student experience on campus. Similarly, a category called resilience unified several processes and impacts identified by student as individual level influences on health and well-being. The construct of languishing was identified as an essential components of student experience when perceived to be in an unsupportive environment. The creation of a model also allowed us to identify gaps, summarize findings, provide evidence of theoretical density and allowed for a visual representation of the core categories that were identified as

barriers to student well-being. Figure 1 provides a visual representation of the model, which contains 3 core categories. Category 1 described the impact of individual factors/choices on health and well-being. In Category 2, the student experience of health is demonstrated when the university setting is perceived as supportive. Category 3 demonstrates the impact that an institution can have when there is a perceived lack of integration of health and wellness on campus and/or concerns about accessibility are present.

4.3.1 Individual/student influences on health and well-being. When asked about what health meant to them; students identified stress, physical activity, nutrition, and mental well-being as important components. Students reported that they were able to maintain good health when they had good time management skills and could prioritize and attend to their stresses proactively.

> "…. if you went to the gym you'd probably feel much better all around, but you get stuck in the cycle of I have to get this essay done or I have to study for this exam so you don't have that balance and you are just focused on doing well and then the anxiety can build up" (Participant from Focus group 3)

Of interest, students talked about the importance of being accountable for their own behaviours.

> "[…] and now like nobody cares if I go to the gym like nobody's going to notice if I go for a run like you know there's no one who's going to be unimpressed with whatever I decide to eat to do health wise or workout wise whereas before if I kind of felt tired that wasn't even an option it just was part of my day like going to practice you know because I had a set time." (Participant from focus group 3)

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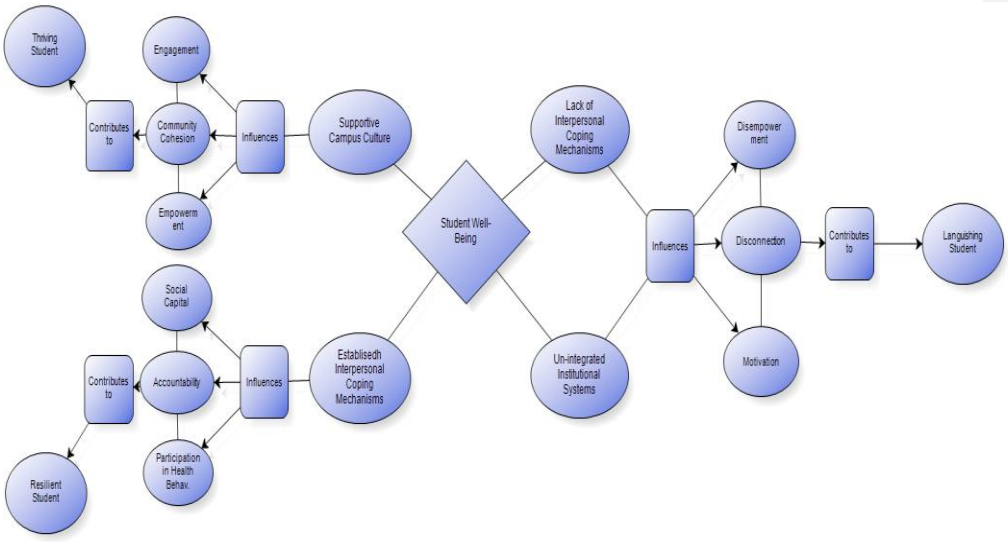

Figure 1. Grounded Theory Model of Individual and Institutional Influences on Post-Secondary Student Health and Well-Being

Overall, students reported that the most influential facilitators of individual health included engagement in positive health behaviours, social support, and personal accountability. The most significant negative influence on their individual health identified by students was stress. Academic demands and engaging in risky behaviours (e.g., drinking, drugs, etc.) were also suggested as detrimental to overall health and well-being.

> "I think all of these things like organizing well and going to the gym are all really great if you're in the right state to police that and enforce it in their life but a lot of people get into that crisis mode where they are feeling stressed and overwhelmed

> by school and they can't do that for themselves because they are too far past that point, we should really look at what gets them there and in terms of academics yes everyone gets overwhelmed by school work, yes everyone gets overwhelmed by grades and marks but I think there's a lot of like contributing factors that can." (Participant from focus group 2)

4.3.2 University influences on health and well-being. In addition to individual level influences, institutional factors that impact overall student well-being were identified. A major category that emerged from focus groups was the positive impact that the university had on the health and wellness of students when it was perceived as being supportive. Student participants referred to the importance of campus culture through their comments about sense of belonging, and inclusivity on campus having a positive impact on well-being.

> "I feel like because it's such a big campus you always see students always walking around like it gives a good vibe I feel like kind of the mental aspect of it feels very community like because there are people walking around like everyone you see people holding doors." (Participant from focus group 4)

Increased student engagement and student involvement were associated with campus community cohesion.

> "I know for me I live on a healthy lifestyle floor I just worked out and I don't know really what other floors are like but I find that everyone on my floor goes to the gym…. it really inspires everyone and everyone builds off each other and wants to be healthy with each other and we'll play inter-murals as a floor and stuff and I think it's really good to have that sense of community." (Participant in focus group 3)

Co-ordinated services and systems that existed on campus were also identified by students as beneficial. Students cited examples like the recreation facilities, and student services as important ways that the university supported health. Interactions with faculty were also cited as having the potential to positively impact the student experience. When students experience the institution as supportive, they reported feeling more engaged, and

more likely to experience community cohesion and a sense of empowerment. These components influence a student's ability to thrive and ultimately, gain an improved sense of well-being.

Focus group participants also reported experiences with the university where health and wellness were seen as un-integrated and/or concerns about accessibility were present. Participants in all groups discussed concerns about lack of options for healthy foods, lack of space for studying, and overcrowding at the recreation centre. Students reported significant frustration with "navigating the system" and accessibility. They referred to limited hours of operation of student services, scheduling conflicts, lack of awareness about support services, physical and structural issues, and policies that were "not student-centred" as problematic. It was reported that while services such as health services and counseling were centrally located, many students were unaware of the exact location, or were unable to access services during operational hours. There also existed concern about a lack of accommodation the services provide to a student's schedule, as recounted by a participant in focus group 2.

> I just don't think the accessibility is there nor does the administration set up the services that actually complement the lifestyles of student living. I mean like we set up all of our support services in time frames as if it was a normal business for normal adults who are working 9 to 5 jobs but student lifestyle is totally different differently organized and having those 9 to 5 support services isn't probably the best time frame to accommodate for them that way because that's typically when they're going to be busiest in their classes and everything (Focus group 2)

Students expressed concern about university services, particularly waiting times for counseling and the effectiveness of academic counseling. In addition to focus group participants' prevalent concerns about awareness of services, it was also expressed that

the promotion of service excluded some groups, such as upper year students, or students living off-campus.

> I find it's more fending for yourself but I'm still in residence so it's kind of still a first year feel ….but I think there are a lot more programs geared towards first years. (Participant from focus group 4)

> I feel like it relieves a lot of stress just knowing that resources are out there but you have to know about them…if the awareness of them increases it could definitely help improve the community feel on campus even more. (Focus group 4)

There was a category in each focus group that there is a lack of accessibility to forums for student voices to be heard within the university environment. Student expressed concerns about lack of integration of campus services, and concerns that a forum for student feedback was not existent.

> There are student centers set up on all of the standing committees at the university and the board of governors and everything but I think that we're very disconnected from the majority of student problems and stuff because we don't have the feedback channels….. I run into people and you know what problems you have with the administration now or stuff like that but we don't have a big network that allows us to get that easy feedback when we need (Focus group 2)

Student participants identified that health and wellness is an important aspect of student life and expressed their interest in participating in the decision making process around the provision of services and resources.

4.3.3 Focus group method. In keeping with recommended focus group guidelines, it was anticipated that 6-10 participants would participate in each group. However, attendance was less than expected during focus group 3 due to poor weather. Focus group 4 also had lower than expected attendance, likely related to mid-term exam scheduling. Group dynamics were impacted by the number of participants, with the smaller groups (3 and 4) being more prone to one member dominance and a reduced

number of alternative opinions being presented. Overall, the focus groups created an opportunity for shared experiences and a collective consciousness of members to be raised about their individual experiences on campus. In focus group 2, when discussing food on campus, everyone reacted with nods, or expressions such as widened eyes about topics such as the cost of food. Nodding, jokes, and body language implying agreement all indicated that shared meaning was evident, as demonstrated in the discussion about grades. Participants shared discouraging experiences, both in the classroom and through navigating services on campus. Participants reported that professors play a role in the institutional climate by "…creating this extra anxiety in students about getting certain grades… add this undue stress and anxiety into an already stressful environment." Participants in focus group 2 unanimously agreed that faculty need to be conscious of individual circumstances in which "people perform differently and have different goals…" Students were unified and passionate when highlighting changes in attitude needed for supporting a healthy campus, as demonstrated in the following interaction:

> […] in general campus and the administration aren't exactly facilitating towards a stress mitigating environment… academic counselling as well is a huge problem in my opinion is it's such a tense environment it's not conducive to the people who are going in there who are already stressed and have problems and I think that the staff who work with and interact with students in that environment could be trained a lot better to be more soothing and calming and confidential to people's problems. (Participant 1)

> […] you just do not get guided it's like the first thing they say every single time is have you checked the website? And I'm like yes I just waited an hour I was on my laptop at the whole time I was checking every single website. (Participant 2)

> Yeah it's like they don't actually want to go out of their way to help you… (Participant 3)

With respect to group interaction, questions about the role of the university in health and wellness evolve into heated discussions about barriers, frustrations, and

concerns with expressions of shared experience. Further, participants gravitated towards discussing barriers that they faced, and this even dominated the question about 'how the institution supports health and well-being'. Participants intently watched everyone speaking during focus group 2, when the discussion of barriers occurred. Frustration in the group was palpable when they shared perceptions about lack of available study space, with all participants mumbling "more space". A common idea was held that "small things like not being able to find a spot and wasting 20 minutes of study time increases stress and worsens health and well-being". Participation in the focus groups allowed for students to have insights about their experience as a student that they may not have previously identified. In particular, a sense of solidarity emerged about the importance of the student voice and perceived lack of support from university administration.

4.4 Discussion

It has been argued that the 'ideal' academic environment prepares students for their future professional life and contributes towards their personal development, psychosomatic, and social well-being (Divaris et al., 2008). This is the first study that explored individual, social, physical and policy influences on the perceived health and well-being of Canadian post-secondary students. The application of this information can be used to improve students' quality of life and well-being, as well as, enhance their educational experiences. Focus groups with Canadian students identified individual, social environmental, physical environmental, and policy factors that challenge the maintenance of optimal health and well-being among students who attend post-secondary institutions.

4.4.1 Individual. A multifaceted view of the connections between health, learning,

productivity, and campus structure can be addressed through a socio-ecological model (Sallis, Owen & Fisher, 2008). Focus group participants identified that nutrition, physical activity, and mental health were important individual influences on health and well-being. Students also discussed the pervasiveness of stress, laying emphasis on the need to prioritize and attend to stressors proactively. Health promotion interventions can target behaviour change at the individual-level through the acquisition of knowledge, attitudes, and skills, as well as encourage the utilization of various tools, including observational learning, changing cognition, and behavioural modification (Bandura, 1991, McLeroy, et al., 1988; Stokols, 1996).

