Exploring the Acceptability of Exercise in Students Seeking Treatment for Depression: ‘Another tool in the tool-box.'

by

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A thesis submitted in conformity with the requirements for the degree of Master of Science
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Abstract

The high prevalence of depression in university students is placing an increasing demand on campus mental health services to provide adequate and timely treatment. Exercise is an effective and accessible treatment for depression; however, acceptability of exercise as a treatment remains unclear. By employing a qualitative research design that incorporated the use of semi-structured interviews, the current study explored the perceptions of exercise as a potential depression treatment among fifteen students (thirteen females; 18-30 years) seeking treatment for depression. Students’ acceptance of exercise for treating depression was informed by prior interest in exercise and physical activity, belief in the benefits of exercise on psychological well-being, and an open attitude towards alternative approaches to managing depression. Referral to supervised exercise may be required to facilitate exercise participation. Findings strengthen the case for recommending exercise within University mental-health services and provide useful insights into students preferences for designing exercise for depression interventions.
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Chapter 1
Introduction and Review of the Literature

1 Setting the stage

“When depression hit, Zoe Margolis felt suicidal. Pills and therapy did nothing to help, but then she got out her old trainers and began to jog.” (Zoe Margolis, ‘Running Saved my Life’ The Guardian. August 24, 2015)

This brief headline for the article, "Running Saved my Life" by Zoe Margolis, illuminates my motivation for the current study. It demonstrates the struggle many individuals with depression face with regards to managing depression and contrasts medical advice with a powerful depiction of human experience. Recent guidelines for the management of depression recommend exercise as the only alternative first-line evidence-based treatment option for individuals with mild to moderate depression severity (Ravindran et al., 2016); given the similar effects on the reduction of depressive symptoms as the other traditional first-line treatment options (i.e., antidepressants and psychotherapy)(Cooney et al., 2013; Ekkekakis, 2015; Kvam, Kleppe, Nordhus, & Hovland, 2016).

Depression is a highly prevalent mental health concern in university students (American College Health Association, 2016). Further, university campuses have reported an increasing demand for mental health services, resulting in long wait times for students to receive specialized treatment (Jaworska, De Somma, Fonseka, Heck, & MacQueen, 2016). An exercise program for students seeking treatment for depression may help ease the burden on university health services and provide immediate access to a recommended depression treatment for students, if it is an acceptable treatment option for them. Therefore, it is imperative to explore factors that influence interest in, and acceptability for exercise in the context of depression treatment and management from the perspective of students actively seeking treatment for depression.

Due to the limitations of current research on exercise in the context of depression treatment and management, this study will attempt to take a necessary step back, and apply a pragmatic approach to understanding students' interest and acceptability for exercise as a treatment for depression. Acceptability of a therapy to individuals is a prime factor influencing the clinical effectiveness of treatments as delivered compared with the efficacy of treatments demonstrated
in clinical trials, and may be influenced by an individual’s beliefs, attitudes and preferences regarding a treatment. Guided by an Aptitude x Treatment Interaction (ATI) research framework, this study undertakes a qualitative exploration of individual experiences of exercise and depression management to contextualize our understanding of interest in and the acceptability for exercise-based depression treatment programs in the university setting. Applying an ATI approach to exploring students' perceptions and preferences for exercise as a treatment for depression, may aid in the identification of common attributes of students seeking treatment for depression where exercise may be the most effective treatment for their depression, as in Zoe's case described above (Caspi & Bell, 2004; Snow, 1991).

Thus, the current study involves in-depth semi-structured interviews with 15 university students actively seeking depression treatment. An inductive thematic analysis (Braun & Clarke, 2006) approach was used to identify patterns in students' exercise and depression management experiences and preferences to contextualize perceived acceptability of exercise-based depression treatment. The qualitative research design of this study has the advantage of providing detailed and rich insights into students' experiences and perceptions of exercise and depression management. In line with recommendations from the Medical Research Center (MRC) framework for intervention development (Craig et al., 2008), this is an important first step in developing an efficient and accepted exercise intervention for students seeking depression treatment in a university setting. Furthermore, the findings from this study will support the development, promotion, delivery, and evaluation of exercise-based depression treatment options appropriate for students seeking treatment for depression from university mental health services.

1.1 Background on Depression

Major depressive disorder (MDD) (also referred to as depression) is a highly prevalent mental disorder and a growing population health issue. The World Health Organization (WHO) recognizes depression as the leading cause of disability worldwide and a major contributor to the global burden of disease (WHO, 2016). In Ontario, MDD is the largest contributor to the burden of disease associated with mental illness and addictions (Ratnasingham, Cairney, Rehm, Manson, & Kurdyak, 2012).
The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), is the accepted method used by mental health professionals in the classification of depression (American Psychiatric Association (APA), 2013). The important feature of MDD is the occurrence of one or more major depressive episode. To characterize a major depressive episode, practitioners use a list of self-reported or observed symptom-based criteria available within the DSM-5 (Table 1). These symptoms are also used to categorize the severity of depressive episodes, based on the impairment they can have on functional domains, such as family relationships, school and academics or work, peer relationships, stress or anxiety levels, suicidal ideation and other self-harm behaviours (American Psychiatric Association (APA), 2013).

Table 1. DSM-5 Symptom Criteria for Major Depressive Episode

| Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (1) or (2). |
|---|---|
| 1. Depressed mood most of the day, nearly every day |
| 2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day |
| 3. Significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month) or decrease or increase in appetite nearly every day. |
| 4. Insomnia or hypersomnia nearly every day |
| 5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down) |
| 6. Fatigue or loss of energy nearly every day |
| 7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick) |
| 8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others) |
| 9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide |

1.1.1 Depression among University Students

In 2012, the annual prevalence of adults (over the age of 18 years) experiencing a major depressive episode in Canada was 4.7% (Statistics Canada, 2012). However, young adults aged 15-24 years report higher rates of MDD than any other age group, with the annual prevalence for experiencing a major depressive episode in this cohort increasing from 6.4% in 2002 to 7.1% in 2012 (Statistics Canada, 2012). Epidemiological research on the age-of-onset of mental disorders using WHO World Mental Health survey data identifies that 75% of adults living with a mental disorder report an age-of-onset before 25 years of age (Kessler et al., 2007). Although
the age-of-onset distribution for mood disorders (including depression) is relatively large (18-43 years) (Kessler et al., 2007), depression in early adulthood contributes to an accumulation of negative consequences that can affect later adult life (Ratnasingham et al., 2012). Furthermore, the personal and social costs of depression are especially high in young adults. Early adulthood is a time where individuals are building their social networks, entering relationships, completing their academic careers and establishing themselves in the job market. Poor mental health may hinder the ability for these tasks to be completed successfully, and result in negative social and economic outcomes that extend into adulthood (Ratnasingham et al., 2012).

