

# Examining the Predictors of Mental Health Outcomes Among Undergraduate Postsecondary Students in Canada

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Symptoms consistent with mental illnesses such as anxiety and depression are dominant in both prevalence and in severity among North American postsecondary student populations over the past several years. This study examined undergraduate students' self-reported symptoms consistent with two common mental illnesses in a Canadian context, and sheds light on several predictors of students' mental health outcomes, including perceived contextual stressors, coping strategies, and perceived barriers to help-seeking. Data for this investigation were obtained through the completion of self-administered questionnaires from a sample of 209 undergraduate students attending a public western Canadian university. Consistent with previous research completed among postsecondary populations, a considerable proportion of students self-reported symptoms consistent with anxiety and depression. The following variables made unique contributions to the prediction of the severity of students' self-reported symptoms: living arrangement; contextual stressors, such as social/environmental maladjustment, academic achievement, curriculum and academic expectations, time/balance, and financial stressors; styles of coping, including functional/adaptive coping, mental and behavioral disengagement, and substance abuse; and perceived barriers to treatment, including fear of self-discovery and fear of therapy. The implications of these findings for future research and intervention at the postsecondary level are discussed.

**Keywords:** *mental illness, contextual stressors, coping, help-seeking, postsecondary students*

## Introduction

Mental illness is a leading contributor to the global burden of disease, particularly among youth and young adults (Gore et al., 2011; Whiteford et al., 2013). Over the past decade, mental health deterioration among postsecondary students has become a major concern (e.g., Benton, Robertson, Tseng, Newton, & Benton, 2003; Cook, 2007; Gallagher, 2013; Hyun, Quinn, Madon, & Lustig, 2006). Students' struggles with homesickness, loneliness, and difficulties in adjusting to the postsecondary lifestyle have been well documented (e.g., Buote et al., 2007; Byrd & McKinney, 2012; Cook, 2007; Fritz & DeMarinis, 2008; Government of Canada, 2006; Jackson, Pancer, Pratt, & Hunsberger, 2000; Oswald & Clark, 2003; Pancer, Hunsberger, Pratt, & Alisat, 2000; Paul & Brier, 2001; Whitehill et al., 2012). These issues negatively impact students' mental health.

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Nearly 90% of the 43,000 students surveyed in the Spring 2016 National College Health Assessment reported feeling overwhelmed with their workloads in the past 12 months, while over 60% reported feeling hopeless (American College Health Association [ACHA], 2016). In the same sample, over 13% of students reported seriously considering suicide within the past year, while 2% reported suicide attempts, up from 9% and 1%, respectively, in the 2013 cycle of this survey. In addition to the high prevalence and severity of symptoms consistent with mental illnesses, several studies have also identified an unmet need for mental health care among the student population (e.g., Givens & Tjia, 2002; Hyun et al., 2006; Park, Attenweiller, & Rieck, 2012; Sunderland & Findlay, 2013; Whitehill et al., 2012; Wilson & Dean, 2009; World Health Organization, 2013; Wyatt & Oswalt, 2013). For example, in a study of over 200 students in the United States, the proportion that screened positive for depression but failed to receive treatment ranged from 37% to 84% (Eisenberg, Gollust, Golberstein, & Hefner, 2007). Researchers suggest that perceived barriers contribute greatly to the reported lack of help-seeking among students, including fear of being stigmatized, having little faith in treatment effectiveness, as well as lacking knowledge of available treatment options (e.g., Eisenberg, Downs, Golberstein, & Zivin, 2009; Eisenberg, Golberstein, & Gollust, 2007; Park, Attenweiler, & Rieck, 2012).

The study of mental health and the stigma associated with mental illnesses have gained increasing attention among policy makers and public health professionals in Canada (Government of Canada, 2006; Mental Health Commission of Canada, 2012; Pearson, Janz, & Ali, 2013; World Health Organization, 2013). Despite continued recognition of these issues among North America's postsecondary student population, gaps remain in the Canadian literature. The vast majority of published studies that explore factors affecting students' mental health are based on American samples. The few available Canadian studies either rely on population-level data (e.g., not specific to postsecondary students) or employ a narrow focus on individual factors, lacking the scope to consider multiple factors simultaneously (e.g., Buote et al., 2007; Jackson et al., 2000; Pancer et al., 2000). At the time the present study was completed, no Canadian study had conducted a multivariate analysis of potential predictors of students' mental health outcomes. While cautious generalization of data between Canada and the United States can occasionally be useful, the vastly different landscapes of institutions of higher learning in each country warrant the need for individual analyses of the postsecondary student milieu. Thus, there remains a need for further research directly addressing factors affecting the mental health of Canadian postsecondary students.

The overall objective of the present study was to provide an analysis of multiple potential predictors of students' mental health outcomes, as indicated by symptoms consistent with depression and anxiety, to develop a more comprehensive understanding of the social context in which Canadian postsecondary students experience mental health and illness. To gain this understanding, the following research questions were examined:

*Research Question 1.* What contextual stressors do students perceive there to be within the postsecondary milieu, and are these stressors predictive of the severity of self-reported symptoms of mental illness?

*Research Question 2.* What coping strategies do students employ, and do different methods of coping predict the severity of self-reported symptoms of mental illness?

*Research Question 3.* What barriers to help-seeking do students perceive there to be, and are these barriers predictive of the severity of self-reported symptoms of mental illness?

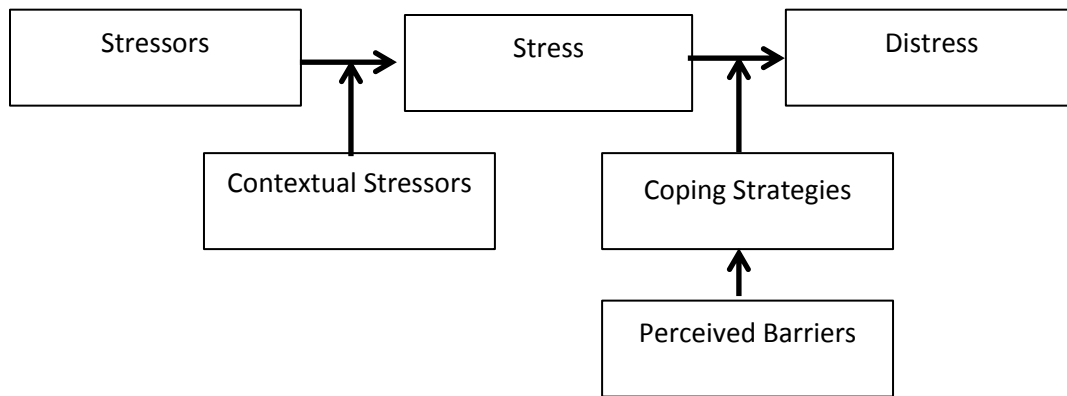
*Research Question 4.* Taken together, are perceived contextual stressors, coping strategies, and barriers to help-seeking predictive of students' mental health outcomes?

The purpose of the present study was to evaluate a variety of potential predictors of the severity of self-reported symptoms of anxiety and depression among a sample of Canadian postsecondary students. Using a cross-sectional study design, a convenience sample of undergraduate students attending a Western Canadian university was gathered through voluntary completion of a questionnaire distributed during class time. The conceptual framework, outcome and predictor variables, and analysis methods are described below.

## **Conceptual Framework**

The concept of mental health is broad and inherently complex. The World Health Organization (2013) describes mental health as not simply the absence of illness, but rather a “state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (p. 38). Mental illnesses can result from a multitude of interacting stressors in an individual's life, including those resulting from environmental, social, and physical factors. No single cause exists for the majority of mental illnesses (Mental Health Commission of Canada, 2013). Students' mental health can be affected by a variety of factors, including sociodemographics (e.g., age, sex), contextual stressors, coping strategies, as well as barriers to help-seeking. As such, each of these factors must be considered when determining significant predictors of students' self-reported mental health outcomes.

The conceptual model (Figure 1) used to achieve the goals of this study was based on Pearlin's (1981) stress process theory (SPT). SPT consists of three conceptual domains: the sources of stress, the mediators of stress, and the manifestations of stress (Pearlin, Menaghan, Lieberman, & Mullan, 1981). In the present study, perceived contextual stressors represent the sources of stress, while coping strategies and perceived barriers to help-seeking represent the mediators of stress. The manifestations of stress are conceptualized in our study as symptoms of anxiety and depression, two broad mental illnesses common in student populations (Iarovici, 2014). Briefly, the conceptual model establishes that stressors, which are mediated by the context in which they are found (e.g., the postsecondary milieu), have the potential to produce a stress response. If stress is not effectively mediated through coping (e.g., use of coping strategies or seeking help), it can lead to a state of distress (e.g., symptoms of mental illness). Wheaton, Young, Montazer, and Stuart-Lahman (2013), from whose research this conceptual model has been adapted, argue that each step between stressors and distress is conditional. That is, the context through which stressors originate can either make a stressor more or less threatening (e.g., stressors that pose a threat to the stability of one's identity, role occupancy, or social location are more likely to precipitate stress than a routine stressor that is often experienced), while coping resources (e.g., seeking social support) may buffer a stressful situation (p. 300).