4.4.2 Social. In addition to individual components, the social environment influences health and is comprised of relationships, culture, and the society with whom individuals interact (Bronfenbrenner, 1994). According to the socio-ecological model, interpersonal factors and social resources are important mediators of life stress, and are integral components of overall well-being (McLeroy et al., 1988). There is strong evidence that peer relationships and connectedness with school affect the vulnerability of young people in relation to health compromising conditions like substance misuse and sexual risk (Viner et al., 2012). Consistent with previous research (Radcliffe & Lester, 2003), student participants suggested that relationships with professors, administrators, and the institutional environment have a role in student engagement (Blum, 2005). Focus group participants referred to the importance of the social connectedness associated with post-secondary institutions. Sense of belonging and inclusivity on campus were described by students as having a positive impact on well-being. They also reported that they were more likely be engaged and to experience community cohesion and a sense of

empowerment when the campus environment was perceived as supportive. The influence of community attitudes on behaviour has been identified as an important aspect of the socio-ecological model (Bronfenbrenner, 1994).

4.4.3 Physical environment. Within SEM, the physical environment is comprised of natural and built physical spaces and includes factors such as weather, geography, accessibility to facilities such as parks and gymnasiums, public transportation, and safety (Bronfrenbrenner, 1994). Focus group participants identified concerns about lack of options for healthy food, lack of space for studying, and overcrowding at the recreation centre on campus. These environmental issues have a direct negative influence on health behaviours (i.e., healthy nutrition and physical activity). Both the built environment (e.g., gymnasium, facilities, libraries, etc.) and natural environment (e.g., walking and cycling trails, accessible pathways, outdoor facilities, etc.) are important components that have the potential to affect the entire student population. Therefore, targeting the physical environment is an important component of creating sustainable behaviour changes, particularly if applied in concert with multiple levels of influence (Sallis, Owen & Fisher, 2008).

4.4.4 Policy. The success of applying a socio-ecological framework on a post-secondary campus is dependent on the extent to which health and wellness needs are embedded into policy/planning as well as the degree to which isolated and fragmented interventions can be eliminated (University of Central Lancashire, 2014). Focus group participants reported significant frustration with "navigating the system" and accessibility. They identified limited hours of operation of student services, scheduling conflicts, lack of awareness about support services, physical and structural issues, and

policies that were “not student-centred” as problematic. Focus group participants’ also discussed lack of awareness of services and inability to access services during operational hours. These issues apply to the policy level of the socio-ecological model and require institutional level commitment to be addressed. As evidenced by the participants in focus groups; when services are inaccessible, policies are not student-centred, and when the approach to health on campus is perceived to lack integration; students feel disengaged, disempowered, and have decreased motivation. This finding highlights the dynamic interplay between interpersonal and institutional impacts on health and well-being, and supports previous research which advocate for the promotion of healthy campus communities to support student wellness (Patterson & Kline, 2008).

4.4.5 Implications. Through this study, it was clearly demonstrated that post-secondary institutions can foster health and well-being among students, and can also provide this population with the necessary supports and resources to participate and thrive in campus life. Multi-level influences can have more enduring health impacts (Golden, & Earp, 2012); consequently, a socio-ecological approach that integrates psychological, social, organizational, cultural, community planning, and regulatory perspectives can help foster well-being in post-secondary students (Stokols, 1996). A post-secondary institution is an important setting in which to address multi-level influences on student health. A socio-ecological approach to health requires collaborative and cross-campus processes such as creating a positive learning environment and organizational culture as well as supporting student well-being though all policies, processes, and learning environments (University of Central Lancashire, 2104). The socio-ecological model emphasizes the importance of moving beyond the health

education models of health promotion that are often employed in post-secondary settings (and focusing solely on individuals' health), to actually understanding how systemic changes within a setting can positively impact the health and well-being of a population (National Association of Student Personnel Administrators, 2004; U.S. Department of Health and Human Services, 2008). Focus groups with students explored what they perceived as barriers or mediators to health, and captured solutions that they themselves identified as sustainable. These valuable findings allow health promotion planners on post-secondary campuses to confidently create targeted programs to address unique needs of post-secondary students.

4.4.6 Limitations. Health is a complex process unique to each individual and shaped by his or her university or pre-university life experiences, and which cannot be fully explored and understood through the findings and interpretations of one research study with 21 participants. The participants' degree of self-awareness about health behaviours, well-being, and experiences at the institution, impacted their ability to recall and ascribe meaning to their narratives. This research was conducted at a large Ontario university. Conducting this research at another university environment, different in size, geographic location, or culture may contribute additional insights, understandings, and considerations. Generalizability is further limited because of the lack of diversity in ethnicity, social class and sexual orientation of participants. Further, this study reflected the voices of those students who indicated an interest in, and were reasonably comfortable with, talking about their ideas and perceptions of health, and did not include those students who did not self-select to participate.

In qualitative inquiry, the researcher is the data-gathering instrument which poses a risk for potential bias (Hennink, Hutter, & Bailey, 2011). The perceptions and experiences of the researchers as they related to the phenomenon of study have influenced the data collection and interpretations. The use of reflexive notes and peer debriefing helped mitigate potential bias and confirmed emerging interpretations. This research can also be further strengthened by incorporating more than two analytic levels of the socio-ecological model (Stokols, 1996).

Despite these limitations, this study provides a contribution about the role of post-secondary institutions in student health and well-being. Student input is paramount in the successful design and implementation of health promotion efforts on post-secondary campuses; their narratives contributed richness to this inquiry. This study provides a basis for health promotion initiatives in post-secondary institutions and a foundation for further research.

4.4.7 Conclusion. Late adolescence is a significant developmental period and also a time of transition for post-secondary students. Student focus group participants highlighted important way in which their overall health and well-being is influenced by individual factors, the social and physical environment and policy. Through the use of a socio-ecological model this study demonstrated ways in which to address student health in a proactively and comprehensive manner. Post-secondary institutions play an important role in assisting students to develop their potential and to attain optimal health in the transition to adulthood. Health not only has immediate effects on students, but is also part of a trajectory of future health and well-being. For these compelling reasons, health and well-being of students should be prioritized by post-secondary institutions.

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CHAPTER 5

5 Discussion

5.1 Summary of Findings

The overall purpose of this integrated-article dissertation was to examine stress in Canadian post-secondary students. Through this thesis, unique socio-demographic predictors of stress in post-secondary students were identified, the complex inter-relationship between health behaivours stress and academic performance were explored in one model using path analysis and for the first time individual, social, physical and policy influences on health in Canadian students was explored.

In study one, 57.6% of respondents reported that their stress was *more than average* or *tremendous*. Common stressors experienced by students included; academics (56.5%), finances (36.8), sleep difficulties (31.9%) and intimate relationships (31.9%). Students with a mental health diagnosis, learning disability, other disability, or chronic illness are more likely to have elevated stresses, as are female students, Caucasian students, non-international students or students who are over the age of 23 years or are in a relationship.

Study two examined the relationship between nutrition, physical activity, sleep and stress in Canadian post-secondary students. A total of 13.2 % of students had adequate fruit and vegetable intake, while 17.2% met Canadian Society for Exercise Physiology's (CSEP) Guidelines for Physical Activity, and 44.8% identified that sleep was not a problem. Overall, 3.3% of students met requirements for all three health behaviours (i.e., physical activity, nutrition, and sleep). Sleep, physical activity, and nutrition all had a direct effect on stress and academic performance. All health

behaviours demonstrated significant indirect effects, through stress, on academics.

Lastly, student perceptions about individual and institutional impacts on health were obtained through focus groups. Students report that stress, health behaviours (i.e., nutrition, physical activity, and adequate sleep) and personal accountability affects intrapersonal health, while social capital is an important interpersonal component. At an institutional level, a supportive campus culture mediates overall well-being by contributing to student engagement, sense of cohesion, and empowerment. When the post-secondary institution's approach to supporting student health is perceived as un-integrated; disconnection, disempowerment, and decreased motivation are resultant and adversely impact students.

5.2 Socio-Ecological Theory

A multifaceted view of the connections between health, learning, productivity, and campus structure can be addressed through the socio-ecological model (SEM). Ecological paradigms have their roots within the Ottawa Charter for Health Promotion (World Health Organization [WHO], 1986), which was influential in shifting health promotion away from problem-oriented individual interventions towards a more comprehensive focus. This paradigm posits that health cannot be separated from other determinants of health and highlights the inextricable links between people and their environment. Crucial to this ideology is the concept that "health is created and lived by people within the settings of their everyday life; where they learn, work, play and love" (WHO, 1986, p.4). Therefore, a post-secondary institution is an important setting in which to address multi- level influences on health. The socio-ecological model emphasizes the importance of moving beyond health education models, which are often

utilized, in post-secondary settings. While health education focuses solely on individuals' health, a shift to actually understanding how systemic changes within a setting can positively impact health and well-being is amore efficacious approach to addressing student health
(National Association of Student Personnel Administrators, 2004; U.S. Department of Health and Human Services, 2008). It has been argued that health services and health promotion efforts at institutions of higher education can be improved by being delivered within the context of an ecological or whole system approach (American College Health Association, 2014; Canadian Organization of University and College Health (COUCH), 2014; Health Campus 2020).

5.2.1 Individual level. Study one discovered unique and informative predictors about who is more than likely to experience stress within the post-secondary population. These findings provide useful information for who stress interventions may be particularly useful. The present findings support published literature suggesting that stress is higher in female students, graduate students, and in students with a mental health diagnoses, learning disability, or chronic illness. A surprising finding was that non-international students also experience elevated stress. This finding conflicts with published literature and bears further exploration (Ulla, & Pérez-Fortis, 2010, Duru, Poyrazli, 2014; Rice, Choi, Zhang, Morero, & Anderson, 2012). Another unexpected finding was the impact of relationships on stress. Students in relationships were more likely to experience elevated stress, with intimate relationships being reported as the third highest reported stressor by Canadian students. Notwithstanding opportunities for future research, these valuable findings allow health promotion planners to confidently create

targeted programs that address the unique needs of students from the aforementioned demographic groups.

In study three, focus group participants gave their perspective on the pervasiveness of stress, laying emphasis on the need to prioritize and attend to stressors proactively. Therefore, it is useful for post-secondary institutions to provide interventions and programs that address these prevalent concerns of students. Within the SEM paradigm, interventions targeting the individual level utilize tools such as, observational learning, changing cognition, and behavioural modification (Bandura, 1991, Stokols, 1996). A review of literature finds evidence of interventions that effectively decrease levels of perceived stress in the student population. For example; Mindfulness, Acceptance Commitment Therapy (ACT), Yoga, and Cognitive Behavioural Therapy (CBT) have all been found to lead to symptom reduction of clinical stress-related problems, decreased anxiety, decreased negative health behaviours, increased ability to deal with negative emotions, and improved overall well-being (Carmody & Baer, 2008; Christopher, Chiesa & Serretti, 2009; Christopher Dunnagan, Schure, 2008; Roberts & Danoff-Burg, 2013; Eberth & Sedlmeier, 2012; Galbraith & Brown, 2010; Milligan, 2006, Simard & Henry, 2009; Muto, Hayes, & Jeffcoat, 2011; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008). It is recommended that students at post-secondary institutions have access to programs such as these to improve positive coping and reduce stress (CACUSS & CMHA BC, 2013).