The onset and recurrence of depression in young adults have been found to co-occur with major life transitions causing high levels of stress, such as the completion of high school and entrance into the labour force or higher education (Ratnasingham et al., 2012). Furthermore, a greater number of life events experienced is also associated with increases in perceived stress and depressive symptoms (Mahmoud, Staten, Hall, & Lennie, 2012). Accounting for a large subsection of the young adult population, university students report experiencing multiple life events, such as trouble with academics, decreased closeness with family, trouble with home life and relationships, and major changes in sleep patterns and eating habits (O’Dougherty, Hearst, Syed, Kurzer, & Schmitz, 2012). In a recent systematic review of 24 studies, published between 1990 and 2010 reporting on the depression prevalence among university students, prevalence rates of depression were found to range from 10% to 85%, with a weighted mean prevalence of 30.6% (Ibrahim, Kelly, Adams, & Glazebrook, 2013). Therefore, university students experience rates of depression higher than those found in the general population. Furthermore, to assess the physical and psychological health needs of post-secondary students, the American College Health Association (ACHA) administers the National College Health Assessment (NCHA) each academic year. As reported in the Spring 2013 Canadian Executive Summary of the survey, 59.6% of students surveyed reported experiencing feelings of “hopelessness”, 44.4 % of students indicated that they felt “so depressed it was difficult to function” and, 13% of students reported that they were “seriously considering suicide” within a 12-month period (American College Health Association, 2016). Additionally, once an individual has experienced their first depressive episode, the chances of experiencing subsequent episodes increase exponentially (Kessing, 1998). Therefore, depression is a common mental health concern among university students, requiring urgent attention.
Despite being a socially advantaged population, university students are at higher risk of depression; given that the accumulation of stressful life events increases the risk of experiencing depressive symptoms (Mahmoud et al., 2012). On top of academic stress, student loans contributing to financial stress, disturbances in eating and sleeping habits, and changes in family and social relationships have also been reported by students and may contribute to poor mental health (Richardson, Abraham, & Bond, 2012). While stress may not be the direct cause of depression, the individual's ability to cope effectively with stressful situations may mediate the impact of stress on mental wellbeing. The transactional model of coping differentiates between two main stress-coping mechanisms, adaptive and maladaptive (Lazarus & Folkman, 1987). Adaptive coping involves actions that resolve the stressful situation and result in positive psychological and emotional adjustment. However, maladaptive coping behaviours results in a failure to resolve the stressful situation, and in young adult college students, is a primary predictor of depression, anxiety, and stress (Mahmoud et al., 2012). Further, the use of avoidance coping (e.g., procrastination, giving up of personal responsibility, restricting thoughts, and failure to assess and plan to resolve a situation)(Cohen & Lazarus, 1973) is also significant predictor of depressive symptoms, and frequently described by college students reporting high levels of family and college stress (Dyson & Renk, 2006).

Currently, universities are responding to an increase in the demand for mental health services (Hunt & Eisenberg, 2010; Storrie, Ahern, & Tuckett, 2010). For example, the University of Toronto reports that the number of students registering with Accessibility Services for reasons related to mental health doubled over a five-year period (2009-2014). Additionally, the number of unique patients seen each year by counseling services increased by 10% since 2009, with 4184 new patients seen in 2013/2014 (University of Toronto, 2014). The high prevalence of students with mental health concerns and the severity of the concerns students are presenting with to campus mental health services, supports the need to recognize university students as a vulnerable, at-risk population.

1.1.2 Challenges Associated with Access to Treatment

Although students can often obtain mental health services on campus, many campuses have limited services or have wait lists for services due to high demand. Results from a recent study evaluating the existing mental health services available at post-secondary institutions across Canada report that although counselling services are typically available, students may still face
challenges accessing these services (Jaworska et al., 2016). Furthermore, counselling sessions are limited, follow-up procedures are uncommon, and complete diagnostic assessments and the use of standardized diagnostic systems are rare (Jaworska et al., 2016). Students may also seek treatment from family physicians, and although many family physicians routinely screen patients for mental health issues, depression is often not detected, with estimates that up to 50% of people who seek treatment are not recognised as depressed (Cepoiu et al., 2008; Mitchell, Vaze, & Rao, 2009). Additionally, once depression is detected, family physicians report being frustrated by long waiting lists when attempting to refer patients for psychiatric treatment (Collins, Wolfe, & Joanne, 2006). Due to the pressures for psychiatrists to address only the most complex and critically ill patients, they may also decline referrals of patients with uncomplicated common mental disorders with the view they may be appropriately served by other resources within the mental health system (Goldner, Jones, & Fang, 2011).

The psychiatry waiting list survey, conducted between January 2013 and April 2013, provides data on the total wait time (between referral by a general practitioner and the time that the required elective treatment begins) for psychiatry (Barua & Esmail, 2013). Surveys were mailed to all specialists in the psychiatry category of the Canadian Medical Association’s membership (n = 3942). Although survey response rate was low (6%; n = 226), the results indicated that the median total wait time has risen from 17.8 weeks in 2012 to 20.3 weeks in 2013 to see a psychiatrist. Furthermore, median patient wait times to see a specialist, following a referral from a general practitioner, across Canada is 1.9 weeks for urgent referrals and 8.5 weeks for elective referrals (Barua & Esmail, 2013). However, the benchmark guidelines set for wait times for psychiatric care by the Wait Time Alliance (WTA) in Canada recommends that patients with MDD should be seen between 24 hours (in emergency cases) and within four weeks for scheduled cases (Wait Time Alliance, 2014). This is especially concerning given that high wait times result in barriers to accessing specialized services when required, and are likely to lead to delayed treatment, lost opportunities for early intervention, and suboptimal clinical outcomes (Goldner et al., 2011).

Research examining the use of mental health services among young adults meeting DSM-criteria for MDD reports a notable undertreatment of depressed young people, with approximately 22% of young adults, males more likely than females (50% vs. 15%), never consider contacting mental health services (Aalto-Setälä, Marttunen, Tuulio-Henriksson,
Poikolainen, & Lönnqvist, 2002; Wittchen, Nelson, & Lachner, 1998). The literature on mental health treatment-seeking behaviour in young adults suggests that in addition to provider factors (i.e., detection and wait-times), the undertreatment of depression is also associated with various patient-level factors (Gulliver, Griffiths, & Christensen, 2010). In young adults, the most significant barriers to help-seeking include stigma and embarrassment, problems recognising symptoms (poor mental health literacy), and a preference for self-reliance (Gulliver et al., 2010). Furthermore, in 2012, young adults accounted for 23% of individuals who perceived their needs for mental health care as partially met or not met at all (Statistics Canada, 2012). Although there have been apparent increases in the willingness of university students to access campus mental health services (Hunt & Eisenberg, 2010), young adults are among the age cohorts least likely to seek help for their mental health problems (Statistics Canada, 2012).

To quantify mental health service use in university students, Eisenberg, Golberstein, and Gollust, (2007) administered a web-based survey to a random sample of 2785 students and found that of students with positive screens for depression or anxiety, the proportion who did not receive any services ranged from 37% to 84%, depending on the disorder. Furthermore, the authors reported that a lack of perceived need, being unaware of services or insurance coverage, skepticism about treatment effectiveness, low socioeconomic background, and being Asian or Pacific Islander were all predictors for not receiving mental health services (Eisenberg, Golberstein, & Gollust, 2007). The barriers young adults and students face associated with seeking treatment for depression suggests that access to mental health treatment for students needs to be improved.
1.2 Management of Depression in Primary Care

Current guidelines for the management of depression in the primary care setting include several principal elements: (1) Active efforts to detect depression by conducting a thorough biopsychosocial assessment, using clinical scales. (2) Obtaining collateral information whenever possible. (3) Formulation of a diagnosis and differential diagnosis. (4) Establishing therapeutic alliance; (5) Supporting patient education and self-management. (5) Engaging the patient as a partner in determining treatment goals. (6) Construction of a comprehensive management plan, including safety, together with the patient and his or her family (or other supports) if possible. (7) Delivery of evidence-based treatments. (8) Monitoring treatment outcomes using measurement-based care (Lam et al., 2016). Furthermore, The Canadian Network for Mood and Anxiety Treatments (CANMAT), clinical guidelines for the management of MDD in Adults, identifies two treatment phases, acute and maintenance, in the management of MDD (Lam et al., 2016). The goals of the acute treatment phase are to eliminate symptoms of depression and restore psychosocial functioning; by establishing a therapeutic alliance, educating and supporting self-management, selecting and delivering evidence-based treatment(s), and monitoring the individuals’ progress (Lam et al., 2016). The goal of the maintenance treatment phase is to ensure a return to full function and quality of life and to prevent symptom recurrence; achieved by continually educating and supporting self-management, rehabilitation, treating comorbidities and monitoring for recurrence (Lam et al., 2016). However, the challenges associated with access to treatment as well as various limitations related to traditional depression treatments, pose as barriers to adequately following the “best-practice” depression management guidelines.