**Figure 1.** *Conceptual Model for Predictors of Postsecondary Students' Mental Health Outcomes*

## Predictors and Hypotheses

Several sociodemographic characteristics were considered in our model, including age, sex, marital status, living arrangement, and year of study. A number of contextual stressors were also evaluated, including social/environmental stressors, academic achievement, curriculum and academic expectations, time/balance stressors, and financial stressors. Finally, coping strategies (functional/adaptive coping, mental/behavioral disengagement, and substance abuse) were considered in addition to perceived barriers to help-seeking (fear of self-discovery, fear of therapy, and fear of stigma). Hypotheses are reported below.

### Age

According to the literature, younger students struggle more than their older counterparts with stressful maladjustment when first integrating into the postsecondary environment (e.g., Jackson et al., 2000; Pancer et al., 2000; Paul & Brier, 2001). Arnett's (2000) concept of emerging adulthood, encompassing ages 18 to 25, provides a theoretical rationalization for these findings (e.g., Arnett, 2000; Iarovici, 2014). Arnett argues that identity formation and consolidation occur during this transitional period where individuals lack role permanence and its associated stability. Individuals who fall within this age period more frequently report struggling with symptoms consistent with mental illness (e.g., Benton et al., 2003; Kessler, Berglund, Borges, Nock, & Wang, 2005; Sunderland & Findlay, 2013).

*Hypothesis 1.* Self-reported symptoms of mental illness will be more severe among younger students.

### Sex

According to the literature, women are more likely to self-report symptoms consistent with mental illness than their male counterparts (e.g., Eisenberg, Gollust, Golberstein, & Hefner, 2007; Government of Canada, 2006; Hyun et al., 2006; Pearson et al., 2013). The high prevalence of mental illness among women is of particular importance to this study because women account for 56% of Canada's postsecondary student population (Statistics Canada, 2015).

*Hypothesis 2.* Self-reported symptoms of mental illness will be more severe among female students.

## Marital Status

Marriage has been consistently correlated with better physical and mental health outcomes (e.g., Koball, Moduddin, Henderson, Goesling, & Besculides, 2010; Margolis & Myrskylä, 2010; Wood, Goesling, & Avellar, 2007). This protective effect may be explained by a number of benefits related to marriage that promote health, including increased economic advantages and social support (Koball et al., 2010).

*Hypothesis 3.* Self-reported symptoms of mental illness will be less severe among participants who are married or in a common-law relationship.

## Living Arrangement

Studies that have examined the relationship between students' living arrangement and their mental health outcomes have reported inconsistent findings (Buote et al., 2007; Eisenberg, Gollust, et al., 2007). As students enter emerging adulthood, parental influence tends to decrease, while peers become a key source for social support, values, and sense of belonging (Irons & Gilbert, 2005). Thus, students who remain in their childhood home may find it difficult to make a smooth transition into the postsecondary lifestyle lacking the immediate social support of their friends. However, it is also possible that the social support offered by family may produce a buffering effect on students' stress levels. In fact, moving away from one's childhood home has been correlated with feelings of homesickness and loneliness among new students (Paul & Brier, 2001). Therefore, it is reasonable to assume that students living at home may benefit from the positive influence of familial social support.

*Hypothesis 4.* Self-reported symptoms of mental illness will be less severe among students living off-campus with their families.

## Year of Study

Students experience a variety of changes to their immediate environment following their transition to university, including shifts in living arrangements, social circles, and access to transportation and regular amenities (e.g., laundry and groceries). Difficulty with adjusting to the postsecondary lifestyle has been identified as a major stressor among new undergraduate students (e.g., Cook, 2007; Oswald & Clark, 2003; Pancer et al., 2000; Paul & Brier, 2001).

*Hypothesis 5.* Self-reported symptoms consistent with mental illness will be more severe among students in an earlier year of study.

## Contextual Stressors

The transition to university is filled with potential sources of stress for students (Oswald & Clark, 2003). In addition to the stressors associated with social and environmental maladjustment, students will often experience a significant increase in both academic expectations and workload. Difficulty in keeping up with the volume of academic work at the postsecondary level has been cited as a significant source of stress for first-year students in particular (Pancer et al., 2000). Academic achievement and the pressure to succeed have also been reported as significant stressors for students who are underprepared for the increase in academic expectations at the postsecondary level (e.g., Jerema, 2010; Martinello, 2008; Parker, Summerfeldt, Hogan, & Majeski, 2004). Poorly developed time management and organizational skills can further exacerbate these stressors. Balancing responsibilities to family, social circles, academics, and work can result in role strain,

particularly for an emerging adult who is still developing the ability to multitask. In addition to balancing academic demands, many students are required to work to pay for expenses as they become accustomed to their increased financial independence (Marshall, 2010). Hyun et al. (2006) found that financial confidence was a significant contributor to students' emotional wellbeing, marking financial strain as another considerable source of stress.

*Hypotheses 6–10.* The greater stress a student perceives there to be because of a stressor, the more severe his/her self-reported symptoms of mental illness will be.

## **Coping Strategies**

Research has generally shown that stress can be mediated by employing effective coping strategies (Billings & Moos, 1981; Byrd & McKinney, 2012; Carver, Scheier, & Weintraub, 1989; Noh & Kaspar, 2003; Pearlin et al., 1981; Taylor & Stanton, 2007). Coping strategies are used to mitigate feelings of stress, and can be employed in both adaptive and maladaptive ways; that is, individuals can employ both positive and negative methods of coping in attempt to buffer stress. Taylor and Stanton (2007) define adaptive, or positive coping strategies as generally healthful behaviors, marked by “taking direct action or confronting emotional responses to a stressor” or problem, while negative, or maladaptive coping strategies are less constructive and are less likely to culminate in a resolution of the problem, often “marked by avoidance, such as withdrawal or denial” (p. 378). In Byrd and McKinney's (2012) study, students' use of coping mechanisms had the largest influence on mental illness and produced the greatest overall change in mental health outcomes. In the present study, we included seeking social support, planning, positive reframing, and active coping as adaptive coping methods. Maladaptive methods of coping included behavioral and mental (e.g., self-blame, denial) disengagement and substance abuse.

*Hypothesis 11.* The greater the frequency of coping through functional/adaptive coping mechanisms, the less severe students' self-reported symptoms of mental illness will be.

*Hypotheses 12–13.* The greater the frequency of coping through behavioral/mental disengagement OR substance abuse, the more severe students' self-reported symptoms of mental illness will be.

## **Barriers to Help-Seeking**

Within the broader population, only one quarter of youth struggling with mental health issues seek professional care (Wilson & Deane, 2010). Similar findings have been reported among student populations (e.g., Eisenberg, Golberstein, & Gollust, 2007; Givens & Tjia, 2002; Rosenthal & Wilson, 2008). This disconnect between the need for treatment and unwillingness to seek help may exist because of perceived barriers to help-seeking. Based on Park et al.'s (2012) study, we tested the following potential barriers: fear of stigma, fear of therapy, and fear of self-discovery. Despite efforts to eradicate stigma and foster supportive postsecondary environments, fear of stigma remains one of the largest barriers to help-seeking among students (e.g., Crisp et al., 2005; Givens & Tjia, 2002; Wilson & Deane, 2010; Wyatt & Oswalt, 2013). Fear of therapy and fear of self-discovery have also been frequently reported among student populations, often manifesting as lack of faith in treatment quality and effectiveness (e.g., Eisenberg, Golberstein, et al., 2007; Givens & Tjia, 2002; Wilson & Deane, 2010), concern for confidentiality (e.g., Givens & Tjia, 2002), a lack of perceived need for help (e.g., Eisenberg, Golberstein, et al., 2007; Wilson & Deane, 2010; Whitehill et al., 2012), and concern over having to admit to struggling with a mental health related issue (e.g., Park et al., 2012).

*Hypotheses 14–16.* The more prominent a perceived barrier to help-seeking is to students, the more severe self-reported symptoms of mental illness will be.

## Method

### Participants and Instrumentation

A sample of 209 undergraduate students attending a mid-sized, public university in Western Canada participated in a 25-item, self-administered questionnaire. Invitations to participate were delivered to instructors of all undergraduate classes in the Sociology and Social Studies Department during the fall semester of 2014. Of the 16 classes offered during the time frame, only two did not partake in the study. Questionnaires were distributed during the first 15 minutes of participating classes over a 1-week period in October by one of the investigators or the class instructor (based on the instructor's preference). Two instructors chose to administer the questionnaires themselves. All participants were assured of anonymity and confidentiality, in addition to their right to withdraw at any time. No incentive was provided. Though a formal response rate was not calculated due to the non-probabilistic nature of the sampling design, anecdotal information obtained from course instructors revealed that in each participating class, all students completed the questionnaire unless they had already done so in another class. There were no withdrawals. Participating students were enrolled in several faculties, including Arts ( $n = 103$ , 58.5%), Education ( $n = 35$ , 19.9%), Business Administration ( $n = 19$ , 10.8%), Science ( $n = 8$ , 4.5%), Kinesiology and Health Studies ( $n = 6$ , 3.4%), Fine Arts ( $n = 4$ , 2.3%), and Other ( $n = 1$ , 0.6%). Approval to complete this study was obtained from the University of Regina's Research Ethics Board (REB# 2014-178).