5.2.2.1. Self- efficacy. Another way to build capacity to manage stress in post-secondary students is through the development of self-efficacy. The concept of self-efficacy is a central construct in Social Cognitive Theory (SCT) that can be useful for

directing individual level (Stokol, 1992). SCT of health behaviours compliments the socio-ecological model. For example, according to the SEM, health behaviours have multiple influences which interact across different levels (Sallis, Owen, & Fisher, 2008). Similarly, the SCT emphasizes reciprocal determinism, or the interaction between people and their environments (Bandura, 1991) however, it focuses primarily on the social environment at the individual level (McAlister, Perry, & Parcel, 2008).

According to Bandura (1977), self-efficacy is the extent of one's belief in his or her own ability to succeed in performing specific tasks. One's sense of self-efficacy can play a major role in how he or she approaches goals, tasks, and challenges (Bandura, 1977). The concept of self-efficacy applies for university students, whom are constantly facing goals, tasks, and challenges. A strong sense of self-efficacy can help mediate reactions to stress and health behaviours that impact academic performance.

5.2.2.2 Stress and self-efficacy. Within the context of stress, self-efficacy refers to one's confidence in his or her ability to handle stressful situations (Bandura, 2011). Possessing high levels of self-efficacy acts to decrease the potential for experiencing negative stress feelings by increasing an individual's sense of being in control of the situations they encounter (Bandura, 2011). For example, a university student experiences stress related to struggling to write an essay for a course. The student expects that the professor will help address his concerns and therefore sets up a meeting to receive direction and guidance. Based on this experience the student has had success in handling the situation. Furthermore, the perception of being in control (rather than the reality of being in or out of control) is an important buffer of negative stress (McAlister, Perry, & Parcel, 2008). People with well-developed coping skills typically develop a

higher sense of self-efficacy than those who have poorer coping skills, and are thus less likely to suffer the negative impact of stress reactions (Bandura, 1991). Subsequently, if a student's capacity to cope is increased, they will become less reactive to stress and better able to manage stressful situations (Patterson & Kline, 2008). Possessing coping strategies may lead to increased motivation, self-esteem, and positive health (Eisenbarth, 2012). For this reason, it is crucial that university students have the opportunity to develop self-efficacy so that they may be supported in achieving academic success and maintaining a healthy lifestyle.

5.2.2.3 Resilience and thriving of individuals. Stress is often placed within the context of sub-optimal mental health or a medical model approach to health. Within the literature on post-secondary students, there is a focus on high-risk behaviours such as alcohol, smoking, or mental health problems (Bennett & Holloway, 2014; Holloway, Bennett, Parry, & Gorden, 2014; King, Vidourek, & Singh, 2014; Kingsbury, Gibbons, & Gerrard, 2014; Kwan, Faulkner, Arbour-Nicitopoulos**,** & Cairney, 2013; Leinwand, 2007; Moore-Rodríguez et al., 2014; Pengpid, Peltzer, Mirrakhimov, et al, 2014; Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004; Ward, Allemande, & De Witte, 2014). However, health and well-being do not only come with the avoidance of risk, but rather it develops from the successful use of effective protective factors. Resilience is an important protective factor that directs individual actions towards solutions (University West, 2014). Cote and Nightingale (2012) recently suggested that resilience can be applied to human-environment relations that fit well within the systems approach or social-ecological perspective (Cote & Nightingale, 2012). Resilience and thriving were identified as category amongst focus group participants as factors that could support well-

being. Students who took part in the focus groups suggested that engaging in physical activity, healthy nutrition, time management skills, and stress management support resilience. Several challenges arise during life as a post-secondary student that have the potential to markedly impact stress and academic success (Parker, Summerfeldt, Hogan, & Majeski, 2004). Results from study one and two demonstrated that Canadian students experience elevated levels of stress, multiple stressors, and infrequently meet physical activity, sleep, or nutrition guidelines; all of which negatively influence academic performance. The ability to become resilient allows one to remain competent despite exposure to stressful life experiences (Luthar, 1991). It is not possible to get through adolescence or young adulthood without facing adversity, and therefore resilience is an essential component students require in order to succeed in their daily lives and academic career (Catterall, 1998). Well-being is linked to resilience as it allows students to remain competent despite exposure to stressful life experiences (Fonagy, 1994; Luthar, 1991; Rutter, 2012; Walsh, 2007; Werner, 1995); it is a process through which individuals are able to successfully adapt or bounce back from stress or trauma (Campbell-Sills, Cohan, & Stein, 2006). The link between capacity building, thriving, and resilience is essential to both student well-being and learning (CAUCUSS, 2013).

Another concept similar to resilience is thriving. Thriving, in a context of social support, includes developing one's potential, in addition to working productively and creatively (Carver, 1998). For students in academia, thriving encourages active engagement and optimal functioning rather than merely surviving university or college (Jenkins, 2008). Thriving in an academic environment can be supported through building capacity of students and by focusing on resources that maintain and improve health.

Empowering students to participate actively in maintaining their wellbeing sets the foundation for increased ability to sustain wellbeing not only during time in university, but also over their lifespan (CAUCUSS & CMHA, 2013; Freire, 1973; Laverack, 2006).

5.2.2 Social environment. SEM is based on Bronfenbrenner's Ecological Systems Theory of Development (1994). Bronfenbrenner (1994) emphasized that a person's development is affected by everything in their surrounding environment. A significant component of the environment is the social environment, which is comprised of relationships, culture, and the society with which individuals interact (Stokol, 2003). Focus group participants referred to the importance of the social connectedness associated with the post-secondary institution. Sense of belonging and inclusivity on campus were described by students as having a positive impact on well-being. They also reported that they were more likely to feel engaged as well as experience community cohesion and a sense of empowerment when the campus environment was perceived as supportive. The notion that positive community attitudes can influence behaviour has been identified as an important aspect of SEM (Bronfenbrenner, 1994). Another important social influence for students is peer acceptance; in fact focus group participants highlighted that social capital as an important component of well-being. When applying SEM, another important social influence in post-secondary institutions is student relationships with faculty, teaching assistants, and university staff. This is supported by a recent review article on factors that support resilience (Benzies & Mychasiuk, 2009); the findings from this paper demonstrated that supportive mentors or responsible adults outside the family such as teachers or coaches can also act as protective factors for young people.

5.2.3 Physical environment. Within SEM, the physical environment is comprised of natural and built physical spaces and includes factors such as: weather, geography, accessibility to facilities such as parks and gymnasiums, public transportation, and safety (Bronfrenbrenner, 1994). Focus group participants identified concerns about lack of options for healthy food, lack of space for studying, and overcrowding at the recreation centre on campus. These environmental issues have a direct negative influence on health behaviours (i.e., healthy nutrition and physical activity). Both the built environment (i.e., gymnasium, facilities, and libraries) and natural environment (i.e., walking and cycling trails, accessible pathways, and outdoor facilities) are important components that have the potential to affect the entire student population. Therefore, targeting the physical environment is a vital component of creating sustainable behaviour change, particularly if applied in concert with multiple levels of influence (Sallis et al., 2008).

5.2.4 Policy. The success of applying a SEM framework on a post-secondary campus is dependent on the extent to which health and wellness needs are embedded into policy/planning as well as the degree to which isolated and fragmented interventions can be eliminated (University of Central Lancashire, 2014). Often significant reorganization and planning inclusive of health and wellness needs are required to make this paradigm shift (ACPA, & NSPA, 2004). It has been suggested that for multi-level influence to occur, the strategic plan of post-secondary institutions must reflect the link between health and academic success (Dooris, Cawood, Doherty, & Powell, 2010; Patterson & Kline, 2008), on post-secondary campuses. This includes integrating health and well-being into academic structures, policies, and processes of these institutions (McKean,

2011; Queens University, 2012). Linking health priorities to the strategic plan, policies, and service provision of the university helps to create accountability, develop infrastructure, and maintain comprehensiveness.

In Study three, students reported significant frustration with "navigating the system" and accessibility. They referred to limited hours of operation of student services, scheduling conflicts, lack of awareness about support services, physical and structural issues, and policies that were "not student-centred" as problematic. Lack of awareness of services and inability to access services during operational hours were also discussed by focus group participants. These issues apply to the policy level of SEM and require institutional level commitment in order to be addressed.

5.3 Implications for Institutions

The World Health Organization (1998) describes a *Health Promoting University* as one that enhances health and well-being and enables all individuals in the campus community to achieve their full potential. While individual-level interventions can assist students in developing skills to cope with stress and improve their self-efficacy, health promotion efforts need to consider the post-secondary institution environment as a whole (Tsouros, Dowding, Thompson, & Dooris, 2012). With the adoption of a comprehensive health strategy, issues of integration, co-ordination, awareness, and access (as identified concerns among focus group participants), can be addressed (CAUCUSS, 2011). Although creating a campus environment that supports student health and well-being has been described as an institutional responsibility (Mackean, 2011; National Association of Student Personnel Administrators [NAPSA], 2004; Ontario University and College Health Assocation [OUCHA], 2009), it may prove challenging to integrate a systematic

approach to health into higher education institutions, as this is not the central aim of the university. One strategy to engage post-secondary institutions in addressing student health is through making a connection to university core business. For example, health and well-being can be linked to student recruitment, retention, experience, and achievement as well as staff performance and organizational productivity (University of Central Lancashire, 2014).

Health programs are more effective when they are planned and evaluated with the active participation of those responsible for implementing them as well as those who are affected (Ransdell, 2001). To address the issue of stress, student input enabled an understanding of the health priorities, and if applied to multi-level interventions, will allow campus-wide health promotion efforts and health and wellness services to be evidenced based. Focus groups with students explored what they perceived as barriers or mediators to health, and captured solutions that they themselves identified as sustainable. These valuable findings allow health promotion planners on post-secondary campuses to confidently create targeted programs that address the unique needs of students. Data from studies ones, two, and three can be considered part of a needs assessment which is a crucial first step to health promotion planning, implementation, and evaluation. It is important that health and wellness interventions employed on post-secondary campuses to be effective and sustainable. Therefore, continual short- and long-term evaluations for the purpose of monitoring and continuous quality improvement need to be built into various stages of the planning and implementation and established linkages to the larger university system made (Crosby & Noar, 2011; Radcliffe & Lester, 2003).