1.2.1 Depression Treatment and Associated Limitations

Two common and extensively researched first-line treatments for MDD include pharmacotherapy and psychotherapy. Pharmacological therapy is recommended for both the acute and maintenance phases of MDD management (Kennedy et al., 2016). In particular, second-generation antidepressants such as selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors, and other drugs that selectively affect the activity of neurotransmitters, play a prominent role in treatment (Kennedy et al., 2016). However, the effectiveness of antidepressant medications when compared to pill placebo control groups has
been found to vary widely based on initial depression severity (Fournier et al., 2010). To illustrate the magnitude of the difference between the two treatments as a function of initial depression severity; Fournier et al. (2010) conducted a recent meta-analysis of six studies comparing active antidepressant treatment with pill-placebo controls and divided the samples using symptom severity classifications based on Hamilton Depression Rating Scale (HDRS) (Hamilton, 1960) scores offered by the American Psychiatric Association (2000) (mild to moderate, HDRS score of 18 or less; severe, HDRS score of 19 to 22; and very severe, HDRS score of 23 or greater). Although the authors found a small to moderate effect size of $d = 0.47$ (95% CI, 0.22 to 0.71) in favour of antidepressant medication for patients in the very severe group (n = 283), for patients in the mild to moderate (n = 180; $d = 0.11$, 95% CI, -0.18 to 0.47 ) and severe (n = 255; $d = 0.17$, 95% CI, -0.08 to 0.43) groups the effect sizes were below the standard definition of a small effect ($d = 0.20$) (Cohen, 1977), for reductions in depressive symptoms at post-acute phase of treatment (Fournier et al., 2010). While the magnitude of benefit of antidepressant medication compared with placebo increases with the severity of depression symptoms, in patients with mild to moderate symptoms the benefit is minimal to non-existent (Fournier et al., 2010). Thus, current treatment options recommended for individuals with depression of mild severity include psycho-education, self-management, and psychological therapies (Kennedy et al., 2016).

A common psychotherapy also recommended for both acute and maintenance treatment phases of MDD is cognitive-behavioural therapy (CBT) (Parikh et al., 2016). CBT is an intensive, time-limited and symptom focused psychotherapy, based on the idea that depressive affect is maintained through distorted beliefs about the self, the world, and the future (Depression Health Center, 2014). In CBT, patients learn to recognize these automatic thinking patterns and are taught more adaptive ways of responding. CBT interventions focus on activating patient engagement in their environment and have been found to be effective in reducing symptoms of social withdrawal and increasing the individual’s feelings of mastery and pleasure (Depression Health Center, 2014). CBT has been shown to produce noticeable relief in about 65–70% of patients (Zu et al., 2014). In a recent subgroup analysis (five trials), conducted within a larger meta-analysis of CBT for adult depression, the effect of CBT was compared with pill-placebo controls, and was found to have a small and significant effect size of $g = 0.33$ (95% CI, 0.16-0.50, p< 0.001 ) in favour of CBT (Cuijpers et al., 2014).
In some cases, pharmacological therapy might be considered in the treatment of mild depression, due to a patient’s preference, previous response to antidepressants or lack of therapeutic response to non-pharmacological interventions (Kennedy et al., 2016). Notably, antidepressants are not recommended to be regularly used by people with persistent subthreshold depressive symptoms or mild depression in the first instance (Barbui, Cipriani, Patel, Ayuso-Mateos, & Van Ommeren, 2011). However, in the primary care setting, patients with MDD are often treated using antidepressant medications, although it may not always be the patient’s preference. For example, one study found that in 73% of cases, general practitioners prescribe antidepressant medication during the first visit in which depression is diagnosed (van Schaik et al., 2004). Furthermore, clinical practice guidelines recommend that the minimum duration of antidepressant treatment for MDD should be between 6-12 months (Kennedy et al., 2016). However, issues in medication adherence have been reported, where 30% of patients discontinue treatment at 30 days, and 40% or more discontinue treatment within 90 days (Olfson, Marcus, Tedeschi, & Wan, 2006). Although MDD in itself may reduce adherence to treatment, factors contributing to poor antidepressant treatment adherence include lack of response to treatment, the stigma associated with having a psychiatric illness and negative side-effects of medications (Olfson et al., 2006).

In patients treated for the first time, CBT with three months of maintenance is associated with lower rates of relapse when compared to patients treated with antidepressants (31% vs. 76%) (Vittengl, Clark, Dunn, & Jarrett, 2007). While there is evidence that patients treated with CBT, who have had successful acute-phase treatment for several months show low rates of relapse; stopping acute-phase CBT treatment results in a relapse rate of 54% within two years (Hollon et al., 2005). In most cases, CBT is delivered on a fee-for-service basis, and the associated costs of CBT treatment increases the risk for relapse (Parikh et al., 2016). However, a Cochrane meta-analysis (9 trials, N = 882) assessed the effectiveness of psychological and pharmacological interventions for preventing relapse or recurrence of depression after an initial episode in children and youth up to 25 years of age and found no difference in outcomes with either treatment (Cox et al., 2012). While the evidence suggests that pharmacotherapy and psychotherapy are both adequate treatments for depression, given their associated limitations, there is a growing interest in the role of alternative therapies in the treatment of depression.
1.3 Exercise for Depression

Firstly, it is important to differentiate exercise from physical activity. Although the terms may often be used interchangeably they have different connotations. Physical activity broadly encompasses participation in any movement that requires energy expenditure. On the other hand, exercise is planned, structured, repetitive, and intentional, usually with the purpose of maintaining or increasing health and fitness (Caspersen, Powell, Christenson, 1985). Currently, both the WHO (WHO, 2016) and the CANMAT guidelines (Ravindran et al., 2016) recommend implementing exercise into the standard treatment of MDD. Based on recent CANMAT guidelines, exercise is the only first-line alternative therapy recommended for the treatment of MDD of mild to moderate severity in Canada (Ravindran et al., 2016). Physical exercise has been shown to reduce the risk of developing depression (Mammen & Faulkner, 2013) and improve psychological well-being (Biddle & Mutrie, 2008). Furthermore, when used to treat depression, exercise can lead to improvements in prognosis and remission rates (Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005; Vittengl, Clark, Dunn, & Jarrett, 2007). Moderate intensity exercise is also suggested as a helpful and attractive adjuvant therapy for patients with treatment-resistant depression (Mota-Pereira et al., 2011). Current Canadian guidelines for exercise as a treatment for depression (Ravindran et al., 2016), recommend the administration of supervised moderate-intensity exercise sessions, lasting at least 30 minutes each, at least three times weekly, for a minimum of nine weeks (Stanton & Reaburn, 2014).

1.3.1 Efficacy of Exercise for Depression

Recent systematic reviews and meta-analyses examining the relationship between exercise and depression provide support for the effectiveness of exercise as a treatment for depression (Cooney et al., 2013; Ekkekakis, 2015; Kvam et al., 2016). In the most recent meta-analysis of randomized controlled trials (RCTs), Kvam et al., (2016) examined the efficacy of exercise as a monotherapy and as an adjunct intervention to antidepressant medication. Based on 23 trials (N = 977), Kvam et al. (2016) found that reductions in depressive symptoms after treatment showed a moderate to large and significant effect in favour of exercise g = 0.68 (95% CI, 0.92 to 0.44, p < 0.001). In trials comparing exercise to no intervention (4 trials; N = 77), Kvam et al. (2016) reported a large and significant effect in favour of exercise, g = 1.24 (95% CI, 1.83 to 0.65, p < 0.001). When exercise was compared to usual care (4 trials; N = 180) Kvam et al.'s,
(2016) analysis yielded a moderate and significant effect in favour of exercise, $g = 0.48$ (95% CI, 0.80 to 0.16, $p < 0.001$). Furthermore, Kvam et al., (2016) reported that the effects of exercise when compared to psychological treatments (3 trials; N = 79) or antidepressant medication (3 trials; N = 236) were small and not significant ($g = -0.22$, 95% CI, -0.65 to 0.21, $p = 0.370$ and $g = -0.08$, 95% CI, -0.33 to 0.18, $p = 0.55$) respectively. When exercise combined with antidepressant medication was compared with medication only, Kvam et al., (2016) included four studies (N = 188) in the analysis, yielding a moderate but nonsignificant effect in favour of the combined treatment ($g = -0.50$, 95% CI, -1.10 to 0.11, $p = 0.11$). The results from Kvam et al.’s (2016) meta-analyses are promising and provide evidence that exercise is an efficacious treatment compared to no treatment and that the beneficial effects of exercise do not differ from established treatments for depression (i.e., pharmacotherapy and psychotherapy).