Representativeness of the sample to the Fall 2014 undergraduate student body was evaluated by comparing the sample's age, sex, and faculty statistics to known university parameters on these characteristics (Office of Research Planning, 2014). Our sample was overrepresented by females (82.7% of the sample vs. 62.3% of the population), younger students ( $\bar{x} = 22.1$ ,  $SD = 5.13$  vs.  $\mu = 24$ ), and students enrolled in the Faculty of Arts (58.5% of the sample vs. 18% of the population). Our sample was also compared to the age and sex compositions of the broader Canadian undergraduate student body. In our sample, 47.8% of undergraduate students were under the age of 20, compared to 25% across the country for the 2012–2013 academic year (Statistics Canada, 2014). Finally, our sample was overrepresented by females (83% of the sample vs. 57% of the national student population; Statistics Canada, 2014). As such, the characteristics of this convenience sample limit the external validity (generalizability) of the findings. However, findings from the current study contribute to the current body of Canadian literature on students' mental health, and address gaps such as the need for multivariate analyses of multiple predictors of students' mental health outcomes. Ideally, trends and themes identified in our study will contribute to larger, more comprehensive studies in the future.

### Data Analysis

Several statistical analyses were undertaken to determine the make-up of the sample and the relationships between factors of concern. All analyses were conducted using IBM SPSS, Version 23. Univariate analyses were undertaken to examine descriptive statistics for all variables. Measures of central tendency and dispersion were computed and data was assessed for issues relating to outliers, missing data, skewness and kurtosis. No significant outliers were found, and the limited amount of missing data did not warrant any adjustment. There were no issues related to the skewness and kurtosis of variables.

### **Outcome measures**

Two measurement scales were used to evaluate the frequency with which students had experienced a variety of symptoms consistent with anxiety and depression over the previous 2-week period. The Generalized Anxiety Disorder seven-item scale (GAD-7) was used to measure symptoms consistent with anxiety, while the Patient Health Questionnaire nine-item scale (PHQ-9) was used to measure those consistent with depression. Participants were asked to indicate the frequency with which they had experienced each of the items on the PHQ-9 and GAD-7 on a Likert-scale ranging from 0 (*not at all*) to 3 (*almost every day*) over the past 2 weeks. Participants' responses to the items on each scale were added, with composite scores ranging from 0 to 21 for the GAD-7 and from 0 to 27 for the PHQ-9. Higher scores indicated greater severity of symptoms consistent with anxiety and depression, respectively. As previous investigators have successfully done (e.g., Luxton, Skopp, & Marguen, 2010; Rosemann et al., 2007), we kept these scores as continuous, interval-ratio variables for analysis, as it is always better to use the highest level of measurement (i.e., interval-ratio) whenever possible (Healey & Prus, 2015; Neuman & Robson, 2015). Furthermore, the authors of both the GAD-7 and PHQ-9 have confirmed their reliability and validity, as well as increasing use, as severity indices for symptoms of anxiety and depression (Kroenke, Spitzer, & Williams, 2001; Spitzer, Kroneke, Williams, & Löwe, 2006).

Both scales have excellent reliability and validity based on vigorous psychometric testing. The PHQ-9 has a high internal consistency of  $\alpha = 0.89$ , and a test–retest reliability of 0.84 (Kroenke et al., 2001). In terms of validity, a score of 10 or greater on this scale has a sensitivity and specificity of 88%, with a likelihood ratio of 7.1 (Kroenke et al., 2001). That is to say, a respondent with a major depressive disorder is seven times more likely to have a score of 10 points or higher than a person without. The likelihood ratio increases to 13.6 with a score of 15 or greater (Kroenke et al., 2001). As scores continue to increase, so too does the likelihood of having a depressive disorder. The GAD-7 has an excellent internal consistency of  $\alpha = 0.92$  and a good test–retest reliability of 0.83 (Spitzer et al., 2006). In terms of validity, authors of the scale report that a score of 10 or higher has a sensitivity of 0.89 and specificity of 0.82 for detecting generalized anxiety disorder (Spitzer et al., 2006). The GAD-7 also has good convergent validity, as demonstrated by its correlations with the Beck Anxiety Inventory ( $R = 0.72$ ) and the anxiety subscale of the Symptom Checklist-90 ( $R = 0.74$ ; Spitzer et al., 2006).

### **Predictor variables**

Prior to multivariate analyses, several scales were constructed from our item pools for perceived contextual stressors, coping strategies, and perceived barriers to treatment. Principal components factor analysis was used to determine the dimensionality of the data to identify subsets of items constituting meaningful scales that measured the same underlying construct. The data were checked to ensure all assumptions for the analysis were met; namely, that most interitem correlation coefficients were above 0.30, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was above 0.60, and the Bartlett test of Sphericity was statistically significant. Only factors with an eigenvalue of 1.0 or above were retained for investigation. Scree test and parallel analysis were also used to determine which factors should be retained (Pallant, 2011). The factors were rotated using the varimax (stressors, coping) and promax (barriers) methods (Pallant, 2011). Orthogonalized (uncorrelated) factor scores were then computed using the Anderson-Rubin method (Tabachnick & Fidell, 2007). Reliability analysis was undertaken on all scales to determine internal consistency using Cronbach's alpha, which measures the extent to which items on a scale evaluate the same underlying construct. The operational definitions of each of the predictor variables considered in our analyses are detailed in Table 1. Table 2 reports means, standard deviations, interitem correlations and Cronbach's alpha coefficients for all predictor variables (where applicable).



**Table 1. Definitions of Predictor Variables Considered in Analyses**

Variable	Label and Explanation
I. Socio-demographic variables	<p>-“Sex,” a discrete, nominal variable. Male is the reference category.</p> <p>-“Age,” a continuous, interval-ratio variable inquiring exact age at the time of the survey.</p> <p>-“Marital Status,” a discrete, nominal variable. Single is the reference category.</p> <p>-“Living Arrangement,” a categorical variable. Other than “off campus with family” is the reference category.</p> <p>-“Year of Study,” a continuous, interval-ratio variable that inquired as to the student’s year of study at the time of survey completion.</p>
II. Contextual stressors	<p>Assessed using items from Burge's (2009) University Student Stress Scale, with revisions based on other reviewed academic stress instruments (e.g., Rocha-Singh's [1994] Graduate Stress Inventory-Revised). Participants indicated degree of stress each item caused on a 4-point Likert scale. Initial extraction through principal components (PC) produced seven factors (KMO = .807; Bartlett's test = 1,148.68, <math>df = 136</math>, <math>p &lt; .001</math>), rotated using varimax. Five factors were extracted, accounting for 62% of the variance:</p> <p>-“Social/Environmental,” (eigenvalue = 5.26), accounted for 31% of the variance and was composed of five items (factor loadings): meeting new people/friends (.78), adjusting to campus environment (.67), prepping and delivering presentations (.65), meeting with professors (.65), and participating in class (.65).</p> <p>-“Academic Achievement,” (eigenvalue = 1.91), accounted for 11.3% of the variance and was composed of four items: witnessing a drop in GPA (.87), receiving poor grades (.82), expectations from self to do well (.63), and waiting for grades (.57).</p> <p>-“Curriculum/Expectations,” (eigenvalue = 1.31), accounted for 7.7% of the variance and was composed of four items: sitting exams (.77), studying for exams (.75), meeting assignment deadlines (.69), and handling the academic workload (.56).</p> <p>-“Time/Balance,” (eigenvalue = 1.12), accounted for 6.6% of the variance and was composed of two items: lack of time for friends/family and social activities (.78) and balancing work with school (.76).</p> <p>-“Financial Stress,” (eigenvalue = 1.00), accounted for 5.9% of the variance and was composed of two items: taking student loans and having to pay them back (.86) and worrying about money (.77).</p>
III. Coping mechanisms	<p>Assessed using 12 (of 14) scales from the Brief-COPE inventory (Carver, 1997; Carver et al., 1989). Participants indicated frequency of use for each coping method on a 4-point scale. Initial extraction through PC produced four factors with a number of cross loadings. We ran a second order factor analysis (KMO = .670; Bartlett's test = 361.33, <math>df = 36</math>, <math>p &lt; .001</math>; e.g., using scale totals as raw data, and omitting one substance abuse item and the self-distraction items which did not load anywhere), which was rotated using varimax. This yielded three factors with eigenvalue &gt;1, which explained 60% of variance.</p> <p>-“Functional/Adaptive Coping,” the first factor (eigenvalue = 2.65), accounted for almost 30% of variance and was composed of five items (factor loadings): seeking emotional support (.73), seeking instrumental support (.73), planning (.72), positive reframing (.71), and active coping (.70).</p> <p>-“Mental/Behavioral Disengagement,” (eigenvalue = 1.67), accounted for 18.6% of the variance and was composed of three items (factor loadings): disengagement (.82), self-blame (.81), and denial (.58).</p> <p>-“Substance Abuse,” the final factor (eigenvalue = 1.01), accounted for 12% of the variance and had a single item with one very high factor loading: using/abusing drugs to distract oneself (.95).</p>