5.3.1 Applications and examples. There are examples of socio-ecological models of health that have been applied to the university setting. In the United States, Healthy Campus 2020 describes an ecological approach to improve student, faculty, and staff health by focusing on multi-level influences (e.g., public policy, community, institutional, interpersonal, and intrapersonal factors; McLeroy, Bibeau, Steckler, & Glanz, 1988). Another ecological model is illustrated in the Healthy Universities national network in the United Kingdom (University of Central Lancashire, 2104). This group advocates for the promotion of a facilitative environment for the development of a whole university approach to health and well-being (University of Central Lancashire, 2104). Their approach considers both staff and student well-being, with a philosophy that the organizational level programs should take a proactive approach to address well-being (Dooris et al., 2010).

These theoretical concepts are applicable to student well-being in post-secondary institutions. For example, the Cornell University Mental Health Model presents a framework for building resilience through four action areas including: 1. service, 2. connectedness, 3. efficacy and mastery, and 4. self- awareness (Cornell University Mental Health Model, 2012). This model was created based on the premises that: 1. academic stress does not cause distress but exacerbates distress, 2. many students at risk for psychological distress enter university with potentially mutable vulnerabilities (e.g., social connectedness, emotion acceptance and regulation, cognitive style, sense of life meaning), and 3. cognitive style is a particularly powerful predictor of distress and thriving (and is mutable; Cornell University, 2012). Building capacity and resilience are

crucial aspects of addressing stress and the Cornell Models provides a template that can be used by the post-secondary sector.

5.3.2 Proactive approach. To enable students to learn, high quality psychosocial support and health care must exist where and when it is needed (ACPA & NSPA, 2004). Addressing issues of student health and well-being requires leadership, and is more effective when it is preventative (Dooris & Doherty, 2009). It is unfortunate that some Canadian universities take a reactive approach to addressing the health and well-being of students. For example, following a widely publicized suicide of a student, Carleton University commissioned an independent consultant to create their Mental Health Framework for their campus (Carleton Framework, 2011). Similarly, reeling from two alcohol-related deaths and four suicides, Queens undertook a massive review of its alcohol policy and mental health action (Queens University, 2014). Acadia University in Nova Scotia created a campus-wide alcohol strategy after a student fatality occurred (Strang Report, 2013). Within higher education institutions, widespread improvements to system access and health literacy have the potential to prevent emergent situations (CAUCUSS & CMHA, 2013). Given these compelling examples, it is prudent to avoid a situation in which tragedy mitigates action, especially given the context of students who struggle significantly with stress. National College Health Assessment (NCHA) data identified that Canadian post-secondary students frequently experience impediments to academics, and 80.7% of students reported experiencing at least one traumatic or difficult to handle situation in the last year. Given the clear and established link between the health and academic success of students in Canadian post-secondary institutions, a proactive and comprehensive approach to approaching this issue is warranted.

5.4 Future Directions

Continuing efforts should continue to identify factors that may mediate the relationship between perceived stress, health behaviours, and academic performance in post-secondary students. These results provide evidence that stress is a detrimental aspect of student life which can lead to other negative outcomes among Canadian post-secondary students. Preliminary results from these studies support a view that students are a distinct group with specific needs. Although stress may affect all Canadians, it is of particular concern for post-secondary students; this is especially true in light of research that has demonstrated that post-secondary students experience significantly higher levels of stress than the general population (Adalf, 2005; Adalf et al., 2001). There exists an opportunity to advocate at the provincial and national level for the unique needs of post-secondary students to be addressed. Given the findings from studies one, two, and three; developing interventions and programs for students to learn how to manage stress is warranted. Students in this study expressed explicit interest in receiving health-related information from their institution. Study one revealed that discrepancies exist with more students wishing to receive information than those who actually received health information from their university (NCHA, 2013). Not only are students interested in information, focus group participants advocated for the inclusion of student voices in the creation of a wellness strategy to ensure that the needs of students are addressed by their post-secondary institution. Students are important stakeholders that should be involved in the collective responsibility for creating campus conditions that support transformative learning and well-being (CAUCUSS, 2013). Application of a socio-ecological framework for health revaluation on post-secondary campus is an important

consideration for future research. A multi-level, proactive, and comprehensive method of addressing health will enable students to build their capacity to navigate stress, and impacts student health throughout their career as a student and beyond. A whole campus approach to supporting student health is critical to ensuring that Canadian post-secondary students will thrive.

5.5 Limitations

This work was based primarily on the NCHA. The NCHA is a self-report survey and is therefore prone to recall bias and social desirability bias (Araas, Sebren, & Swan, 2008). The method of administration (i.e., e-mail web-based survey) assumes that students access their university e-mail accounts. In addition, there are inherent limitations associated with the use of cross-sectional correlation designs. Alteration and manipulation of independent or dependent variables is not possible and causality cannot be demonstrated. Given that information is gathered in one sitting, the possibility of observing perceived stress and health behaviours over a long period of time is not possible. An opportunity exists to create an instrument that more accurately measures constructs such as stress or health behaviours on post-secondary populations. There were a limited number of questions in the NCHA survey about stress and mental health, and the questions that were asked are limited in their scope. Future research should explore alternative instruments that apply and investigate these concepts in post-secondary students. Specifically, the creation of a measurement instrument that more objectively measures stress would eliminate some of the biases that exist in self-report questionnaires. Health is a complex process unique to each individual and shaped by his or her university or pre-university life experiences; as such, it cannot be fully explored

and understood through the findings and interpretations of one research study with 21 participants. The participants' degree of self-awareness about health behaviours, well-being, and experiences at the institution impacted their ability to recall and ascribe meaning to their narratives. This research was conducted at a large, Ontario university. Conducting similar research at another university, which differs in size, geographic location, or culture, may contribute additional insights, understandings, and considerations to this area of work. Generalizability is further limited because of the lack of diversity in ethnicity, social class, and sexual orientation of participants. Further, this study reflected the voices of those students who indicated an interest in, and were reasonably comfortable with, talking about their ideas and perceptions of health, and did not include those students who did not self-select to participate.

5.6 Conclusion

Within institutions of higher education, it is essential to create conditions in which students can flourish. This can be accomplished through considering multiple influences on health including; individual level determinants, the social environment, the physical environment, and policy-level influences. Student health and wellness is influenced by multiple complex factors in a reciprocal relationship with their environment. Accordingly, a health promoting university identifies environmental factors and influences which interact and affect individual behavior (NASPA, 2004). A socio-ecological approach to health in a post-secondary setting provides an opportunity to support students in managing stress, developing self-efficacy, participating in positive health behaviours, and maintaining optimal well-being across multiple levels of influence (CAUCUSS, 2013). Given this compelling evidence from the three studies in this

research, the development of a comprehensive strategy to promote student health is encouraged in Canadian post-secondary institutions.

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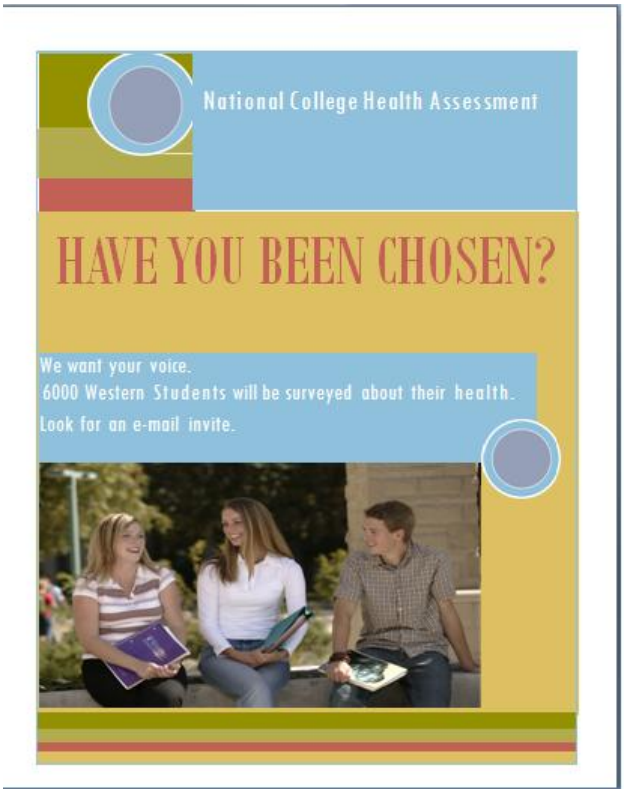
Appendix A

Recruitment Poster



Appendix B

Sample Recruitment Letter

E-mail subject line: Western University Student Health Survey

Letter of Invitation/Consent

Dear *First name of student*,

You have been randomly selected to participate in a health survey for Western University students called the National College Health Assessment (NCHA-Web). Consider participating because your voice is important in providing accurate student health information for Western.

By participating in this study, you have a **1 in 10 chance of winning a $10 gift certificate to the campus book store!!!** Winners will be contacted via e-mail at the end of next month.

The NCHA-Web is completed online via the Internet (see link below). We encourage you to complete the survey in one sitting, which typically takes about 20-30 minutes.

You have been assigned an ID number in order for the secure Internet server to manage your online survey input. This number is imbedded in your URL address to access the survey. When you submit the survey, your responses will be housed at the ACHA. To ensure confidentiality and privacy, the link between student e-mail addresses, unique ID numbers, and survey responses can never be made as personal identifiers are never stored with survey responses and unique ID numbers are destroyed before data are compiled and shared with the Western. Furthermore, data transmission is encrypted and firewall securities are in place.

The plan for this study has been reviewed for its adherence to ethical guidelines and approved by Health Research Ethics Board (HREB) at the Western University.

The study team will comply with the Western University Standards for the protection of

Human Research Participants. Should you have any questions about this survey or how it will be used, or if you would like to obtain survey results, please contact [redacted]

Your participation is completely voluntary and confidential. There is the potential that you may have personal discomfort with the content of certain questions. If you become upset during the course of the survey you can stop at any time. If you have emotional concerns that arise while participating in the survey, please seek assistance from [redacted]

By linking to the survey web site you are acknowledging that you are consenting to participate in the NCHA-Web Survey. If you agree to participate in the ACHA NCHA-Web survey, click on the following Internet address to continue:

[URL HERE]

If clicking on this link does not automatically open your Internet browser, please cut and paste the entire web address into your browser window.

Please be aware that you will be sent 2 reminder messages about participating in this survey.

Thank you for your participation!

Student Health Services

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Appendix C

Sample of Non-Responder Letter

E-mail subject line Jan28th: Reminder - Western Student Health Survey

E-mail subject line Feb 4th: Last Chance - Western Student Health Survey

Dear *First name of student*,

If you are one of the 420 Western students who have completed the NCHA survey, we appreciate it. If you have yet to participate, there is still time!!!!

You have been randomly selected to participate in the Western University student health survey, known as the National College Health Assessment Web survey (NCHA-Web). We want your voice in providing accurate student health information for Western.

By participating in this study, you have a **1 in 10 chance of winning a $10 gift certificate to the campus book store!!!**

If you agree to participate in the NCHA-Web Survey, follow this link.

[redacted]

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We encourage you to complete the survey in one sitting, which typically takes about 20-30 minutes.

You have been assigned an ID number in order for the secure Internet server to manage your online survey input. This number is imbedded in your URL address to access the survey. When you submit the survey, your responses will be housed at the ACHA. To ensure confidentiality and privacy, the link between student e-mail addresses, unique ID numbers, and survey responses can never be made as personal identifiers are never stored with survey responses and unique ID numbers are destroyed before data are compiled and shared with the Western University. Furthermore, data transmission is encrypted and firewall securities are in place.