However, methodological challenges within the exercise and depression literature make comparisons between studies difficult due to variations in assessment, diagnosis, and severity of depression. Furthermore, the setting for delivery, the size of the sample, outcomes of interest and the nature of the intervention delivered (type, frequency, and duration of the intervention) may also influence the antidepressant effect of the exercise intervention and limit the interpretation of the results. For example, in the most recent Cochrane systematic review which evaluated the effectiveness of exercise for depression, when exercise was compared with a ‘control’ intervention (i.e., standard treatment, no treatment or a placebo treatment) (35 trials; N = 1356), the authors reported an overall pooled standardized mean difference (SMD) of -0.62 (95% CI: -0.81 to -0.42), indicating a moderate clinical effect size in favour of exercise (Cooney et al., 2013). However, in a critical appraisal of the exercise for depression literature, Ekkekakis (2015) conducted a re-analysis of the studies included in the Cochrane systematic review (Cooney et al., 2013), with reasonable modifications employing strict trial inclusion and exclusion criteria, and reported a large pooled SMD of -0.90 (95% CI, -1.11 to -0.69) compared to the medium SMD of -0.62 (95% CI, -0.81 to -0.42) reported by the Cochran review. Furthermore, reported by the Cochrane review, when only trials that the authors considered to have adequate allocation concealment, intention-to-treat analysis, and blinded outcome assessment were included in the analysis (6 trials; N = 464), the pooled SMD reported was -0.18 (95% CI: -0.47 to 0.11), indicating a small effect size in favour of exercise. However, when limiting the analysis to only two “high-quality” trials with pill placebo controls and only considering patients with depression diagnosis at baseline, Ekkekakis (2015) reported a pooled
SMD of -0.40 (95% CI -0.76 to -0.04) indicating a small to moderate clinical effect size in favour of exercise which is comparable to the effect of pharmacotherapy and psychotherapy on reducing depression (Pim Cuijpers et al., 2014).

Additionally, the literature on the long-term benefits of exercise in the treatment of depression is still unclear, with recent meta-analyses finding only small effect sizes for the long term benefits of exercise on depression. Reported in the Cochrane review, pooled data from trials (8 trials; N = 377) that provided long-term follow-up data on mood found a small effect size in favour of exercise on the reduction of depressive symptoms (-0.33, 95% CI -0.63 to -0.03) (Cooney et al., 2013). Similarly, Kvam et al., (2016) included seven studies (N = 348) in their analysis of follow-up studies and the controlled effect of exercise on depressive symptoms after treatment in follow-up studies identified was also small and nonsignificant, g = 0.22 (95% CI, 0.53 to 0.09, p = 0.16).

The literature suggests that exercise is an effective intervention for depression when compared to multiple control conditions. Furthermore, the effect of exercise as an independent treatment is evident, and relatively large when compared to no intervention. Therefore, exercise may serve as an alternative for patients who do not respond to traditional treatment options or for individuals who are on waiting lists to receive specialized treatment. However, the lack of studies of the highest methodological quality, and including long-term follow-up, complicates the interpretation of the evidence-base. An important challenge is also the lack of ‘effectiveness’ studies. Existing evidence supports the ‘efficacy’ of exercise as an antidepressant, yet it is not clear how exercise treatment would be implemented in practice. These challenges likely restrict the availability of exercise as a treatment option in primary care settings.

1.3.1.1 Exercise Interventions for Students with Depression

There is a limited body of research investigating the efficacy of exercise interventions for alleviating depressive symptoms in students. Table 1 provides an overview of seven trials (including pilot studies and randomized controlled trials) that reported on the effects of exercise interventions on depression levels in student populations (Hemat-Far et al., 2012; Kim et al., 2004; Mailey et al., 2010; McCann & Holmes, 1984; Nabkasorn et al., 2005; Orth, 1978; Reuter et al., 1984; see Table 1).
The literature on the effects of exercise interventions on students' levels of depression is promising with the majority of studies reporting significant differences between intervention and control groups for reductions in depression (Hemat-Far et al., 2012; Kim et al., 2004; McCann & Holmes, 1984; Orth, 1978; Reuter et al., 1984), while the remaining two trials report small effect sizes in favour of exercise (Mailey et al., 2010; Nabkasorn et al., 2005). However, it should be noted that in one study (Mailey et al., 2010), an online physical activity counselling intervention was administered that offered no supervised exercise sessions and participants were already receiving counselling from campus mental health services. Similarly, Nabkasorn et al., (2005) compared an exercise group to a usual care group. The terms “no intervention”, “waiting list”, and “usual care” have been used interchangeably in previous reviews and studies (Kvam et al., 2016). Although this is common practice, including individuals receiving treatment complicates the interpretation of results, as exercise compared to other treatments is likely to yield smaller effect sizes than if exercise is compared to no intervention.

Furthermore, the trials of exercise interventions in students are hampered by limitations. Definitive conclusions on the efficacy of exercise interventions on students’ depression levels are difficult to make given that all of the trials employed self-reported depression outcome measures and did not distinguish between depressive symptoms and depression as a diagnosis fulfilling certain diagnostic criteria (i.e. based on the DSM). Further, studies in student populations also exhibit poor generalizability, as the majority of trials consist of small sample sizes (ranging between N= 11 to N = 59), report biases in the selection of the sample (some trials included students with and without depression) and the majority of the trials consist of only female participant samples. Comparisons between trials are also difficult given variations in the nature of the exercise interventions delivered. Although the majority of studies had an aerobic exercise group, the level of support provided (i.e., supervised vs. non-supervised exercise), the opportunity for social interaction, and the length of the interventions varied.
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>McCann &amp; Holmes¹, 1984 USA</strong></td>
<td>N = 47</td>
<td><strong>Depression Measure</strong>: Beck Depression Inventory</td>
</tr>
<tr>
<td>RCT (parallel group)</td>
<td>Age: No details of age</td>
<td><strong>Intervention</strong>:</td>
</tr>
<tr>
<td></td>
<td>Gender: 100% Female</td>
<td>1. Aerobic exercise: group running, jogging or dancing for 1 hour twice weekly for 10 weeks (n = 16 randomised)</td>
</tr>
<tr>
<td></td>
<td>Female: n = 47</td>
<td>2. Placebo control group: muscle relaxation for 15 - 20 minutes 4 times a week (n = 15 randomised)</td>
</tr>
<tr>
<td></td>
<td>Male: n = 0</td>
<td>3. Waiting list control (n = 16 randomised)</td>
</tr>
<tr>
<td></td>
<td>Description: Self-reported depression; Undergraduate psychology students with a requirement to participate in a research project</td>
<td><strong>Results</strong>: subjects in the aerobic condition showed reliably lower reductions in their depression scores than did subjects in either the placebo condition or the no treatment condition, with only one participant drop out from the exercise group.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Limitations</strong>:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Depression levels were below sixteen on the BDI, and there was no clinical interview to confirm the diagnosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4/47 withdrew (1 from the aerobic exercise, 1 from the placebo condition and 2 from the 'no treatment' condition).</td>
</tr>
</tbody>
</table>