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IV. Barriers to help-seeking	<p>Assessed using an abridged version of the Mental Health Treatment Obstacles and Fears inventory (Park et al., 2012). Participants indicated degree of concern with each item on a 4-point Likert scale (1 = <i>I would not be concerned</i> and 4 = <i>I would be very concerned</i>). Initial extraction through PC produced three factors (KMO = .880; Bartlett's test = 1,003.02, <math>df = 66</math> and <math>p &lt; .001</math>), extracted and rotated using promax. Together, these three factors accounted for 52% of the variance:</p> <p>-<i>Fear of Therapy</i>," or fear of consequences of therapy, (eigenvalue = 4.76), was composed of five items (factor loadings): treatment will make things worse (.81), information I share will not be kept confidential (.77), I will be put on drugs or hospitalized (.66), seeing a therapist will negatively impact my job (.55), and therapy will not work (.44). Factor 1 accounted for almost 40% of the variance.</p> <p>-<i>Fear of Self-Discovery</i>," (eigenvalue = 0.82), accounted for 6.8% of variance and was composed of four items (factor loadings): I will have to admit to a problem that I am not ready to face (.93), what the therapist says will be difficult for me to hear (.68), I will have to relive some unpleasant experiences (.60), and I will have to change how I am currently coping (.56).</p> <p>-<i>Fear of Stigma</i>," (eigenvalue = 0.69), was composed of three items (factor loadings): My friends will judge me negatively for seeing a therapist (.74); I will be labelled as crazy (.69); and if I see a therapist, it means something is really wrong with me (.57).</p>
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Prior to performing multivariate analyses, the data were assessed to rule out any issues of multicollinearity by examining a correlation matrix. The data were also checked to ensure all assumptions of bivariate and multivariate analyses were met before completing regression. The predictor variables were only weakly correlated with one another (e.g., coefficients under 0.40), indicating that all variables were appropriate for use in regression analyses. Hierarchical multiple linear regression was chosen as the most suitable regression analysis to evaluate the data in the context of our study's objectives.

**Table 2.** Summary of Means, Standard Deviations, Cronbach's  $\alpha$  Coefficients, and Interitem Correlations for All Variables

	<i>M</i>	<i>SD</i>	<i>N</i>	Items	$\alpha$	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
1. Female <sup>a</sup>	0.83	0.38	208	—	—	1.00																	
2. Age	22.10	5.13	207	—	—	-0.12	1.00																
3. Married <sup>b</sup>	0.16	0.37	208	—	—	-0.04	0.46***	1.00															
4. Live with family <sup>c</sup>	0.39	0.49	209	—	—	-0.08	-0.12	-0.30***	1.00														
5. Year of study	2.67	1.12	205	—	—	-0.03	0.30***	0.21**	0.06	1.00													
6. Social/ Environmental	—	—	207	5	0.73	0.08	-0.08	-0.08	0.14*	-0.07	1.00												
7. Academic achievement	—	—	207	4	0.79	0.03	-0.05	-0.14	0.21**	0.04	0.00	1.00											
8. Curriculum/ Expectations	—	—	207	4	0.79	0.13	-0.11	0.02	-0.08	-0.08	0.04	0.03	1.00										
9. Time/Balance	—	—	206	2	0.62	0.08	-0.01	0.03	0.08	0.04	0.03	0.01	-0.03	1.00									
10. Financial stress	—	—	203	2	0.64	0.12	0.13	0.14	-0.10	-0.03	0.01	0.01	-0.04	-0.01	1.00								
11. Functional/Adaptive	—	—	198	5	0.77	0.16*	0.13	0.04	-0.12	0.03	-0.04	0.21**	0.00	0.14	0.14	1.00							
12. Mental/Behavioral disengagement	—	—	207	3	0.58	0.14	-0.02	0.00	0.01	-0.10	0.25**	0.16*	0.14	0.28***	0.10	0.00	1.00						
13. Substance abuse	—	—	198	1	—	0.05	-0.05	0.04	0.08	0.02	0.04	0.03	-0.05	0.04	-0.02	0.00	0.00	1.00					
14. Fear of therapy	—	—	209	5	0.80	-0.08	-0.05	0.01	-0.02	-0.04	0.08	0.11	-0.02	-0.04	0.30	-0.02	0.21**	-0.04	1.00				
15. Fear of self- discovery	—	—	207	4	0.81	0.06	-0.06	-0.11	0.15*	-0.12	0.17**	0.13	0.21**	-0.03	-0.08	0.06	0.44***	0.00	0.01	1.00			
16. Fear of stigma	—	—	208	3	0.75	-0.14*	-0.12	-0.09	0.11	0.03	0.03	0.09	-0.03	0.10	-0.06	-0.11	0.02	0.20**	-0.01	0.01	1.00		

<sup>a</sup> Dummy variable, where 0 = male (reference category). <sup>b</sup> Dummy variable, where 0 = unmarried (single, separated, divorced, or widowed; reference category). <sup>c</sup> Dummy variable, where 0 = other living arrangement (alone, with roommates, or in residence; reference category). <sup>d</sup> The computed factor scores (Items 6 through 16) are standardized to a mean of zero and a standard deviation of 1 (Tabachnick & Fidell, 2012). \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

## Results

Our first objective was to determine the prevalence and severity of self-reported symptoms consistent with anxiety and depression among our sample. Participants were asked to indicate the frequency with which they had experienced each of the items on the PHQ-9 and GAD-7 on a Likert-scale ranging from 0 (*not at all*) to 3 (*almost every day*) over the previous 2-week period. Total scores of 5 and over indicated that symptoms of anxiety and depression were at least mildly present. Cut-points of 5, 10, and 15 indicated mild, moderate, and severe anxiety on the GAD-7, while cut-points of 5, 10, 15, and 20 indicated mild, moderate, moderately severe, and severe depression on the PHQ-9. Participants' responses are shown by cut-point in Table 3.

**Table 3. Severity of Depression and Anxiety by Recommended Cut-Points**

	<i>F</i>	%
Anxiety (GAD-7)		
1. None (0–4)	44	21.3
2. Mild (5–9)	69	33.3
3. Moderate (10–14)	51	24.6
4. Severe (15+)	43	20.8
Total	207	100.0
Depression (PHQ-9)		
1. None (0–4)	51	24.6
2. Mild (5–9)	64	30.9
3. Moderate (10–14)	45	21.7
4. Moderately Severe (15–19)	31	15.0
5. Severe (20+)	16	7.7
Total	207	100.0

For each scale, the authors recommend using a cut off screening point of 10 to indicate probable mental illness (Kroenke & Spitzer, 2002; Kroenke et al., 2001; Spitzer et al., 2006). A score of 10 or greater on the PHQ-9 has a sensitivity and specificity of 88% for major depression (Kroenke & Spitzer, 2002, p. 2). Sensitivity is also maximized at a cut-point of 10 for the GAD-7, with both sensitivity and specificity over 80% (Spitzer et al., 2006, p. 1094). Based on these criteria, about 44% of respondents in our study screened positive for at least mild depression, while about 45% of respondents screened positive for at least mild anxiety. These findings are comparable to those of previous studies (e.g., Garlow et al., 2008; Martin et al., 2014; Moreno, Jelenchick, & Breland, 2015; Moreno, Jelenchick, & Kota, 2013). Descriptive statistics for individual responses to each item in the PHQ-9 and GAD-7 are displayed in Tables 4 and 5, respectively.

The overall mean score for the PHQ-9 was 9.50 ( $SD = 6.2$ ). Responses to the PHQ-9 mirrored the most recent findings of the National College Health Assessment of Canadian postsecondary students. In our study, nearly 67% of participants reported “feeling down, depressed, or hopeless” over the past 2 weeks. Nationally, 50% of students reported they had felt “so depressed it was difficult to function” or had “felt very sad” over the past 2 weeks, while over one quarter reported feeling “hopeless” (ACHA, 2016, p. 31). Over 17% of our participants reported suicidal ideation at some frequency over the past 2 weeks, with 1.4% self-reporting having felt this way almost every day. Again, these findings are consistent with the literature. Nationally, over 2% of students

reported having self-injured in the past 2 weeks, 3% reported seriously considering suicide and 0.5% reported having tried (ACHA, 2016, p. 32).