The plan for this study has been reviewed for its adherence to ethical guidelines and approved by Health Research Ethics Board (HREB) at the Western University.

The study team will comply with the Western University Standards for the protection of Human Research Participants. Should you have any questions about this survey or how it will be used, or if you would like to obtain survey results, please contact [redacted]

Your participation is completely voluntary and confidential. There is the potential that you may have personal discomfort with the content of certain questions. If you become upset during the course of the survey you can stop at any time. If you have emotional concerns that arise while participating in the survey, please seek assistance [redacted]

Thank you so much for contributing!

Student Health Services

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Appendix D

Finale Ethics Approval Letter

Western

Research Ethics

Use of Human Participants - Ethics Approval Notice

[redacted]

Review Level: Delegated
Approved Local Adult Participants:0
Approved Local Minor Participants:0
Protocol Title: Healthy Campus Western University - National College Health Assessment (NCHA) Needs Assessment
Department & Institution: Health Sciences,Western University
Sponsor:
Ethics Approval Date: December 12, 2012 **Expiry Date:**April 30, 2013
Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
Other	Proposed additional questions	

This is to notify you that The University of Western Ontario Research Ethics Board for Health Sciences Research Involving Human Subjects (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced revision(s) or amendment(s) on the approval date noted above. The membership of this REB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the University of Western Ontario Updated Approval Request Form.

Members of the HSREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the HSREB.

The Chair of the HSREB is Dr. Joseph Gilbert. The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

[redacted]

Ethics Officer to Contact for Further Information

Janice Sutherland (jsutherl@uwo.ca)	Grace Kelly (grace.kelly@uwo.ca)	Shantel Walcott (swalcot@uwo.ca)

This is an official document. Please retain the original in your files.

Appendix E
Permission from ACHA to Use Canadian Data Set

American College Health Association

[redacted]

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Thank you for submitting a request to use ACHA-NCHA data in your project "Who is stressed? A study of socio-demographic, health behaviours, and life experiences in Canadian University students related to increased stress." Your request has been approved and enclosed you will find the ACHA-NCHA Reference Group Dataset you requested and the corresponding survey codebook.

Please note that a number of items on the ACHA-NCHA II were changed beginning with the Fall 2011 survey period. Edits were made to nq16 (alcohol consequences), nq54 (race and ethnicity), and nq65 (disabilities). Also, nq66 was added to capture student veteran status. **Data from these items should not be compared with data collected with the ACHA-NCHA II prior to Fall 2011.**

I have enclosed a copy of our data use guidelines and agreement for your information. Your signed copy is on file in my office. Please note that additional studies using the ACHA-NCHA data acquired through this request require submission of a new data use request to the ACHANCHA Program Office.

As stated in the agreement, we would appreciate a copy of any final products that result from your research. We also ask that you add the following disclaimer to any article or presentation you make using the ACHA-NCHA data:

> *The opinions, findings, and conclusions presented/reported in this article/presentation are those of the author(s), and are in no way meant to represent the corporate opinions, views, or*

policies of the American College Health Association (ACHA).

ACHA does not warrant nor assume any liability or responsibility for the accuracy, completeness, or usefulness of any information presented in this article/presentation.

Please don't hesitate to contact me if you have any questions.
Best of luck with your research,

[redacted]

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Appendix F

Sample NCHA Survey

Spring 2013 Canadian National College Health Assessment w/COUCH extra questions

The following questions ask about various aspects of your health. This survey is completely voluntary. You may choose not to participate or not to answer any specific questions. You may skip any question you are not comfortable answering. The survey is confidential. E-mail contact information is destroyed before data are compiled to protect confidentiality. Composite data will then be shared with your campus for use in health promotion activities.

Health, Health Education, and Safety

1) How would you describe your general health?

- Excellent
- Very good
- Good
- Fair
- Poor
- Don't know

2A) Have you received information on the following topics from your college or university? (Please mark the appropriate column for each row)

	No	Yes
Alcohol and other drug use		
Cold/Flu/Sore throat		
Depression/Anxiety		
Eating disorders		
Grief and loss		
How to help others in distress		
Injury prevention		
Nutrition		
Physical activity		
Pregnancy prevention		

2B) Have you received information on the following topics from your college or university? (Please mark the appropriate column for each row)

	No	Yes

Problem use of Internet/computer games	☐	☐
Relationship difficulties	☐	☐
Sexual assault/Relationship violence prevention	☐	☐
Sexually transmitted disease/infection (STD/I) prevention	☐	☐
Sleep difficulties	☐	☐
Stress reduction	☐	☐
Suicide prevention	☐	☐
Tobacco use	☐	☐
Violence prevention	☐	☐

3A) Are you interested in receiving information on the following topics from your college or university? (Please mark the appropriate column for each row)

	No	Yes
Alcohol and other drug use	☐	☐
Cold/Flu/Sore throat	☐	☐
Depression/Anxiety	☐	☐
Eating disorders	☐	☐
Grief and loss	☐	☐
How to help others in distress	☐	☐
Injury prevention	☐	☐
Nutrition	☐	☐
Physical activity	☐	☐
Pregnancy prevention	☐	☐

3B) Are you interested in receiving information on the following topics from your college or university? (Please mark the appropriate column for each row)

	No	Yes
Problem use of Internet/computer games	☐	☐
Relationship difficulties	☐	☐
Sexual assault/Relationship violence prevention	☐	☐
Sexually transmitted disease/infection (STD/I) prevention	☐	☐
Sleep difficulties	☐	☐
Stress reduction	☐	☐
Suicide prevention	☐	☐
Tobacco use	☐	☐
Violence prevention	☐	☐

4) Within the last 12 months, how often did you: (Please mark the appropriate column for each row)

	N/A, did not do this activity within the **last 12 months**	Never	Rarely	Sometimes	Most of the time	Always
Wear a seatbelt when you rode in a car?	☐	☐	☐	☐	☐	☐
Wear a helmet when you rode a bicycle?	☐	☐	☐	☐	☐	☐
Wear a helmet when you rode a motorcycle?	☐	☐	☐	☐	☐	☐
Wear a helmet when you were inline skating?	☐	☐	☐	☐	☐	☐

5) Within the last 12 months: (Please mark the appropriate column for each row)

	No	Yes
Were you in a physical fight?	☐	☐
Were you physically assaulted (do not include sexual assault)?	☐	☐
Were you verbally threatened?	☐	☐
Were you sexually touched without your consent?	☐	☐
Was sexual penetration attempted (vaginal, anal, oral) without your consent?	☐	☐
Were you sexually penetrated (vaginal, anal, oral) without your consent?	☐	☐
Were you a victim of stalking (e.g., waiting for you outside your classroom, residence, or office; repeated emails/phone calls)?	☐	☐

6) Within the last 12 months, have you been in an intimate (coupled/partnered) relationship that was: (Please mark the appropriate column for each row)

	No	Yes
Emotionally abusive? (e.g., called derogatory names, yelled at, ridiculed)	☐	☐

Physically abusive? (e.g., kicked, slapped, punched)	□	□
Sexually abusive? (e.g., forced to have sex when you didn't want it, forced to perform or have an unwanted sexual act performed on you)	□	□

7) How safe do you feel: (Please mark the appropriate column for each row)

	Not safe at all	Somewhat unsafe	Somewhat safe	Very safe
On this campus (daytime)?	□	□	□	□
On this campus (nighttime)?	□	□	□	□
In the community surrounding this school (daytime)?	□	□	□	□
In the community surrounding this school (nighttime)?	□	□	□	□

Alcohol, Tobacco, and Drugs

8A) Within the last 30 days, on how many days did you use: (Please mark the appropriate column for each row)

	Never used	Have used, but not in **last 30 days**	1-2 days	3-5 days	6-9 days	10-19 days	20-29 days	Used daily
Cigarettes	□	□	□	□	□	□	□	□
Tobacco from a water pipe (hookah)	□	□	□	□	□	□	□	□
Cigars, little cigars, clove cigarettes	□	□	□	□	□	□	□	□
Smokeless tobacco	□	□	□	□	□	□	□	□
Alcohol (beer, wine, liquor)	□	□	□	□	□	□	□	□
Marijuana (pot, weed, hashish, hash oil)	□	□	□	□	□	□	□	□
Cocaine (crack, rock, freebase)	□	□	□	□	□	□	□	□
Methamphetamine (crystal meth, ice, crank)	□	□	□	□	□	□	□	□
Other amphetamines (diet pills, bennies)	□	□	□	□	□	□	□	□

8B) Within the last 30 days, on how many days did you use: (Please mark the appropriate column for each row)

	Never used	Have used, but not in **last 30 days**	1-2 days	3-5 days	6-9 days	10-19 days	20-29 days	Used daily
Sedatives (downers, ludes)	□	□	□	□	□	□	□	□
Hallucinogens (LSD, PCP)	□	□	□	□	□	□	□	□
Anabolic steroids (Testosterone)	□	□	□	□	□	□	□	□
Opiates (heroin, smack)	□	□	□	□	□	□	□	□
Inhalants (glue, solvents, gas)	□	□	□	□	□	□	□	□
MDMA (Ecstasy)	□	□	□	□	□	□	□	□
Other club drugs (GHB, Ketamine, Rohypnol)	□	□	□	□	□	□	□	□
Other illegal drugs	□	□	□	□	□	□	□	□

9A) Within the last 30 days, how often do you think the typical student at your school used: (State your best estimate; Please mark the appropriate column for each row)

	Never used	Have used, but not in **last 30 days**	1-2 days	3-5 days	6-9 days	10-19 days	20-29 days	Used daily
Cigarettes	□	□	□	□	□	□	□	□
Tobacco from a water pipe (hookah)	□	□	□	□	□	□	□	□
Cigars, little cigars, clove cigarettes	□	□	□	□	□	□	□	□
Smokeless tobacco	□	□	□	□	□	□	□	□
Alcohol (beer, wine, liquor)	□	□	□	□	□	□	□	□
Marijuana (pot, weed, hashish, hash oil)	□	□	□	□	□	□	□	□
Cocaine (crack, rock, freebase)	□	□	□	□	□	□	□	□
Methamphetamine (crystal meth, ice, crank)	□	□	□	□	□	□	□	□
Other amphetamines (diet	□	□	□	□	□	□	□	□

pills, bennies)								

9B) Within the last 30 days, how often do you think the typical student at your school used: (State your best estimate; Please mark the appropriate column for each row)

	Never used	Have used, but not in **last 30 days**	1-2 days	3-5 days	6-9 days	10-19 days	20-29 days	Used daily
Sedatives (downers, ludes)	□	□	□	□	□	□	□	□
Hallucinogens (LSD, PCP)	□	□	□	□	□	□	□	□
Anabolic steroids (Testosterone)	□	□	□	□	□	□	□	□
Opiates (heroin, smack)	□	□	□	□	□	□	□	□
Inhalants (glue, solvents, gas)	□	□	□	□	□	□	□	□
MDMA (Ecstasy)	□	□	□	□	□	□	□	□
Other club drugs (GHB, Ketamine, Rohypnol)	□	□	□	□	□	□	□	□
Other illegal drugs	□	□	□	□	□	□	□	□

One drink of alcohol is defined as a 12 oz. can or bottle of beer or wine cooler, a 4 oz. glass of wine, or a shot of liquor straight or in a mixed drink.