| **Nabkasorn et al.¹, 2005 Thailand** | N = 59 | **Depression Measure**: Center for Epidemiological Studies Depression Scale |
| **RCT (16-week two-way crossover trial)** | Age: 18 to 20 years | **Intervention**: |
| | Gender: 100% Female | 1. Group jogging 50 minutes a day 5 days a week for 8 weeks (n = 28) |
| | Female: n = 59 | 2. Usual care (n = 31) |
| | Male: n = 0 | **Results**: A reduction in depressive symptoms among participants in both groups was observed following the intervention. However, the effect size was small (Cohen’s d = 0.27). |
| | Description: Student nurses with mild to moderate depressive symptoms | **Limitations**: |
| | | - Self-report depression |
| | | - Program attrition: 7/28 in jogging group not available at follow-up, 3/31 in control group not available for follow-up |
| | | - In the course of the 40 sessions, the subjects in group A exercised an average of 31.3 ± 0.6 sessions, and those in group B, 29.5 ± 0.7 sessions. |

| **Kim, Cohen, Oh, & Sok³, 2004 Korea** | N = 54 | **Depression Measure**: Depression Screening Instrument |
| **RCT (assessor blinded)** | Age: 19 to 24 years | **Intervention**: |
| | Gender: 100% Female | 1. Experimental group: An Oriental Qi exercise to be done for a total of 30 minutes per session for 12 sessions (2 times a week) over 6 weeks with a meridian exercise instructor (n = 26 randomized) |
| | Female: n = 54 | 2. Control group (n = 28 randomized) |
| | Male: n = 0 | **Results**: The effects of meridian exercise on depression, was statistically significant (t= -8.814, P = .000) between the experimental and control group. |
| | Description: n = 48 (75.8%) subjects were not depressed, and n = 6 (11.0%) subjects had depressive symptoms. | **Limitations**: |
| | | - Self-report depression, only 6 participants were classified as having depression (n=3 exercise; n=3 control) |
| | | - No data provided on adherence or drop-outs although authors mentioned that any participant who was absent for more than 2 sessions was eliminated from data analysis |
RCT
USA
1984
Harris
Mutrie, & Reuter,
RCT
Iran
al
Hemat
armed


Depression Measure: Beck Depression Inventory

Intervention:
1. Intervention condition: Provided with pedometer, access to a website which featured a series of four modules based on social cognitive theory principles on a biweekly basis and attended two monthly meeting with physical activity counselors during the course of the 10-week intervention (n = 24 randomized)
2. Control condition: Standard care; continued to receive mental health counselling across the 10-week period (n = 23 randomized)

Results: Intervention effects on depression were not significant (Cohen’s $d = 0.12$), however, correlation analyses showed increases in physical activity were associated with increases in exercise self-efficacy ($r = 0.62$) and barriers self-efficacy ($r = 0.63$) and decreases in depression ($r = -0.44$) in the intervention condition, but not in the control condition. 90% retention.

Limitations:
- Participants were having mental health counselling, but there is no statement that they had to have depression to enter the study

Orth¹², 1978
USA
RCT (4-armed)

Depression measure: Depression Adjective Checklist

Intervention:
1. Jogging 5 times a week for 30 minutes over 4 weeks (n = 3)
2. Meditation (n = 3)
3. Self-chosen activity (n = 3)
4. Self-monitoring (control) (n = 2)

Results: subjects in the aerobic condition showed reliably lower reductions in their depression scores than did subjects in either the placebo condition or the no treatment condition.

Limitations:
- Self-report depression
- All participants completed the intervention, however, no adherence data was provided.

Hemat-Far et al.¹, 2012
Iran
RCT

Depression Measure: Beck Depression Inventory score

Intervention:
1. 40 - 60 minutes of running, 3 times a week, supervised. (n = 10)
2. Control group with no active intervention (n = 10)

Results: Depression decreased 33.6% than pre-test to a significant effect ($t(4.23), p=0.002$)

Limitations:
- Clinician judgment used to recruit
- Self-report depression outcome measure
- No discussion on attrition rate

Reuter, Mutrie, & Harris¹², 1984
USA
RCT

Depression Measure: Beck Depression Inventory

Intervention:
1. Supervised running for at least 20 minutes, 3 times a week for 10 weeks plus counselling (n= 9)
2. Counselling only (n= 9)

Results: Findings were in favour of exercise on reduction in depression symptoms post-treatment (SMD -0.99 [ 95% CI, -3.19, -0.82 ])

Limitations:
- Self-report depression outcome measure
- No data provided on adherence or drop-outs although trial was considered ‘high risk’ for attrition bias by Cochrane review

Notes: * Included in Cochrane Review. ¹¹ Data from Cochrane review used to report results; if not specified, results reported from published article. ²² Excluded from Cochrane review.
1.4 Study Rationale

With the high prevalence of depression in university students and the need for improving access to depression treatment and care on university campuses, the case for exercise as a treatment option for depression shows potential. Furthermore, the possible advantages of exercise as a beneficial treatment option for MDD in the university mental health services setting are attractive in many ways, as exercise may provide access to an inexpensive therapy that brings several health benefits and improves general well-being. Exercise also has the potential to provide students with an immediate anti-depressive treatment option, without adverse side-effects of antidepressant medications, and has the potential of filling the gap of approximately three to four weeks for individuals placed on wait-lists to receive specialized therapy.

Overall, the research suggests that exercise can improve depressive symptoms in both clinical and non-clinical depressed individuals. The new CANMAT guidelines recommend exercise as a first-line treatment for depression of mild to moderate severity based on current evidence from clinical trials (Ravindran et al., 2016). However, the research on the effect of exercise in reducing symptoms of depression in student samples is limited, with many trials reporting small effects on reductions in depression symptoms, exhibiting poor generalizability due to small sample sizes, and reporting variations in the nature of the interventions delivered. Therefore, there is a need to explore students’ acceptability and preferences for engaging in exercise as a potential treatment for depression; before the development and promotion of an effective exercise program in the treatment setting can occur.

1.4.1 Applying a Pragmatic Approach

The Aptitude-treatment interaction (ATI) paradigm holds the assumption that individuals with certain qualities and characteristics will do better in some forms of therapy than others (Snow, 1991). Research conducted within the ATI framework may help inform an individual’s acceptability of treatment as it provides a pragmatic approach to identifying potential variables that may predict differences in treatment responsiveness (Caspi & Bell, 2004). Insights derived from research applying an ATI framework may also be of particular use to clinicians in selecting the most suitable treatment for their patients (Dance & Neufeld, 1988). Therefore, applying the ATI paradigm may be especially useful in the case of recommending exercise to
individuals for the treatment of depression, where persons with certain characteristics might be more inclined to engage and benefit from exercise as a therapy compared to others.

Snow (1991) highlights that aptitude can refer to any measurable personal characteristic needed as preparation for successful or unsuccessful response to treatment. Therefore, there is a multitude of potential ‘aptitudes’ or characteristics that individuals possess, and are related to their beliefs, attitudes, motivation and preferences, to name a few. Applying an ATI approach to exploring students’ perceptions and preferences for exercise as a potential treatment for depression, can also assist in identifying treatment-related variables or characteristics (e.g., treatment setting, structure, delivery). Exploring individuals’ characteristics can further help determine how exercise interventions need to be adapted in order to increase the acceptability, potency, and cost-effectiveness of exercise-based depression treatment options (Caspi & Bell, 2004).

This study applies a qualitative approach, guided by the ATI research framework, to explore students’ views, beliefs, attitudes and preferences for exercise in the context of depression management and treatment to contextualize students’ perceptions of exercise in the treatment setting. Through exploring issues related to the exercise perceptions of those seeking treatment for depression and interested in exercise, it is believed a more effective exercise intervention can be developed, promoted and delivered to students potentially most responsive to the antidepressant benefits of exercise.
1.5 Study Objectives and Research Questions

The study’s main objective is to explore students’ acceptability and preferences regarding exercise as a potential treatment for depression in the university setting. Specific research questions include:

1. Is exercise considered an appropriate treatment option by students seeking treatment for depression?
2. Are there patient characteristics that are associated with perceiving exercise as acceptable?
3. If exercise is considered acceptable, what are preferences regarding the delivery of exercise as treatment?