The most frequently reported symptoms of depression in our study are sleep-related issues. While these items may be symptomatic of sleep disorders rather than depression, it is important to note that when taken in combination with other items on this scale, sleep-related problems can also be indicative of depression. The link between sleep-related issues and depression has been well supported in the literature (e.g., Doane, Gress-Smith, & Breitenstein, 2015; Ford & Cooper-Patrick, 2001; Gillin, 1998; Johnson, Roth, & Breslau, 2006; Wilson et al., 2014).

**Table 4.** *Self-Reported Symptoms Consistent With Depression (N = 207)*

Item on Questionnaire	Percent Who Reported				<i>M</i>	<i>SD</i>
	0	1	2	3		
1. Little interest or pleasure in doing things	49.8	32.1	12.4	5.7	0.77	0.89
2. Feeling down, depressed, or hopeless	33.0	43.5	17.7	5.7	0.96	0.86
3. Trouble falling or staying asleep, or sleeping too much	20.1	26.8	28.2	24.9	1.58	1.07
4. Feeling tired or having little energy	8.2	31.4	31.9	28.5	1.81	0.95
5. Poor appetite or overeating	24.9	25.8	27.8	21.5	1.46	1.09
6. Feeling bad about yourself, or that you are a failure or have let yourself or your family down	38.9	29.8	17.3	13.9	1.06	1.06
7. Trouble concentrating on things, such as reading or watching television	29.7	34.9	24.9	10.5	1.16	0.97
8. Moving or speaking so slowly that other people noticed—or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	69.4	19.6	9.6	1.4	0.43	0.73
9. Thoughts that you would be better off dead or of hurting yourself in some way	82.8	8.6	4.8	1.4	0.30	0.73
Total Score					9.50	6.20

**Table 5. Self-Reported Symptoms Consistent With Anxiety (N = 207)**

Item on Questionnaire	Percent Who Reported				<i>M</i>	<i>SD</i>
	0	1	2	3		
1. Feeling nervous, anxious, or on edge	9.6	43.1	26.8	20.6	1.58	1.58
2. Not being able to stop or control worrying	24.4	31.1	29.2	15.3	1.35	1.35
3. Worrying too much about different things	10.5	32.1	34.4	23.0	1.70	1.70
4. Had trouble relaxing	24.2	33.8	26.1	15.9	1.34	1.34
5. Being so restless that it is hard to sit still	38.3	34.9	15.8	11.0	1.00	1.00
6. Becoming easily annoyed or irritable	19.6	33.5	36.8	20.1	1.47	1.47
7. Feeling afraid, as if something awful may happen	37.8	28.7	19.1	14.4	1.10	1.10
Total score					9.55	5.50

The overall mean for the GAD-7 summative score was 9.55 ( $SD = 5.5$ ). Symptoms of anxiety were slightly more common among this sample of students than symptoms of depression, likely owing to the number of females in the study. Several studies support the link between sex and anxiety, with women being considerably more likely to self-report symptoms of anxiety than their male counterparts (e.g., Eisenberg, Golberstein, et al., 2007; Eisenberg, Gollust, et al., 2007; Garlow et al., 2008; Hyun et al., 2006). Over 90% of students in the present sample reported feeling nervous, anxious, or on edge during the past 2 weeks, with 20% having felt this way almost every day. This finding is comparable to nationally-based figures: About one in three (28.5%) Canadian students report “overwhelming anxiety” during the previous 2-week period (ACHA, 2016, p. 32). Students in our sample also reported restlessness and irritability at fairly high frequencies, and nearly 15% of participants reported having experienced feelings of fear and dread almost every day over the past 2 weeks.

### Multivariate Analysis

To assess the relative contributions of the hypothesized predictors on the severity of self-reported symptoms of anxiety and depression, hierarchical multiple linear regression analyses were conducted. The results of the two analyses are displayed in Tables 6 and 7.<sup>1</sup> Each set of predictors was entered as a ‘block,’ and assessed in terms of its ability to affect the severity of symptoms after controlling for the previous block of variables. Once all blocks were entered, the overall model and relative contribution of each block of variables was assessed in terms of ability to predict the severity of self-reported symptoms among the sample.

<sup>1</sup> The potential use of the cut off points as our outcome variables was considered at length during the study design phase. Given the level of measurement of the cut-points variables, we ran nested ordinal logistic regression models. Results were very robust: there was no difference in the findings (e.g., statistical significance, direction of association, model fitness, etc.). Ultimately, we chose to operationalize the outcome variables as continuous severity indices, as it is always best to measure at the highest level of measurement. For ease of comparability, the Appendix includes our detailed results of the full ordinal logistic model using the cut-points as outcome variables.

**Table 6.** Hierarchical Regression Coefficients for Selected Predictors of Severity Index for Self-Reported Symptoms of Depression

	Block 1			Block 2			Block 3			Block 4		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
(Constant)	9.452***	2.593		10.76***	2.124		9.511***	1.780		9.450***	1.705	
Sociodemographic factors												
Age	-0.031	0.103	-0.026	-0.004	0.084	-0.003	0.007	0.071	0.005	0.012	0.068	0.010
Sex												
Male (r)												
Female	1.665	1.210	0.102	-0.322	1.007	-0.020	0.188	0.842	0.012	0.023	0.807	0.001
Marital status												
Single (r)												
Married	-0.142	1.449	-0.009	-0.668	1.183	-0.040	-1.000	0.985	-0.060	-1.040	0.937	-0.063
Living arrangement												
Other (r)												
With family	-0.241	0.986	-0.019	-1.710*	0.822	-0.135	-1.650*	0.693	-0.131	-2.020**	0.668	-0.160
Year of Study	-0.199	0.428	-0.036	0.051	0.348	-0.009	-0.186	0.290	0.034	0.268	0.276	0.049
Contextual stressors												
Social/Environmental				2.050***	0.376	0.330	1.298***	0.322	0.209	1.231***	0.306	0.198
Academic achievement				1.609***	0.386	0.255	1.166**	0.336	0.185	1.110**	0.322	0.176
Curriculum/Expectations				1.358**	0.367	0.213	0.966**	0.324	0.156	0.876**	0.312	0.138
Time/Balance				2.260***	0.368	0.368	1.450***	0.325	0.236	1.809***	0.320	0.295
Financial stressors				0.959*	0.380	0.155	0.695*	0.318	0.113	0.872**	0.306	0.141
Coping mechanisms												
Functional/Adaptive							-0.327	0.328	-0.053	-0.497	0.316	-0.081
Mental/Behavioral							2.906***	0.341	0.472	2.072***	0.371	0.336
Disengagement												
Substance abuse							0.912**	0.307	0.148	0.977**	0.297	0.159
Barriers to help-seeking												
Fear of therapy										0.933**	0.299	0.152
Fear of self-discovery										1.329***	0.346	0.215
Fear of stigma										-0.167	0.304	-0.027
Model <i>F</i>	0.550			10.69***			18.45***			18.06***		
<i>R</i>	0.122			0.614			0.761			0.793		
<i>R</i> <sup>2</sup>	0.015			0.377			0.580			0.628		
$\Delta R^2$	0.015			0.362***			0.203***			0.049***		

Note. (r) = reference category. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

### **Severity of symptoms of depression**

As illustrated in Table 6,  $R$  was different from zero at the end of each block, indicating that each group of variables influenced the overall model. Blocks 2 through 4 were statistically significant. After all predictors had been entered into the equation (Model 4),  $R^2$  was 0.628 with  $F = 18.06$ ,  $p < .001$ , indicating that 62.8% of the variability in the severity of students' self-reported symptoms consistent with depression was predicted by the selected sociodemographic variables, contextual stressors, coping strategies, and perceived barriers to help-seeking.

In Block 1, the sociodemographic variables were entered. None of these predictors made a unique contribution to the model. After the Block 2 variables were included, the overall model explained 37.7% of the variance in the severity of symptoms consistent with depression ( $F = 10.69$ ,  $p < .001$ ,  $R^2 = 0.377$ ). After entering the contextual stressors variables, the sociodemographic variable Live with Family became statistically significant, and inversely related to the dependent variable ( $\beta = -0.135$ ,  $p < .05$ ). This provides support for Hypothesis 4. Alone, the contextual stressors explained 36.2% of the total variance, after controlling for the effects of the sociodemographic variables ( $\Delta R^2 = 0.362$ ,  $p < .001$ ). After controlling for the sociodemographic variables, all contextual stressors were found to be significantly and positively related to the dependent variable, with the Time/Balance ( $\beta = 0.368$ ,  $p < .001$ ) and Social/Environmental ( $\beta = 0.330$ ,  $p < .001$ ) stressors making the greatest impacts. These results provide support for Hypotheses 6 through 10.