10) The last time you "partied"/socialized how many drinks of alcohol did you have? (If you did not drink alcohol, please enter 0)

_____Drinks

11) The last time you "partied"/socialized, over how many hours did you drink alcohol? (If you did not drink alcohol, please enter 0)

_____Hours

12) How many drinks of alcohol do you think the typical student at your school had the last time he/she "partied"/socialized? (If you think the typical student at your school does not drink alcohol, please enter 0)

_____Drinks

13) Over the last two weeks, how many times have you had five or more drinks of alcohol at a sitting?

- N/A, don't drink
- None
- 1 time
- 2 times
- 3 times
- 4 times
- 5 times
- 6 times
- 7 times
- 8 times
- 9 times
- 10 or more times

14) Within the last 30 days, did you: (Please mark the appropriate column for each row)

	N/A, don't drive	N/A, don't drink	No	Yes
Drive after drinking any alcohol at all				
Drive after drinking five or more drinks of alcohol				

15) During the last 12 months, when you "partied"/socialized, how often did you: (Please mark the appropriate column for each row)

	N/A, don't drink	Never	Rarely	Sometimes	Most of the time	Always
Alternate non-alcoholic with alcoholic beverages						
Avoid drinking games						
Choose not to drink alcohol						
Determine, in advance, not to exceed a set number of drinks						
Eat before and/or during drinking						
Have a friend let you know when you have had enough						
Keep track of how many drinks you were having						
Pace your drinks to 1 or fewer per hour						

Stay with the same group of friends the entire time you were drinking	□	□	□	□	□	□
Stick with only one kind of alcohol when drinking	□	□	□	□	□	□
Use a designated driver	□	□	□	□	□	□

16) Within the last 12 months, have you experienced any of the following when drinking alcohol? (Please mark the appropriate column for each row)

	N/A, don't drink	No	Yes
Did something you later regretted	□	□	□
Forgot where you were or what you did	□	□	□
Got in trouble with the police	□	□	□
Someone had sex with me **without my** consent	□	□	□
Had sex with someone **without their** consent	□	□	□
Had unprotected sex	□	□	□
Physically injured yourself	□	□	□
Physically injured another person	□	□	□
Seriously considered suicide	□	□	□

17A) Within the last 30 days, what percent of students at your school used cigarettes? State your best estimate.

_____Percent

17B) Within the last 30 days, what percent of students at your school used alcohol? State your best estimate.

_____Percent

17C) Within the last 30 days, what percent of students at your school used marijuana? State your best estimate.

_____Percent

18) In the last 12 months, have you taken any of the following prescriptions drugs that were not prescribed to you? (Please mark the appropriate column for each row)

	No	Yes
Antidepressants (e.g., Celexa, Lexapro, Prozac, Wellbutrin, Zoloft)	☐	☐
Erectile dysfunction drugs (e.g., Viagra, Cialis, Levitra)	☐	☐
Pain killers (e.g., OxyContin, Vicodin, Codeine)	☐	☐
Sedatives (e.g., Xanax, Valium)	☐	☐
Stimulants (e.g., Ritalin, Adderall)	☐	☐

Sex Behavior and Contraception

19) Within the last 12 months, with how many partners have you had oral sex, vaginal intercourse, or anal intercourse? (If you did not have a sex partner within the last 12 months, please enter 0)

_____Number of Partners

20) Within last 12 months, did you have sexual partner(s) who were: (Please mark the appropriate column for each row)

	No	Yes
Female	☐	☐
Male	☐	☐
Transgender	☐	☐

21) Within the last 30 days, did you have: (Please mark the appropriate column for each row)

	No, have never done this sexual activity	No, have done this sexual activity in the past but not in the **last 30 days**	Yes
Oral sex?	☐	☐	☐
Vaginal intercourse?	☐	☐	☐
Anal intercourse?	☐	☐	☐

22) Within the last 30 days, how often did you or your partner(s) use a condom or

other protective barrier (e.g., male condom, female condom, dam, glove) during: (Please mark the appropriate column for each row)

	N/A, never did this sexual activity	Have not done this sexual activity during the **last 30 days**	Never	Rarely	Sometimes	Most of the time	Always
Oral sex?	☐	☐	☐	☐	☐	☐	☐
Vaginal intercourse?	☐	☐	☐	☐	☐	☐	☐
Anal intercourse?	☐	☐	☐	☐	☐	☐	☐

23A) Did you or your partner use a method of birth control to prevent pregnancy the last time you had vaginal intercourse?

- ☐ Yes
- ☐ N/A, have not had vaginal intercourse
- ☐ No, have not had vaginal intercourse that could result in a pregnancy
- ☐ No, did not want to prevent pregnancy
- ☐ No, did not use any birth control method
- ☐ Don't know

23B) Please indicate whether or not you or your partner used each of the following methods of birth control to prevent pregnancy the last time you had vaginal intercourse. (Please mark the appropriate column for each row)

	No	Yes
Birth control pills (monthly or extended cycle)	☐	☐
Birth control shots	☐	☐
Birth control implants	☐	☐
Birth control patch	☐	☐
Vaginal ring	☐	☐
Intrauterine device (IUD)	☐	☐
Male condom	☐	☐
Female condom	☐	☐
Diaphragm or cervical cap	☐	☐
Contraceptive sponge	☐	☐
Spermicide (e.g., foam, jelly, cream)	☐	☐
Fertility awareness (e.g., calendar, mucous, basal body temperature)	☐	☐
Withdrawal	☐	☐

Sterilization (e.g., hysterectomy, tubes tied, or vasectomy)	☐	☐
Other method	☐	☐

24) Within the last 12 months, have you or your partner(s) used emergency contraception ("morning after pill")?

- ☐ N/A, have not had vaginal intercourse in the **last 12 months**
- ☐ No
- ☐ Yes
- ☐ Don't know

25) Within the last 12 months, have you or your partner(s) become pregnant?

- ☐ N/A, have not had vaginal intercourse in the **last 12 months**
- ☐ No
- ☐ Yes, unintentionally
- ☐ Yes, intentionally
- ☐ Don't know

Weight, Nutrition, and Exercise

26) How do you describe your weight?

- ☐ Very underweight
- ☐ Slightly underweight
- ☐ About the right weight
- ☐ Slightly overweight
- ☐ Very overweight

27) Are you trying to do any of the following about your weight?

- ☐ I am not trying to do anything about my weight
- ☐ Stay the same weight
- ☐ Lose weight
- ☐ Gain weight

28) How many servings of fruits and vegetables do you usually have per day? (1 serving = 1 medium piece of fruit; ½ cup fresh, frozen, or canned fruits/vegetables; ¾ cup fruit/vegetable juice; 1 cup salad greens; or ¼ cup dried fruit)

- ☐ 0 servings per day
- ☐ 1-2 servings per day
- ☐ 3-4 servings per day
- ☐ 5 or more servings per day

29) On how many of the past 7 days did you: (Please mark the appropriate column for each row)

	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
Do **moderate-intensity** cardio or aerobic exercise (caused a noticeable increase in heart rate, such as a brisk walk) for at least **30 minutes**?	☐	☐	☐	☐	☐	☐	☐	☐
Do **vigorous-intensity** cardio or aerobic exercise (caused large increases in breathing or heart rate, such as jogging) for at least **20 minutes**?	☐	☐	☐	☐	☐	☐	☐	☐
Do 8-10 strength training exercises (such as resistance weight machines) for 8-12 repetitions each?	☐	☐	☐	☐	☐	☐	☐	☐

Mental Health

30) Have you ever: (Please mark the appropriate column for each row)

	No, never	No, not in the **last 12 months**	Yes. in the **last 2 weeks**	Yes, in the **last 30 days**	Yes, in the **last 12 months**
Felt things were hopeless	☐	☐	☐	☐	☐
Felt overwhelmed by all you had to do	☐	☐	☐	☐	☐
Felt exhausted (not from physical activity)	☐	☐	☐	☐	☐
Felt very lonely	☐	☐	☐	☐	☐
Felt very sad	☐	☐	☐	☐	☐
Felt so depressed that it was difficult to function	☐	☐	☐	☐	☐
Felt overwhelming anxiety	☐	☐	☐	☐	☐
Felt overwhelming anger	☐	☐	☐	☐	☐
Intentionally cut, burned, bruised, or otherwise injured yourself	☐	☐	☐	☐	☐
Seriously considered suicide	☐	☐	☐	☐	☐
Attempted suicide	☐	☐	☐	☐	☐

31A) Within the last 12 months, have you been diagnosed or treated by a professional for any of the following? (Please mark the appropriate column for each row)

	No	Yes, diagnosed but not treated	Yes, treated with medication	Yes, treated with psychotherapy	Yes, treated with medication and psychotherapy	Yes, other treatment
Anorexia	☐	☐	☐	☐	☐	☐
Anxiety	☐	☐	☐	☐	☐	☐
Attention Deficit and Hyperactivity Disorder (ADHD)	☐	☐	☐	☐	☐	☐
Bipolar Disorder	☐	☐	☐	☐	☐	☐
Bulimia	☐	☐	☐	☐	☐	☐
Depression	☐	☐	☐	☐	☐	☐
Insomnia	☐	☐	☐	☐	☐	☐
Other sleep disorder	☐	☐	☐	☐	☐	☐

31B) Within the last 12 months, have you been diagnosed or treated by a professional for any of the following? (Please mark the appropriate column for each row)

	No	Yes, diagnosed but not treated	Yes, treated with medication	Yes, treated with psychotherapy	Yes, treated with medication and psychotherapy	Yes, other treatment
Obsessive Compulsive Disorder (OCD)	☐	☐	☐	☐	☐	☐
Panic attacks	☐	☐	☐	☐	☐	☐
Phobia	☐	☐	☐	☐	☐	☐
Schizophrenia	☐	☐	☐	☐	☐	☐
Substance abuse or addiction (alcohol or	☐	☐	☐	☐	☐	☐

other drugs)						
Other addiction (e.g., gambling, internet, sexual)	□	□	□	□	□	□
Other mental health condition	□	□	□	□	□	□

32) Have you ever been diagnosed with depression?

□ No
□ Yes

33) Within the last 12 months, have any of the following been traumatic or very difficult for you to handle? (Please mark the appropriate column for each row)

	No	Yes
Academics	□	□
Career-related issue	□	□
Death of a family member or friend	□	□
Family problems	□	□
Intimate relationships	□	□
Other social relationships	□	□
Finances	□	□
Health problem of a family member or partner	□	□
Personal appearance	□	□
Personal health issue	□	□
Sleep difficulties	□	□
Other	□	□

34) Have you ever received psychological or mental health services from any of the following? (Please mark the appropriate column for each row)

	No	Yes
Counselor/Therapist/Psychologist	□	□
Psychiatrist	□	□
Other medical provider (e.g., physician, nurse practitioner)	□	□
Minister/Priest/Rabbi/Other clergy	□	□

35) Have you ever received psychological or mental health services from your current college/university's Counseling or Health Service?