The study objectives and research questions informed the topics covered in the interview guide and provide the underlying framework for data analysis. The study findings will form the groundwork for the development of effective exercise interventions for students seeking treatment for MDD and contribute to the expansion of the exercise for depression and ATI based literature.
1.6 Review of the Literature

The main focus of this study concerns the perceptions and preferences held by students regarding exercise as a potential treatment for depression. Although no research to date has explored this specifically, this section provides an overview of the relevant literature in the field of exercise and physical activity for mental health and depression. First, a brief overview of the possible mechanisms that may mediate the antidepressant effect of exercise in individuals with depression provides a background on the benefits of promoting exercise participation in students with depression. The literature on the uptake and participation of individuals with depression and mental illness referred to exercise and physical activity programs was also reviewed to contextualize the need for further research on the acceptability of exercise for individuals seeking treatment for depression. A consideration of the qualitative literature on the experiences of mental health service users participating in physical activity and exercise interventions provided a further understanding of the possible factors associated with why individuals engage in exercise for depression. Additionally, the qualitative literature was examined to explore the exercise and physical activity attitudes, barriers, and motivation of individuals with depression and provides the rationale to explore students’ perceptions and expectations for exercise as a treatment for depression. Lastly, literature concerning the exercise preferences of individuals with depression is presented to contextualize the need to explore students preferences for exercise as a treatment for depression. This review is essential for identifying potential factors that may influence an individuals’ interest in exercise as a treatment for depression and provides guidance on conducting research exploring the acceptability and preferences for exercise as a potential treatment for depression in university students.

1.6.1 Mechanisms

The relationship between exercise and improved physical and mental health is well established in both healthy populations and also in patients with long-term chronic conditions such as heart disease and diabetes (Penedo & Dahn, 2005). Current evidence suggests that biochemical, physiological and psychological mechanisms may mediate the relationship between exercise and depression to explain the beneficial effects of exercise on MDD (Blake, 2012; Crone, Smith, & Gough, 2006; Faulkner & Carless, 2006; Fox, 1999).

Exercise has been attributed to biochemical changes in endorphin levels leading to feelings of euphoria and positive effects on monoamine (noradrenaline, dopamine, and serotonin) levels
affecting arousal and attention (Crone et al., 2006; Faulkner & Carless, 2006). Additionally, in adolescent females, exercise has been shown to have positive effects on mood and depression symptoms due to reductions in levels of the stress hormone cortisol (Nabkasorn et al., 2006). However, high-intensity levels of exercise are required to release endorphins from exercise participation, and there is limited research on the role of exercise on the effect of changes in hormone levels on psychological functioning (Carless & Sparkes, 2008; Crone et al., 2006; Nabkasorn et al., 2005). Regarding physiological mechanisms linked to improvements in mental health, exercise has been identified through epidemiological studies, to impact physical health through improvements in cardiovascular fitness, leading to improved overall health and quality of life. However, the link between improvements in physiological functioning and psychological status investigated in experimental studies is considered weak (Biddle & Mutrie, 2008).

The psychosocial mechanisms that have received attention in behavioural psychology are those of distraction, self-efficacy, mastery, self-esteem and social interaction (Craft, 2005; Crone et al., 2006; Fox, 1999). Engaging in exercise has been proposed as providing a distraction from negative thoughts and everyday life stress, reducing levels of rumination, thus contributing to reduced depressive symptoms (Craft, 2005). Self-efficacy, the degree of confidence one feels to meet the challenge at hand, has also been proposed as one mechanism by which exercise may help reduce symptoms of depression (Bandura, 1994; Blake, 2012; Craft, 2005). Self-efficacy refers to the belief that one possesses the necessary skills to complete a task as well as the confidence in accomplishing the task to the desired outcome (Bandura, 1994). According to Bandura (2010), for an intervention to lead to enhanced self-efficacy and contribute to feelings of mastery, programs must be designed to teach the individual how to self-monitor behaviours, set goals, and utilize social support to maintain the desired behaviours. Furthermore, exercise interventions may provide an effective mode to enhance efficacy beliefs based on providing individuals with a meaningful mastery experience. For example, by overcoming a challenging exercise related task, there may be an elevation in independence, success and a sense of control (Knapen, Vancampfort, Morien, & Marchal, 2014). Therefore, participation in an exercise intervention and the successful adoption of exercise may lead to a positive effect on mood, self-confidence, and sense of ability, impacting a person’s autonomy and their ability to cope with life (Craft, 2005; Crone et al., 2006; Faulkner & Carless, 2006). Additionally, it is possible that the antidepressant properties of exercise are related to enhanced feelings of efficacy that result from this mastery experience transferring into everyday life and leading to improved mental
Furthermore, improvements in self-esteem have also been reported and suggest that engaging in exercise helps enhance perceived physical competencies (e.g., physical endurance), and changes people’s perceptions of their physical self and identity in a positive way (Fox, 1999). In particular, for those who are initially low in self-esteem, this extends to more generalized changes in the self, leading to greater global self-esteem (Biddle & Mutrie, 2008; Fox, 1999). Lastly, social interactions involved in engaging in activity in supportive exercise settings, especially for socially excluded groups such as those with depression, provides individuals with the opportunity to engage in forming social relationships and lead to improvements in self-esteem and life satisfaction (Biddle & Mutrie, 2008; Crone et al., 2006; Fox, 1999).

While suggested mechanisms (i.e., biochemical, physiological and psychosocial improvements) may contribute to reducing symptoms of depression; there is no consensus as to what is exactly explaining the antidepressant effects of exercise. Moreover, although exercise may exert a positive influence on an individual’s quality of life through the interplay of plausible mechanisms; these benefits are subjective, vary across populations and are difficult to measure. Acknowledging that the relationship between exercise and improvements in mental health is complex and interrelated with physiological, biochemical and psycho-social aspects, there is a growing body of qualitative literature that has investigated the experiences of exercising. For example, Crone and colleagues (2006) suggest that the actual process of engaging in exercise may be influential in reducing symptoms and improving well-being. The qualitative literature on the experiences of individuals with mental illness participating in exercise interventions is further explored in section 1.6.3, providing more detailed insights into the benefits of exercise participation on well-being and depression symptoms.

1.6.2 Exercise and Physical Activity Recommendations and Referrals

Exercise is recommended to health professionals as a suitable intervention in the treatment of individuals with depression (Mental Health Foundation, 2005; Ravindran et al., 2016). In Canada, integrating exercise into mental health services in the form of a structured referral is currently recommended as an important strategy, although this has yet to be implemented. A search for possible interventions promoting exercise for mental health patients on the Public Health Agency of Canada- Best Practices Portal returns no evidence-based programs available for physicians to suggest to patients. Current interventions available are targeted predominantly
to seniors, for smoking cessation, youth fitness, and individuals living with chronic physical health conditions (i.e., obesity, osteoporosis, heart disease and diabetes). The only intervention targeting mental health concerns is a program promoting yoganic meditation for family dementia caregivers with depressive symptoms (Lavretsky et al., 2013). While exercise is considered an important part of promoting a healthy lifestyle, many physicians highlight barriers to promoting exercise in the clinical setting such as lack of time and the necessary skills to prescribing exercise for their patients (Petrella & Wight, 2000). Furthermore, conclusions from a recent study on lifestyle change recommendation in major depression highlight that written recommendations are not enough for patients with depression to benefit from (Serrano Ripoll et al., 2015). Results from this study also found that taking up a recommendation to exercise is highly dependent on how the recommendation is presented to individuals and their perceptions of the level of support available for implementing the recommendation (Serrano Ripoll et al., 2015).