After the Block 3 variables were included, the overall model explained 58% of the total variance in the severity of symptoms consistent with depression ( $F = 18.45$ ,  $p < .001$ ,  $R^2 = 0.580$ ). Coping strategies, therefore, explained 20.3% of the total variance after controlling for the effects of the sociodemographic and contextual stressors variables ( $\Delta R^2 = 0.203$ ,  $p < .001$ ). As predicted by Hypotheses 12 and 13, Mental/Behavioral Disengagement ( $\beta = 0.472$ ,  $p < .001$ ) and Substance Abuse ( $\beta = 0.148$ ,  $p < .01$ ), which exemplify maladaptive coping strategies, were significantly and positively related to the dependent variable, after controlling for the sociodemographic and contextual stressors variables. While Functional/Adaptive coping did not make a unique contribution to the model, and therefore, did not provide support for Hypothesis 11, the predictor was inversely related to the dependent variable, as expected. The Live with Family variable and contextual stressors retained their significance in Block 3, albeit slightly less so in the case of Academic Achievement ( $\beta = 0.185$ ,  $p < .01$ ).

After the Block 4 variables were included, the overall model explained 62.8% of the total variance in the severity of symptoms of depression ( $F = 18.06$ ,  $p < .001$ ,  $R^2 = 0.628$ ). Barriers to help-seeking, therefore, explained about 4.9% of the total variance, after controlling for the effects of sociodemographics, contextual stressors, and coping strategies ( $\Delta R^2 = 0.049$ ,  $p < .001$ ). In Block 4, the sociodemographic variable Live with Family increased in significance, maintaining its inverse relationship with the dependent variable ( $\beta = -0.160$ ,  $p < .01$ ). All contextual stressors retained their significance levels, except for Financial Stressors which increased in significance ( $p < .01$ ). The Time/Balance ( $\beta = 0.295$ ,  $p < .001$ ) and Social/Environmental stressors ( $\beta = 0.198$ ,  $p < .001$ ) continued to make the greatest contributions of the contextual stressors, though Mental/Behavioral Disengagement made the greatest impact to the overall model ( $\beta = 0.336$ ,  $p < .001$ ). Substance Abuse also retained its significance in the final block ( $p < .01$ ), while Functional/Adaptive coping remained non-significant. Of the three barriers to help-seeking, both Fear of Therapy and Fear of Self-Discovery were significantly and positively related to the dependent variable, after controlling for the sociodemographics, contextual stressors, and coping strategies, with Fear of Self-Discovery making the largest impact of the barriers, and the third-largest impact of all variables in the model ( $\beta = 0.215$ ,  $p < .001$ ). Fear of Stigma was not statistically significant. These findings provide support for Hypotheses 14 and 15, but not 16.



In summary, students who perceived more stress resulting from each of the contextual stressors experienced more severe symptoms of depression. Similarly, students who frequently engaged with maladaptive coping strategies, such as Mental/Behavioral Disengagement and Substance Abuse, and who indicated a Fear of Therapy and Fear of Self-Discovery experienced more severe symptoms. Finally, self-reported symptoms of depression were less severe among students living off campus with their families.

### **Severity of symptoms of anxiety**

As illustrated in Table 7,  $R$  was different from zero at the end of each block, indicating that each group of variables influenced the overall model. Blocks 2 through 4 were statistically significant. After all predictors had been entered into the equation (Model 4),  $R^2$  was 0.596 with  $F = 15.77$ ,  $p < .001$ , indicating that 59.6% of the variability in the severity of students' self-reported symptoms of anxiety was predicted by the selected sociodemographic variables, contextual stressors, coping strategies, and perceived barriers to help-seeking.

In Block 1, the sociodemographic variables were entered. Only sex made a unique contribution to the model ( $\beta = 0.169$ ,  $p < .05$ ). Alone, sex explained 3.3% of the total variance in the severity of symptoms of anxiety. After the Block 2 variables were included, the overall model explained 40.9% of the variance in the severity of symptoms consistent with anxiety ( $F = 12.24$ ,  $p < .001$ ,  $R^2 = 0.409$ ). Sex became non-significant after entering the contextual stressors. Alone, the contextual stressors variables explained 37.6% of the total variance, after controlling for the effects of the sociodemographic variables ( $\Delta R^2 = 0.376$ ,  $p < .001$ ). All the contextual stressors were found to be significantly and positively related to the dependent variable after controlling for the sociodemographic variables, with Time/Balance ( $\beta = 0.371$ ,  $p < .001$ ) and Academic Achievement ( $\beta = 0.319$ ,  $p < .001$ ) making the greatest impacts. These results provided support for Hypotheses 6 through 10.

After the Block 3 variables were included, the overall model explained 56.6% of the total variance in the severity of symptoms of anxiety ( $F = 17.48$ ,  $p < .001$ ,  $R^2 = 0.566$ ). Coping strategies, therefore, explained 15.8% of the total variance after controlling for the effects of the sociodemographic and contextual stressors ( $\Delta R^2 = 0.158$ ,  $p < .001$ ). Functional/Adaptive coping ( $\beta = 0.126$ ,  $p < .05$ ) was statistically significant, but unexpectedly, was positively related to the dependent variable. Thus, Hypothesis 11 was not supported. As predicted by Hypothesis 12, Mental/Behavioral Disengagement was significantly and positively related to the dependent variable ( $\beta = 0.426$ ,  $p < .001$ ). Though Substance Abuse did not make a unique contribution to the model, and therefore, did not provide support for Hypothesis 13, the predictor was positively related to the dependent variable, as expected. The contextual stressors retained their significance in Block 3, albeit slightly less so in the case of Financial Stressors ( $\beta = 0.105$ ,  $p < .05$ ).

**Table 7. Hierarchical Regression Coefficients for Selected Predictors of Severity Index for Self-Reported Symptoms of Anxiety**

	Block 1			Block 2			Block 3			Block 4		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
(Constant)	8.291***	2.286		9.663***	1.840		9.417***	1.609		9.348***	1.582	
Sociodemographic factors												
Age	-0.022	0.091	-0.020	-0.004	0.073	-0.003	-0.026	0.064	-0.025	-0.022	0.063	-0.020
Sex												
Male (r)												
Female	2.441*	1.067	0.169	0.680	0.872	0.047	0.780	0.761	0.054	0.653	0.749	0.045
Marital status												
Single (r)												
Married	1.043	1.277	0.070	0.681	1.025	0.046	0.628	0.891	0.042	0.526	0.869	0.036
Living arrangement												
Other (r)												
With family	0.135	0.869	0.012	-1.280	0.712	-0.114	-0.878	0.626	-0.078	-1.000	0.619	-0.089
Year of Study	-0.188	0.378	-0.039	-0.082	0.302	-0.017	0.115	0.262	0.024	0.163	0.256	0.033
Contextual stressors												
Social/Environmental				1.616***	0.326	0.306	1.118***	0.291	0.202	1.079***	0.284	0.195
Academic achievement				1.716***	0.334	0.319	1.208***	0.304	0.215	1.164***	0.298	0.207
Curriculum/Expectations				1.664**	0.335	0.190	0.781**	0.293	0.138	0.755*	0.289	0.133
Time/Balance				1.096***	0.319	0.371	1.238***	0.294	0.227	1.465***	0.296	0.268
Financial stressors				1.681**	0.329	0.160	0.579*	0.288	0.105	0.658*	0.284	0.120
Coping mechanisms												
Functional/Adaptive							0.691*	0.296	0.126	0.597*	0.293	0.109
Mental/Behavioral							2.338***	0.308	0.426	1.865***	0.344	0.340
Disengagement												
Substance abuse							0.516	0.278	0.094	0.602*	0.275	0.110
Barriers to help-seeking												
Fear of therapy										0.841**	0.277	0.154
Fear of self-discovery										0.598	0.321	0.109
Fear of stigma										0.288	0.282	-0.053
Model <i>F</i>	1.234			12.240***			17.480***			15.770***		
<i>R</i>	0.181			0.639			0.753			0.772		
<i>R</i> <sup>2</sup>	0.033			0.409			0.566			0.596		
$\Delta R^2$	0.033			0.376***			0.158***			0.030**		

Note. (r) = reference category. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

In summary, students who perceived more stress resulting from each of the contextual stressors experienced more severe symptoms of anxiety. Students who frequently engaged with maladaptive coping strategies like Mental/Behavioral Disengagement and Substance Abuse experienced more severe symptoms of anxiety. Unexpectedly, students who employed Functional/Adaptive coping mechanisms also experienced more severe symptoms of anxiety. Finally, students who indicated a Fear of Therapy also demonstrated more severe symptoms consistent with anxiety.