- No
- Yes

36) If in the future you were having a personal problem that was really bothering you, would you consider seeking help from a mental health professional?

- No
- Yes

37) Within the last 12 months, how would you rate the overall level of stress you have experienced?

- No stress
- Less than average stress
- Average stress
- More than average stress
- Tremendous stress

Physical Health

38) Within the last 30 days, did you do any of the following? (Please mark the appropriate column for each row)

	No	Yes
Exercise to lose weight		
Diet to lose weight		
Vomit or take laxatives to lose weight		
Take diet pills to lose weight		

39) Have you: (Please mark the appropriate column for each row)

	No	Yes	Don't know
Had a dental exam and cleaning in the **last 12 months**?			
(Males) Performed a testicular self exam in the **last 30 days**?			
(Females) Performed a breast self exam in the **last 30 days**?			
(Females) Had a routine gynecological exam in the **last 12 months**?			
Used sunscreen regularly with sun exposure?			
Ever been tested for Human Immunodeficiency Virus (HIV) infection?			

40) Have you received the following vaccinations (shots)? (Please mark the appropriate column for each row)

	No	Yes	Don't know
Hepatitis B	☐	☐	☐
Human Papillomavirus/HPV (cervical cancer vaccine)	☐	☐	☐
Influenza (the flu) in the **last 12 months** (shot or nasal mist)	☐	☐	☐
Measles, Mumps, Rubella	☐	☐	☐
Meningococcal disease (meningococcal meningitis)	☐	☐	☐
Varicella (chicken pox)	☐	☐	☐

41A) Within the last 12 months, have you been diagnosed or treated by a professional for any of the following? (Please mark the appropriate column for each row)

	No	Yes
Allergies	☐	☐
Asthma	☐	☐
Back pain	☐	☐
Broken bone/Fracture/Sprain	☐	☐
Bronchitis	☐	☐
Chlamydia	☐	☐
Diabetes	☐	☐
Ear infection	☐	☐
Endometriosis	☐	☐
Genital herpes	☐	☐
Genital warts/Human Papillomavirus (HPV)	☐	☐
Gonorrhea	☐	☐
Hepatitis B or C	☐	☐

41B) Within the last 12 months, have you been diagnosed or treated by a professional for any of the following? (Please mark the appropriate column for each row)

	No	Yes
High blood pressure	☐	☐
High cholesterol	☐	☐
Human Immunodeficiency Virus (HIV)	☐	☐
Irritable Bowel Syndrome (IBS)	☐	☐
Migraine headache	☐	☐

Mononucleosis	☐	☐
Pelvic Inflammatory Disease (PID)	☐	☐
Repetitive stress injury (e.g., carpal tunnel syndrome)	☐	☐
Sinus infection	☐	☐
Strep throat	☐	☐
Tuberculosis	☐	☐
Urinary tract infection	☐	☐

42) On how many of the past 7 days did you get enough sleep so that you felt rested when you woke up in the morning?

- ☐ 0 days
- ☐ 1 day
- ☐ 2 days
- ☐ 3 days
- ☐ 4 days
- ☐ 5 days
- ☐ 6 days
- ☐ 7 days

43) People sometimes feel sleepy during the daytime. In the past 7 days, how much of a problem have you had with sleepiness (feeling sleepy, struggling to stay awake) during your daytime activities?

- ☐ No problem at all
- ☐ A little problem
- ☐ More than a little problem
- ☐ A big problem
- ☐ A very big problem

44) In the past 7 days, how often have you: (Please mark the appropriate column for each row)

	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
Awakened too early in the morning and couldn't get back to sleep?	□	□	□	□	□	□	□	□
Felt tired, dragged out, or sleepy during the day?	□	□	□	□	□	□	□	□
Gone to bed because you just could not stay awake any longer?	□	□	□	□	□	□	□	□
Had an extremely hard time falling asleep?	□	□	□	□	□	□	□	□

Impediments to Academic Performance

45A) Within the last 12 months, have any of the following affected your academic performance? (Please select the most serious outcome for each item below)

	This did not happen to me/not applicable	I have experienced this issue but my academics have not been affected	Received a lower grade on an exam or important project	Received a lower grade in the course	Received an incomplete or dropped the course	Significant disruption in thesis, dissertation, research, or practicum work
Alcohol use	□	□	□	□	□	□
Allergies	□	□	□	□	□	□
Anxiety	□	□	□	□	□	□
Assault (physical)	□	□	□	□	□	□
Assault (sexual)	□	□	□	□	□	□
Attention Deficit and Hyperactivity Disorder (ADHD)	□	□	□	□	□	□
Cold/Flu/Sore throat	□	□	□	□	□	□
Concern for a troubled friend or family	□	□	□	□	□	□

member						

45B) Within the last 12 months, have any of the following affected your academic performance? (Please select the most serious outcome for each item below)

	This did not happen to me/not applicable	I have experienced this issue but my academics have not been affected	Received a lower grade on an exam or important project	Received a lower grade in the course	Received an incomplete or dropped the course	Significant disruption in thesis, dissertation, research, or practicum work
Chronic health problem or serious illness (e.g., diabetes, asthma, cancer)	☐	☐	☐	☐	☐	☐
Chronic pain	☐	☐	☐	☐	☐	☐
Death of a friend or family member	☐	☐	☐	☐	☐	☐
Depression	☐	☐	☐	☐	☐	☐
Discrimination (e.g., homophobia, racism, sexism)	☐	☐	☐	☐	☐	☐
Drug use	☐	☐	☐	☐	☐	☐
Eating disorder/problem	☐	☐	☐	☐	☐	☐
Finances	☐	☐	☐	☐	☐	☐

45C) Within the last 12 months, have any of the following affected your academic performance? (Please select the most serious outcome for each item below)

	This did not happen to me/not applicable	I have experienced this issue but my academics have not been affected	Received a lower grade on an exam or important project	Received a lower grade in the course	Received an incomplete or dropped the course	Significant disruption in thesis, dissertation, research, or practicum work
Gambling	□	□	□	□	□	□
Homesickness	□	□	□	□	□	□
Injury (fracture, sprain, strain, cut)	□	□	□	□	□	□
Internet use/computer games	□	□	□	□	□	□
Learning disability	□	□	□	□	□	□
Participation in extracurricular activities (e.g., campus clubs, organizations, athletics)	□	□	□	□	□	□
Pregnancy (yours or your partner's)	□	□	□	□	□	□
Relationship difficulties	□	□	□	□	□	□

45D) Within the last 12 months, have any of the following affected your academic performance? (Please select the most serious outcome for each item below)

	This did not happen to me/not applicable	I have experienced this issue but my academics have not been affected	Received a lower grade on an exam or important project	Received a lower grade in the course	Received an incomplete or dropped the course	Significant disruption in thesis, dissertation, research, or practicum work
Roommate difficulties	☐	☐	☐	☐	☐	☐
Sexually transmitted disease/infection (STD/I)	☐	☐	☐	☐	☐	☐
Sinus infection/Ear infection/Bronchitis/Strep throat	☐	☐	☐	☐	☐	☐
Sleep difficulties	☐	☐	☐	☐	☐	☐
Stress	☐	☐	☐	☐	☐	☐
Work	☐	☐	☐	☐	☐	☐
Other (please specify in "Additional Comments" box below)	☐	☐	☐	☐	☐	☐

Demographic Characteristics

46) How old are you?

_____Years

47) What is your gender?

☐ Female
☐ Male
☐ Transgender

48) What is your sexual orientation?

☐ Heterosexual
☐ Gay/Lesbian
☐ Bisexual
☐ Unsure

The next two questions ask about your height. For example if your height is 5 foot, 7 inches, please indicate "5" in question 49A and "7" in question 49B.

49A) What is your height in feet?

_____Feet

49B) and inches?

_____Inches

50) What is your weight in pounds?

_____Pounds

51) What is your year in school?

- 1st year undergraduate
- 2nd year undergraduate
- 3rd year undergraduate
- 4th year undergraduate
- 5th year or more undergraduate
- Graduate or professional
- Not seeking a degree
- Other

52) What is your enrollment status?

- Full-time
- Part-time
- Other

53) Have you transferred to this college or university within the last 12 months?

- No
- Yes

54) What is your racial or ethnic identification? (select all that apply)

- Aboriginal (Inuit, Metis, North American Indian, etc.; status or non-status)
- Arab
- Black
- Chinese
- Filipino

- Japanese
- Korean
- Latin American
- South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)
- Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, etc.)
- West Asian (e.g., Iranian, Afghan, etc.)
- White
- Multiracial
- Other

55) Are you an international student?

- No
- Yes

56) What is your relationship status?

- Not in a relationship
- In a relationship but not living together
- In a relationship and living together

57) What is your marital status?

- Single
- Married/Partnered
- Separated
- Divorced
- Other

58) Where do you currently live?

- Campus residence hall
- Fraternity or sorority house
- Other college/university housing
- Parent/guardian's home
- Other off-campus housing
- Other

59) Are you a member of a social fraternity or sorority? (e.g., National Interfraternity Conference, National Panhellenic Conference, National Pan-Hellenic Council, National Association of Latino Fraternal Organizations)

- No
- Yes

60) How many hours a week do you work for pay?

- 0 hours
- 1-9 hours
- 10-19 hours
- 20-29 hours
- 30-39 hours
- 40 hours
- More than 40 hours

61) How many hours a week do you volunteer?

- 0 hours
- 1-9 hours
- 10-19 hours
- 20-29 hours
- 30-39 hours
- 40 hours
- More than 40 hours

62) What is your approximate cumulative grade average?

- A
- B
- C
- D/F
- N/A

63) Within the last 12 months, have your participated in organized college athletics at any of the following levels? (Please mark the appropriate column for each row)

	No	Yes
Varsity		
Club sports		
Intramurals		

64) Do you have any of the following? (Please mark the appropriate column for each row)

	No	Yes
Attention Deficit and Hyperactivity Disorder (ADHD)		
Chronic illness (e.g., cancer, diabetes, auto-immune disorders)		
Deafness/Hearing loss		

Learning disability	☐	☐
Mobility/Dexterity disability	☐	☐
Partial sightedness/Blindness	☐	☐
Psychiatric condition	☐	☐
Speech or language disorder	☐	☐
Other disability	☐	☐

65) Are you currently or have you been a member of the Canadian Forces (Regular Force or Reserve)?

☐ No
☐ Yes and I **have** deployed to an area of hazardous duty
☐ Yes and I **have not** deployed to an area of hazardous duty

66) Moderate to vigorous physical activity causes an increase in heart rate and can include brisk walking or jogging. Over the past 7 days: How many total minutes of moderate to vigorous physical activity did you do in at least 10 minute bouts?