Predominantly found in the UK, exercise opportunities for individuals with mental health problems are activity promoted within mental health services (Mental Health Foundation, 2005). Exercise referral schemes involve the referral of patients by health professionals to a leisure provider to participate in an exercise program under the supervision of exercise professionals (Mental Health Foundation, 2005). However, the participation rates of individuals referred to exercise for mental health are lower than those of individuals referred for physical health (Crone, Johnston, Gidlow, Henley, & James, 2008). Crone, Johnston, Gidlow, Henley, & James (2008) compared the uptake, attendance, and completions rates between individuals referred to exercise for physical health (n= 2767) and mental health (n = 134) using data from a UK physical activity referral scheme between 2000 and 2003. The authors reported that although initial progression rates were similar between the groups (94% vs 90%), referral uptake (60% vs. 69%; p < 0.001) and programme completion (22% vs. 34%; p < 0.001) were significantly lower in the mental health referrals (Crone et al., 2008). Therefore, referrals to exercise may be less suited to meet the needs of mental health patients and require more research to identify the factors that support an individual in participating in exercise once referred by a physician. A review of the qualitative literature on the experiences of individuals involved in exercise and physical activity interventions provides some understanding of how perceptions influence the motivation of mental health service users and people with depression to take part in exercise interventions.
1.6.3 Participant Experiences of Exercise for Mental Health Programs

The proposed mechanisms for the effects exercise can have on depression have been primarily studied through quantitative outcome research focused on symptomatic improvement (Fox, 1999). Qualitative studies exploring exercise intervention experiences can potentially provide a more in-depth understanding of how and why exercise can help with depression recovery. Understanding participation from a service user perspective is pertinent. Involving individuals in research provides the “voice of first-hand experience” to promote the positive contributions that exercise can have on a person’s quality of life and recovery from mental illness (Crone, Smith, & Gough, 2005; Crone, 2007).

In a thematic review of thirteen published qualitative studies on mental health and physical activity interventions, Mason and Holt (2012) identify main themes within mental health service users’ experiences and perceptions of exercise interventions that act as mechanisms influencing motivation to participate in the exercise intervention. Contextualizing the experiences of individuals involved in mental health and physical activity interventions, Mason and Holt (2012) highlight the expression of six common themes across participant accounts within the studies. These themes included, the socially inclusive and non-stigmatizing environment of physical activity and exercise interventions, a sense of meaning, purpose and achievement, the role of facilitating personnel, improved symptoms, feeling safe and positive changes in self-identity through the development of an exercise identity (Mason & Holt, 2012). However, this review included samples of mental health services users with a variety of mental illnesses, including ‘severe mental illness’, depression and schizophrenia (Mason & Holt, 2012). Furthermore, this review included exercise programs that varied in their structure, activity intensities and delivery. Interestingly, out of a total of 70 participants included in the review, only 17 were female; this is in contrast to samples from quantitative studies on the preferences for exercise as a treatment for depression, where the majority of the samples are female (Busch et al., 2016; Carpiniello, Primavera, Pilu, Vaccargiu, & Pinna, 2013). However, by conducting interviews our understandings of the mechanisms that may play a role in the positive impacts of exercise on mental wellbeing go beyond the purely physical health-related factors, and also extend beyond traditional psychological factors (i.e., self-efficacy and self-esteem). Thus, these themes are important to consider when exploring an individual’s perceptions of exercise for the treatment of depression, although, experiences and perceptions may differ between populations and exercise intervention structure. Therefore, qualitative studies exploring the experiences of
mental health service users (Crone, 2007) and individuals with depression (Faulkner & Biddle, 2004; Searle et al., 2014) participating in exercise and physical activity programs were further considered. Findings from the three qualitative studies are described below to capture the variety of the perceptions and experiences of individuals participating in exercise programs for mental health (Crone, 2007; Faulkner & Biddle, 2004; Searle et al., 2014).

In a qualitative investigation by Crone (2007), the experiences of two male and two female mental health services users participating in a walking project were explored using semi-structured interviews. Themes were identified using grounded theory methods and included attitudes regarding the project, factors affecting participation, attitudes and opinions of the project, perceived benefits and outcomes of participation and participant experiences. Participants reported positive attitudes attributed to the areas visited during the walking program described as “areas of outstanding natural beauty” and noted they enjoyed that their walks often featured engaging educational talks. One of the main benefits perceived by the participants was the opportunity to meet and be with others, and participants in the study described their experience as a purposeful activity and a sense of doing something to keep them busy. Factors that appeared to facilitate attendance were related to the known benefits that the participants expected to receive such as, enjoyment and companionship and the opportunity to get away from their “normal” environment. Crone (2007) also reported that the role of the organizers of the walks was also important as facilitators were appreciated for doing their job well and commended on their qualities such as being approachable, nice and able to cope with the diverse needs of the individuals. The role of facilitators was discussed as a major factor contributing to participants expressing their interest in continuing their involvement in the walking project.

To contextualize participant adherence to an exercise on prescription scheme, Faulkner and Biddle (2004), conducted repeated semi-structured interviews over a one-year period with six mental health service users. Through thematic and narrative analysis, the authors reported on the experiences of two males and one female with depression to give a longitudinal perspective on the role of physical activity in the lives of participants, and how this changed over time. This allowed for a closer rapport and understanding of participants’ experiences. Participants were categorized on the basis of exercise adherence over the year (initial enthusiast, slow starter, and regular attendee) and key themes influencing adherence included perceived benefits of exercise, barriers experienced, and the importance of contextual events which facilitated or hindered
attempts to be active. Exercise was seen as an important coping strategy in the recovery from depression rather than as a treatment, although all individuals reported that physical activity was associated with positive mood, providing structure to their day and a sense of accomplishment. Further, the exercise scheme was viewed as promoting social interaction by the “slow starter” participant. Barriers identified were similar to previous studies and included symptoms, lack of time, poor physical and emotional health and low motivation. In addition, Faulkner and Biddle's (2004) longitudinal methodology was able to identify life events that had an impact on subjective well-being, such as changes in employment status, associated with increases or decreases in physical activity. The authors also point out the mediating effects life events can have on psychological well-being. This study further demonstrated the importance of understanding participant’s lives through a wider context by consideration of environmental, interpersonal and intrapersonal factors in order to understand the relationship between participation in exercise and depression (Faulkner & Biddle, 2004).

Similar to the results reported by Crone (2007), Searle et al., (2014) identified how the quality of program facilitator engagement could positively influence participant engagement in physical activity interventions through the social support they provide. In Searle et al.'s (2014) study, the authors explored the experiences of facilitated physical activity for the management of depression in primary care. Participants were interviewed at two-time-points, first at four months (n=19) and again at eight months (n=12). Using a grounded theory framework, the authors identified themes that enhanced engagement in physical activity and the importance of a supportive non-judgmental relationship with physical activity facilitators. The authors also found that participants preferred initial face-to-face contact to be made prior to the transition to more remote delivery techniques such as through telephone (Searle et al., 2014). Although participants viewed the phone calls as regular motivational prompts for self-reflection and affirmation of the progress towards engaging in physical activity, this also highlights that individuals may become reliant on phone calls as a means of sustaining the relationship with the facilitator (Searle et al., 2014). The participants in this study had engaged well with the facilitation in both the face-to-face and telephone contexts and had perceived physical activity facilitators to be participant-centered. The importance placed on the quality of program facilitators sheds light on the attitudes and expectations individuals may have of program facilitators. Overall, these studies highlight potential preferences for supervision and ongoing support in exercise treatment interventions.
1.6.4 Views, Attitudes, and Barriers to Exercise

Attitudes and perceived barriers towards exercise participation are important factors that may influence perceptions of exercise as a treatment for depression. Depression is associated with low levels of physical activity, attributed to the effects of depression on motivation to engage in healthy lifestyle behaviours (Biddle, 2000). The physical symptoms of depression such as lethargy and fatigue, and the emotional symptoms such as low confidence, are also viewed as a hindrance to physical activity participation by individuals with depression (Searle et al., 2011). Furthermore, depressive symptoms experienced by patients have been found to influence their views on exercise participation. For example, physical activity is considered by some depressed patients as an alternative coping mechanism, that can be tried after stabilization using antidepressants (Faulkner & Biddle, 2004).