## Discussion

The results from the present study indicated that several students in the sample suffered from symptoms consistent with anxiety and/or depression. Using the recommended cut-point of a score of 10 or greater on each scale, 44% of students screened positive for depression, while 45% screened positive for anxiety. While high, these proportions are comparable to those found in previous studies. For example, Benton et al. (2003) found that nearly half of the postsecondary students included in their sample met DSM-IV criteria for at least one mental illness during the previous year. Similarly, Eisenberg, Golberstein, et al. (2007) reported that almost 30% of students in their study screened positive for either depression or anxiety. Using the PHQ-9 as a screening tool, Moreno et al. (2015) found that 47% of students in their sample screened positive for at least mild depression, while Moreno et al. (2013) found that 39% of their sample screened positive for depression. In Martin, Usdan, Cremeens, and Vail-Smith's (2014) study, 21% screened positive for anxiety on the GAD-7, while 18% screened positive for depression on the PHQ-9. Although these last estimates are considerably lower than ours are, participants in Martin et al.'s (2014) study were recruited based on their risk for disordered gambling, rather than anxiety or depression, probably reflecting methodological differences in research. Responses to individual items on the PHQ-9 and GAD-7 in the present study were comparable to nationwide data on the physical and mental health of Canadian postsecondary students (ACHA, 2016). The overall mean scores on each scale (9.50 and 9.55 on the PHQ-9 and GAD-7, respectively) were similar to those reported in previous studies using the same scales to screen for cases of anxiety and depression (e.g., Garlow et al., 2008; Moreno et al., 2015).

A variety of potential predictors of students' mental health outcomes was examined in the present study, including contextual stressors, coping strategies, and perceived barriers to help-seeking. Our study assessed the predictive validity of our conceptual model in relation to the severity of undergraduate students' self-reported symptoms of depression and anxiety in two separate regression models. Overall, the regression analyses produced strong models accounting for nearly 63% and 60% of the total variance in the severity of symptoms of depression and anxiety, respectively.

Mental/behavioral disengagement, a maladaptive coping strategy, was the most influential predictor of students' mental health outcomes in both models. Substance abuse was also a significant predictor of more severe symptoms of depression and anxiety. These findings are consistent with previous studies, which have shown that maladaptive coping often results in worsening mental health issues, as opposed to mediating them (e.g., Byrd & McKinney, 2012; Carver et al., 1989). More adaptive coping strategies, such as functional/adaptive coping encourage healthy adjustment and mediate mental distress (e.g., Hunt & Eisenberg, 2009; Irons & Gilbert, 2005; Whitehill et al., 2012). As in previous studies (e.g., Byrd & McKinney, 2012; Hefner & Eisenberg, 2009; Taylor & Stanten, 2007), functional/adaptive coping had an inverse (though non-significant) relationship with the severity of symptoms of depression. However, it held a significant, positive relationship with the severity index for anxiety, suggesting that even the use of adaptive coping methods may increase a person's anxiety. Dwelling on an issue or unsuccessfully attempting to resolve it can produce even more

stress, exacerbating symptoms associated with anxiety (Carver et al., 1989). Additionally, reaching out to friends or family for social support may result in increased stress if the advice given is unhelpful or misinformed. Seeking social support may also have a negative effect if one is met with stigma due to divulging a struggle with mental health-related issues.

For both the depression and anxiety models, time/balance stress was the second most influential predictor of the severity of symptoms consistent with mental illness. Students face time management challenges both in and outside of the academic setting (e.g., work, social engagements, relationships with friends, family, etc.). Students in our sample identified lack of time for friends, family, and social obligations, as well as balancing academic and work obligations as significant sources of stress, mirroring national level data that young adults between the ages of 15 and 24 view managing their time between multiple obligations as a significant source of stress (Government of Canada, 2006). In the anxiety model, academic achievement was a close runner up to time/balance. These findings are consistent with the literature, where academic self-confidence has been identified as a significant predictor of mental health outcomes in addition to being a major source of stress for students (e.g., Byrd & McKinney, 2012; Iarovici, 2014; Pancer et al., 2000). Social/environmental stress was the second-most influential predictor of the contextual stressors variables for the depression model, and had the fourth-highest impact overall on both models. This finding is consistent with the fact that adjusting to the postsecondary environment can often be an exceedingly stressful experience for students (e.g., Byrd & McKinney, 2012; Cook, 2007; Jackson et al., 2000; Oswald & Clark, 2003; Pancer et al., 2000). In particular, Oswald and Clark (2003) note that students new to postsecondary education often find the transition to be the most stressful adjustment phase in their life. For both models, all contextual stressors made significant, unique contributions to predicting the severity of symptoms consistent with anxiety and depression. These findings suggest that students at this university struggled with perceived contextual stressors within the postsecondary milieu.

Fear of self-discovery was the most influential of the three barriers to help-seeking, and the third most influential predictor of the severity of symptoms consistent with depression. Although the variable was not a statistically significant predictor in the anxiety model, it maintained a positive relationship with this dependent variable, indicating that the greater the fear of self-discovery, the poorer the mental health outcome. This barrier included items such as fear of having to relive unpleasant experiences, having to alter current methods of coping, and discovering that something is really wrong with one's mental health. As help negation is symptomatic of depression, it is not surprising that fear of discovering more about one's mental state is a significant barrier to treatment, as well as a significant predictor of the severity of symptoms consistent with depression.

Fear of therapy was a significant predictor of the severity of symptoms for both models. The items combined to create this variable consisted of doubts regarding confidentiality, fear that issues would be worse than one first thought, fear of being placed on medication or being hospitalized, lack of faith in treatment effectiveness, and fear that seeking professional treatment would negatively impact future career or educational opportunities. This is consistent with Givens and Tjia's (2002) finding that high-achieving students reported several of these items as barriers to seeking treatment. Threat of academic jeopardy in particular was found to be an important obstacle for medical students considering treatment for mental illness. Additionally, Eisenberg, Golberstein, et al. (2007) found that students reported concerns that treatment would not help, a fear of being hospitalized, and concern for privacy. The final barrier, fear of stigma, was not statistically significant in either model and shared an inverse relationship with the dependent variable, contrary to our hypothesis. This finding may indicate that postsecondary institutions' efforts towards eradicating the stigma surrounding mental illness have been successful. It may also be indicative of students deciding to

seek help for fear of being stigmatized if their struggles with mental illness become apparent to others.

Finally, of the sociodemographic variables, only students' living arrangement was found to be a significant predictor of the severity of symptoms of depression (the variable was non-significant in the anxiety model). Our research findings here run contrary to Buote et al.'s (2007) finding that living on campus led to positive mental health outcomes because of building strong social support systems with other students. We hypothesized that familial social support would have a buffering effect on the potential emergence of symptoms consistent with mental illness, particularly for those experiencing stress produced by environmental maladjustment (e.g., struggling to form new relationships). Results of the present study showed that living with family members off campus had a statistically significant, inverse relationship with the severity of symptoms of depression, as compared to other living arrangements (living on residence, near campus with friends, or off campus alone). Given the notable importance of strong social support networks in the previous literature (e.g., Byrd & McKinney, 2012; Hefner & Eisenberg, 2009; Irons & Gilbert, 2005; Wilson & Dean, 2010), this finding may indicate that the safety net of familial social support effectively mediates the severity of symptoms consistent with depression more so than the social support of friendships. It is also possible that students receive more functional social support from family members and more structural social support from friendships. Hefner and Eisenberg (2009) emphasized the importance of functional social support, finding that the positive effects of social support were the most effective when the support provided was highly functional.

### **Limitations and Future Directions**

Despite participants having been assured of both confidentiality and anonymity, bias resulting from self-reported data as well as social desirability may have influenced the results of our study. Additionally, the conceptual model used for the purposes of this study outlines a linear relationship, namely stress devolving into a state of distress (e.g., symptoms of mental illness) based on the mediating effects of contextual stressors, coping strategies, and perceived barriers to help-seeking. Future research should investigate the possibility of a multidirectional relationship between distress and coping strategies and perceived barriers to help-seeking. It is possible that struggling with a mental illness such as anxiety or depression may inflate perceived barriers to help-seeking, and produce a greater tendency towards the use of maladaptive coping strategies.

Taken together, the predictors included in our analyses account for 63% and 60% of the total variance in the severity of symptoms consistent with depression and anxiety, respectively. While both models are strong, there remain other predictors that require attention in future studies. One such predictor is the lack of awareness and education surrounding the recognition of mental illnesses, as well as a lack of knowledge of available treatment options (Wilson & Dean, 2010). Several researchers have suggested that an inadequate level of mental health literacy may be leading students to believe that their poor mental state is a result of the normal stresses associated with postsecondary life (e.g., Eisenberg, Golberstein, et al., 2007; Wilson & Dean, 2010; Wyatt & Oswalt, 2013). This finding is concerning, given that this misconception may be contributing towards the low rate of help-seeking among students. Additionally, researchers (e.g., Kuss, Griffiths, & Binder, 2013; Young, 2004) have suggested that students often demonstrate an overreliance on technology, and in some cases may suffer from Internet addiction. Given that mental/behavioral disengagement had the greatest impact on students' mental health outcomes in our study, future research should explore students' overreliance on, and disengagement through technology as a maladaptive coping strategy. Finally, the present study did not explore social psychological measures such as self-efficacy, self-esteem, or self-confidence, all of which have been identified in previous

research as significant predictors of an individual's ability to cope effectively. Future research should incorporate these personality measures to achieve a well-rounded analysis of coping abilities and strategies.