☐ <30 minutes
☐ 30-60 minutes
☐ 61-90 minutes
☐ 91-150 minutes
☐ >150 minutes

Appendix G

Permission from ACHA to Use Canadian Dataset – Health Behaviours

May 1, 2014

[redacted]

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Thank you for submitting a request to use ACHA-NCHA data in your projects "Health Behaviors in Canadian Post-Secondary Students: Impact of Nutrition, Sleep, and Physical Activity" and "Health Behaviors in Canadian Post-Secondary Students: Impacts & Mediators of Academic Success." Your request has been approved and enclosed you will find the ACHA- NCHA Reference Group Dataset you requested and the corresponding survey codebook. Both institutional and student identifiers have been removed from the file.

I have enclosed a copy of our data use guidelines and agreement for your information. Your signed copy is on file in my office. Please note that additional studies using the ACHA-NCHA data acquired through this request require submission of a new data use request to the ACHA-NCHA Program Office.

As stated in the agreement, we would appreciate a copy of any final products that result from your research. We also ask that you add the following disclaimer to any article or presentation you make using the ACHA-NCHA data:

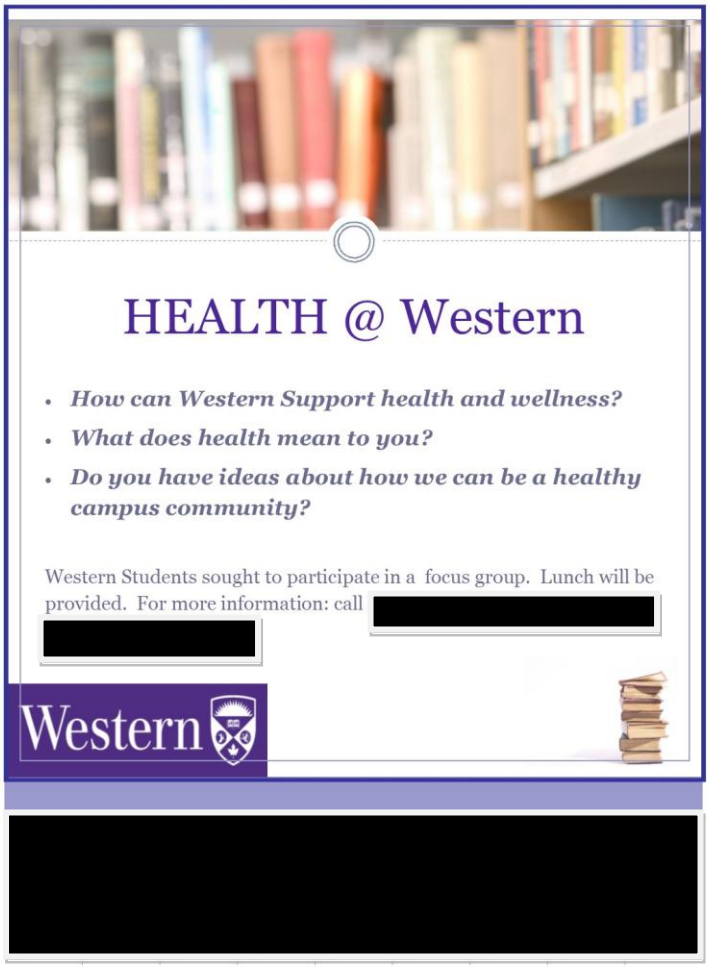
The opinions, findings, and conclusions presented/reported in this article/presentation are those of the author(s), and are in no way meant to represent the corporate opinions, views, or policies of the American College Health Association (ACHA). ACHA does not warrant nor assume any liability or responsibility for the accuracy, completeness, or usefulness of any information presented in this article/presentation.

Please don't hesitate to contact me if you have any questions. Best of luck with your research,

Mary Hoban, PhD, MCHES
Director, ACHA-NCHA Program Office
Enclosure: ACHA-NCHA Data Use Guidelines and Agreement

Appendix H

Focus Group Recruitment Poster



Appendix I

Letter of Information – Focus Groups

Letter of Information – Student Participants

Study Title: What is a Healthy Campus? - An inquiry at Western

Researchers [redacted]

[redacted]

[redacted]

Introduction

You are invited to participate in a research study examining students' ideas about health and experiences of health and wellness on campus. The purpose of this study is to; (1) involve all stakeholders in a collective, shared responsibility for creating campus environmental conditions that support health and well-being, (2) obtain an in-depth appreciation that Western community members attribute to health, and (3) identify gaps in health services and information. Data will be collected through student, staff and student focus groups [redacted].

Study Background

The primary objective of this study is to develop a substantive theory regarding how students, staff and faculty members at Western university experience health on campus. This information will guide us in identifying priorities toward enhancing overall wellness of the Western community, and thereby strengthening the experiences of all who are part of the Western community. Hearing directly from students will enable an understanding of the health priorities and assist us to better tailor campus-wide health promotion efforts and health and wellness services.

What Does Participation in this Study Involve? Where will this study Take Place?

SAMPLE QUESTIONS THAT WILL BE ASKED IN THE FOCUS GROUP INCLUDE: What does a healthy campus look like? What does health mean to you? What helps you make healthy lifestyle choices? What does Western do well to support

health and wellbeing? What prevents from making healthy lifestyle choices? What ideas do you have to make Western a healthier campus?

The focus group will take approximately 60 to 90 minutes (a 10 to 15 minutes break will be provided). It will be conducted in a central location on Western campus. Focus groups will consist of 6 to 10 participants. All interviews and focus groups will be conducted in English. Each focus group will be audio-taped and transcribed into a written format for further data analysis. The transcribed data will not contain any personal information that could identify you. **If you do not wish to be audio taped, you should not participate in this study.**

After the focus group is complete, we may contact you by email only to ensure that our interpretations of the information collected from you are accurate. However, you are not required to agree to be contacted afterwards in order to participate in the focus group. In the consent form attached, please indicate if you prefer to be contacted or not contacted after your participation in the focus group.

Who is Eligible to Participate in this Study?

We are interested in having up to 10 student participants in this study. ANY STUDENT WHO IS REGISTERD AT WESTERN UNIVERSITY (MAIN CAMPUS) IS ELIGIBLE TO PARTICIPATE IN THIS STUDY.

Confidentiality and Informed Consent

Focus group participants will be asked to keep everything that is discussed within the focus confidential. All of the information collected by the researchers will remain confidential. If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your explicit consent to the disclosure. Only individuals directly involved with this study (that is, the researchers identified above) will have access to any information that could reveal your identity. The one exception is where the representatives of the Western's Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

Data Storage and Security Measures

The recorded focus group session, transcribed information, and any identifying information will be kept in a locked filing cabinet in Health Services Western University. The transcribed data and any identifying information will be maintained in separate, secure locations. Any electronic data or files will be stored on password protected computers. The recordings and corresponding transcripts will be destroyed 5 years after the completion of the study. If you agree to participate, we request that you sign the attached consent form. If you would like a copy of the summary of results upon completion of the study, please indicate this to one of the study investigators. We will record your name and contact information on a page separate from other information we collect.

Are There any Benefits or Risks Associated with Participating in this Study?

There are no direct benefits to you for your participation in this research. Your participation in this study may reveal information that may help the university better understand how students experience health and address any gaps in service provision. YOU WILL RECEIVE REIMBURSEMENT FOR PARKING FOR PARTICIPATING.

There are no known risks, harms or discomforts associated with participating in this study. However you may experience emotional reactions during the discussion if you or other students recount difficult experiences related to health and well-being. At least one facilitator will be present at all times before, during and after the focus group to address any potential concerns. You will be provided with printed information about on campus counselling services and you will be referred to appropriate counseling resources should you become distressed.

Study Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time. If you require any further information regarding this research project or your participation in the study you may [redacted]

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[redacted]

YOU DO NOT WAIVE ANY LEGAL RIGHTS BY SIGNING THIS CONSENT DOCUMENT.

This letter is for you to keep

Participant Initials _____

Appendix J

Demographic Information Form for Focus Groups

Demographics Questions for Focus Group Participants

Your participation has contributed in a meaningful way to our study. We are interested in obtaining some additional information that will assist with our study. Information gathered is anonymous and confidential

What is your gender? Circle the correct response) Male Female Other

Are you an international student? Yes No

What is your academic status? Part Time Full Time

What is your year in school
_____ 1st year undergraduate
_____ 2nd year undergraduate
_____ 3rd year undergraduate
_____ 4th year undergraduate
_____ 5th year undergraduate
_____ Graduate or professional
_____ not seeking a degree

To Which Faculty Do you belong? _____

Where do you Currently Live?
_____ Residence
_____ With Parents
_____ Off-campus
_____ other

How old are you? _____

Thank you so much for participating in this research project!

Appendix K

Informed Consent for Participation in Focus Groups

Consent Form

Study Title: What is a Healthy Campus? - An inquiry at Western

Researchers: [redacted]

I have received information on this research study and agree to participate. I acknowledge that participation is voluntary and that I may refuse to participate, refuse to answer any questions or withdraw from the study at any time.

_____ _____

Printed Name Date

_____

Signature

After the focus group is complete, we may contact you by email only to ensure that our interpretations of the information collected from you are accurate. My preference is:

Contact _____ Do Not Contact _____

Appendix L

Ethics Approval – Focus Groups

Western Research

Research Ethics

Use of Human Participants - Initial Ethics Approval Notice

[redacted]

Review Level: Delegated
Protocol Title: Exploring health and wellness: An inquiry at Western University
Department & Institution: Health Sciences\Occupational Therapy,Western University
Sponsor:
Ethics Approval Date: November 13, 2013 **Expiry Date:** September 30, 2016
Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
Instruments	Focus Group Question Guide-Received 2013/09/26	
Advertisement	Staff Recruitment Poster-Received 2013/09/25	
Advertisement	Faculty Recruitment Poster-Received 2013/09/25	
Advertisement	Student Recruitment Poster-Received 2013/09/25	
Letter of Information & Consent	Staff/Faculty Letter of Information/Consent	2013/10/28
Letter of Information & Consent	Student Letter of Information/Consent	2013/11/04
Western University Protocol		

This is to notify you that The University of Western Ontario Research Ethics Board for Health Sciences Research Involving Human Subjects (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced revision(s) or amendment(s) on the approval date noted above. The membership of this REB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the University of Western Ontario Updated Approval Request Form.

Members of the HSREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the HSREB.

The Chair of the HSREB is Dr. Joseph Gilbert. The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

[redacted]

Ethics Officer to Contact for Further Information

Erika Basile (ebasile@uwo.ca)	Grace Kelly (grace.kelly@uwo.ca)	Mina Mekhail (mmekhail@uwo.ca)	Vikki Tran (vtran@uwo.ca)

This is an official document. Please retain the original in your files.

Curriculum Vitae

Name: [redacted]

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Post-secondary Education and Degrees:	University of Western Ontario London, Ontario, Canada 1992-1996 BSW McMaster University Hamilton, Ontario, Canada 1997-2001 HBSc. University of Western Ontario London, Ontario, Canada 2008 -2010 MSc.
Honours and Awards:	Dean's Honour List 1993-1997 Award for School of Social Work 1995-1996
Related Work Experience	Health Promotion Manager, Student Health Services University of Western Ontario 2010-present

Publications:

[redacted]

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