Due to scope restraints, our study examined symptoms of only two broadly defined mental illnesses common to student populations: anxiety and depression. As a variety of mental health issues affect students, future research should work towards addressing additional challenges (e.g., eating, sleep, and substance abuse disorders). While several sociodemographic variables were collected from our sample, only five were included in the multivariate analyses. Due to the limited variability in our sample, sociodemographic variables were heavily skewed to more dominant groups (e.g., heterosexual, Caucasian, non-religious, etc.) and thus, inclusion of many of these variables in the analyses would not have been informative. The sociodemographics ultimately included in our analyses were selected based on their importance in the relevant literature and the findings of previous studies. It is likely that additional sociodemographics (e.g., race/ethnicity, sexual orientation, religiosity, etc.), particularly those characterizing non-dominant groups, would have a significant impact on the prediction of students' mental health outcomes. Therefore, more comprehensive future research should investigate these important variables. Additionally, only one of the sociodemographic variables included in our analyses was statistically significant. This is most likely due to our limited sample size: A larger study would be better powered to detect statistical significance in a greater number of sociodemographic variables.

Finally, the screening tools used to evaluate symptoms of depression and anxiety in this study were used as indices of symptom severity, and not as tools for clinical diagnosis of mental illness. It is important to note that while both the PHQ-9 and GAD-7 have been deemed appropriate for use as severity indices (Kroenke et al., 2001; Kroenke & Spitzer, 2002; Spitzer et al., 2006); a high score on a symptom severity index does not necessarily indicate a diagnosable mental illness. Finally, it is also important to acknowledge that the time of year during which survey completion took place, near midterm examinations, may have contributed to spikes in symptoms consistent with anxiety and depression, artificially inflating students' scores on both the PHQ-9 and GAD-7.

## Conclusion

While the findings of this study should not be used to make definitive claims about the state of all Canadian postsecondary students' mental health, the conclusions drawn here will contribute to the Canadian body of knowledge on postsecondary students' mental health. Growing this knowledge base is essential for the development of successful mental health services and literacy education programs provided by Canadian postsecondary institutions. Although the data in our study is bound to the convenience sample of students at this university, general trends and themes may be applicable to larger, more comprehensive studies in the future, particularly given that the findings of this study parallel those of previous research. Future research should work towards extending this line of research to larger student samples, and replicating these findings across diverse university environments to better understand the average Canadian postsecondary student's social context and to gain clarification of the factors affecting students' mental health outcomes.

Additionally, several scales used to measure concepts in the current study are becoming outdated. In particular, the creation of a new scale tool for measuring students' perceptions of contextual stressors would be useful for future research. To develop a comprehensive inventory of potential stressors that are significant for students, we recommend a "for students by students" development approach, as employed by Park et al. (2012) in the development of the Mental Health Treatment Fears and Obstacles (MHTFO) inventory, a version of which was utilized in our study. Through this

method, student participants are first asked to respond to one or two targeted, open-ended questions that prompt them to provide answers that are qualitatively analyzed and organized into a large inventory of items. This inventory is then rereleased to participants in a scaled question format, and the resulting data factor analyzed to determine the strongest items, as well as the reliability and validity of the tool.

Despite several Canadian universities' proposed strategic initiatives targeted at raising awareness and decreasing stigma, as well as fostering supportive postsecondary environments, an unmet need for treatment continues to exist among student populations, and reports of increasing prevalence of symptoms consistent with mental illness among students continue to come to light. Additionally, the apparent prevalence and severity of symptoms consistent with mental illness among this population continues to rise according to reports from university counseling centers (e.g., Gallagher, 2013). Canadian postsecondary institutions' movements towards the encouragement and support of students struggling with mental illnesses needs to continue to develop stigma-free environments where open discussion of mental health is welcomed. It is imperative that both faculty and students are aware of how to recognize deteriorating mental health as well as symptoms consistent with mental illness, and have active knowledge of the resources available to encourage healthy and effective help-seeking behavior among peers. Based on the findings of our study, students perceived there to be several contextual stressors within the postsecondary setting, and struggled most with time/balance issues. Universities should continue to provide struggling students with guidance directed towards developing organizational skills and the ability to balance multiple obligations. To deliver these services, however, students must first be encouraged to seek help when needed. A movement away from mental and behavioral disengagement as a coping mechanism needs to be addressed and conveyed to undergraduate students across Canada. In support of this, the continued development and implementation of anti-stigma initiatives, as well as renewed commitment to encouraging informed mental health literacy throughout postsecondary institutions must be priorities moving forward.

Previous studies have indicated a prevalence of stress and other overwhelming feelings among postsecondary populations across North America (e.g., American College Health Association, 2016; Benton et al., 2003; Cook, 2007; Gallagher, 2013; Hyun et al., 2006; Mental Health Commission of Canada, 2013). Findings show students actively struggle with environmental maladjustment, feelings of homesickness, loneliness, and difficulty with managing the multiple demands of their academic, professional, and social lives (e.g., Buote et al., 2007; Byrd & McKinney, 2012; Cook, 2007; Fritz & DeMarinis, 2008; Government of Canada, 2006; Jackson et al., 2000; Oswald & Clark, 2003; Pancer et al., 2000; Paul & Brier, 2001; Whitehill et al., 2012). Through this study, we have begun to investigate these factors within a Canadian context, finding a considerable presence of symptoms consistent with anxiety and depression, along with significant perceived contextual stressors, use of maladaptive coping strategies, and perceived barriers to help-seeking at a single Canadian university. Given these empirical findings, in addition to the fact that suicide is currently the second leading cause of death among young Canadians aged 15 to 34 (Statistics Canada, 2012), it is imperative that future research continues to evaluate factors affecting postsecondary students' mental health outcomes, making the treatment and analysis of mental health issues among this population a policy priority for Canada. More comprehensive studies in the future should move Canada towards building a healthier future for postsecondary students.

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## Appendix

### Ordered Logistic Regression Effects of Selected Predictors on the Severity of Self-Reported Symptoms Consistent with Depression and Anxiety by Cut-Points

	Severity of Depression Cut-Points			Severity of Anxiety Cut-Points		
	Estimate	SE	Wald	Estimate	SE	Wald
Threshold 1	-1.442	0.918	2.466	-2.293	1.186	3.738
Threshold 2	0.801	0.904	0.785	0.307	1.159	0.070
Threshold 3	2.977**	0.944	9.957	2.408*	1.189	4.101
Threshold 4	5.397***	1.046	26.642	—	—	—
<i>Sociodemographic factors</i>						
Age	0.006	0.037	0.029	0.010	0.039	0.060
Sex						
Male (r)	0.000			0.000		
Female	0.629	0.426	2.180	-0.566	0.442	1.635
Marital status						
Single (r)	0.000			0.000		
Married	-0.226	0.483	0.218	-0.292	0.500	0.341
Living arrangement						
Other (r)	0.000			0.000		
With family	-1.180**	0.344	11.748	0.370	0.349	1.124
Year of study	0.222	0.144	2.365	0.001	0.149	0.000
<i>Contextual stressors</i>						
Social/Environmental	0.722***	0.162	19.873	0.622***	0.172	13.101
Academic achievement	0.677***	0.171	15.621	0.669***	0.175	14.624
Curriculum/Expectations	0.435**	0.165	6.966	0.385*	0.169	5.201
Time/Balance	0.551***	0.170	10.540	0.637***	0.179	12.691
Financial stressors	0.350*	0.154	5.160	0.376*	0.161	5.466
<i>Coping mechanisms</i>						
Functional/Adaptive	-0.226	0.163	1.917	0.408*	0.175	5.453
Mental/Behavioral	1.148***	0.206	30.912	1.156***	0.234	24.447
Disengagement						
Substance abuse	0.696***	0.161	18.588	0.397*	0.158	6.316
<i>Barriers to help-seeking</i>						
Fear of therapy	0.466**	0.159	8.634	0.399*	0.173	5.344
Fear of self-discovery	0.550**	0.179	9.450	0.258	0.191	1.829
Fear of stigma	-0.022	0.156	0.020	-0.146	0.167	0.764
Test of parallel lines						
-2 log likelihood ( $\chi^2$ , <i>df</i> ) <sup>Sig</sup>	354.79 (23.87, 48) <sup>n.s.</sup>			333.37 (7.24, 32) <sup>n.s.</sup>		
Model fitting						
-2 log likelihood ( $\chi^2$ , <i>df</i> ) <sup>Sig</sup>	378.66 (164.83, 16) <sup>***</sup>			340.61 (148.78, 16) <sup>***</sup>		
Goodness-of-fit test						
Pearson $\chi^2$ ( <i>df</i> ) <sup>Sig</sup>	528.12 (696) <sup>n.s.</sup>			583.97 (518) <sup>n.s.</sup>		
Pseudo- <i>R</i> <sup>2</sup>						
Cox and Shell	0.602			0.564		
Nagelkerke	0.632			0.604		

Note. (r) = reference category; n.s. = not statistically significant.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

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