Negative past exercise experiences, poor body image, and low energy have also been identified as demotivating factors associated with attempting to engage in physical activity and contribute to barriers to being physically active in individuals with depression. These issues have been attributed to ability and confidence, and tend to be reported by low active females (Azar et al., 2010; Searle et al., 2011; Seime & Vickers, 2006). For example, in a study of physical activity correlates in young women with depressive symptoms, the authors conducted semi-structured interviews with a sample of 40 young women (aged 18-30 years; 20 with depressive symptoms and 20 without depressive symptoms) (Azar et al., 2010). Using thematic analysis, and guided by the social-ecological model, the authors identified common themes that were found to hinder physical activity participation in women with depression (Azar et al., 2010). Women with depressive symptoms particularly described negative physical activity experiences during their youth, more barriers to physical activity, participating in more spontaneous than planned activity, lower self-efficacy for physical activity, and being influenced by their friends' and family's inactivity (Azar et al., 2010). The findings from this study suggest that interventions designed to promote physical activity in women with depression should consider strategies that help participants overcome negative early life experiences, engage support from family and friends, and promotes planning for activity in advance (Azar et al., 2010).

In an exploration of patients’ views of physical activity for the treatment of depression in the context of primary care, Searle et al. (2011) conducted in-depth interviews following a semi-structured topic guide, with 33 adult participants (57.5% female) in a RCT examining exercise
and depression, who had either started taking antidepressants or were not on medications. The researchers assessed the effectiveness of physical activity for the management of depression and emerging themes were summarized using a framework approach (Searle et al., 2011). Most of the participants in their study perceived physical activity to be an acceptable treatment for depression. The participants in their study also had a general awareness that physical activity could be an effective means of managing depression, and they found that these views were informed anecdotally through the media and participants’ individual experiences (Searle et al., 2011). Furthermore, mechanisms by which physical activity could enhance mood were described by participants as personal benefits based on the belief about the cause of their depression (Searle et al., 2011). Participants who had been classified as ‘medium’ or ‘high’ active individuals at the entry of the study were found to believe that aerobic activities would be helpful for depression. These participants usually cited a biochemical imbalance in the brain as a cause of depression, and it was apparent that they believed enhanced mood could be achieved through a biochemical pathway (Searle et al., 2011). Participants also considered lower intensity activities as helpful for enhancing mood, due to having a relaxing or meditative quality (Searle et al., 2011). Participants citing situational factors as a cause of depression were more likely to suggest that lower-intensity activities, such as walking, could be helpful as a means of distraction. However, the authors note that the generalizability of their study findings, “may be limited, as participants were primarily white British, and depression is known to affect individuals of all ethnic backgrounds who may have different views” (Searle et al., 2011, p. e55).

1.6.5 Preferences for Treatment

Patient treatment preference is associated with factors such as beliefs about the causes of depression, the efficacy of treatments available, social support and the ability of the patient to engage in treatment through access, availability, and associated costs. In the primary care setting, providing patients with their preferred depression treatment has been associated with higher adherence rates and better outcomes (Kwan, Dimidjian, & Rizvi, 2010). Kwan, Dimidjian, & Rizvi’s (2010) study examined the effects of depression treatment preference on attrition, adherence, and change in depressive severity in a longitudinal randomized clinical trial comparing pharmacotherapy and psychotherapy. Before randomization, 106 individuals with MDD reported whether they preferred psychotherapy, antidepressant medication, or had no preference. The findings from this study identified that a mismatch between preferred and actual
treatment is associated with greater likelihood of attrition, fewer expected visits attended, and a less positive working relationship (Kwan et al., 2010). Similarly, matching preferences within the context of exercise have also been found to influence exercise engagement, compliance and effects on depression symptom reduction (Callaghan, Khalil, Morres, & Carter, 2011; Dishman, 1995). A recent pragmatic RCT compared the prescription of a specified dose of exercise with a self-selected dose among women living with depression (Callaghan, Khalil, Morres, & Carter, 2011). Callaghan et al. (2011) found that women who exercised “as recommended by national guidelines” attended 6 of 12 sessions (50%), while the group that had exercised at their “preferred intensity” attended 8 of 12 sessions (66%). Furthermore, Callaghan et al., (2011) reported that participants in the specifically designed program for depression that included motivational support, was significantly more effective in reducing depression and led to significantly greater improvements in a number of other psychological and psychosocial factors (i.e., quality of life, self-esteem, and mental well-being) compared with the “exercise-as-usual” group. These findings from Callaghan et al.'s, (2011) study suggest that exercise combined with other features may be more beneficial than exercise alone. Furthermore, if individuals seeking treatment for depression are going to adhere to an exercise treatment program, it is important they be able to exercise at an intensity that is comfortable for them. Research on the challenges of treating depression with exercise suggests that discussions related to what activities would benefit patients most based on their symptoms should be promoted within primary care (Seime & Vickers, 2006). These findings highlight the importance of addressing patient attitudes and preferences, as they may indirectly influence depression outcomes, indicated by the patients’ level of engagement and interest in participating in exercise as a treatment.

In an examination of depressed patients’ motivation to exercise, Carpiniello, Primavera, Pilu, Vaccargiu, & Pinna (2013) conducted a case–control study comparing the attitudes, preferences and perceived barriers to PA between patients attending a community mental health center (n = 138) with a control group individuals not affected by mental disorders (n = 138), matched for gender, mean age and education. Findings from this study revealed how patients and controls shared largely common preferences regarding physical activity, although patients expressed a slightly higher preference for simple activities such as walking. Moreover, patients and controls were found to share several common attitudes, such as how medical advice and exercise facilitator support were both considered equally relevant between the groups (Carpiniello et al., 2013). Both groups viewed exercise as essential both for physical and mental health and
preferred engaging in physical activity with others, rather than alone (Carpiniello et al., 2013). Similarly, Busch et al. (2016) studied the preferences for exercise as a treatment for depression by surveying 102 individuals with depression and reported that the majority of their depressed sample was interested in an exercise for depression program. The most preferred activities included walking and weight lifting. However, symptoms of depression were seen as significant barriers to increased exercise (Busch et al., 2016). Overall, individuals with depression display less pleasure and motivation towards physical activity and are negatively influenced by their psychological status. However, they are aware of the importance of exercise for their physical and mental well-being, and are capable of recognizing a series of barriers that prevent them from undertaking regular physical activity (Busch et al., 2016; Carpiniello et al., 2013).

While the literature suggests that an individual’s interest, perceptions, and preferences regarding exercise as a treatment for depression should be considered in the design and delivery of exercise interventions promoted to persons with mental illness and depression, this research is limited. The current qualitative evidence lacks the voice of students and has primarily explored the experiences and perceptions of mental health service users participating in exercise or physical activity programs. Although one qualitative study (Azar et al., 2010), explored the physical activity correlates of young adult women with depression, there is still a need for conducting qualitative research in student populations with depressive symptoms, as they may have different perceptions of the role of exercise as a treatment for depression than the samples studied in the current qualitative literature base. Additionally, no studies have explored the preferences for exercise as a treatment for depression in students. Acknowledging the gap in the qualitative evidence base on the perceptions of exercise as a treatment for depression in university students, and in order to develop effective exercise programs for students with depression, their perceptions, beliefs, attitudes, and preferences for the structure of exercise (e.g., activity, setting, intensity, etc.) need to be explored. Thus, this is the focus of the current thesis.
Chapter 2
Methodology

2 Overview

The purpose of this thesis is to explore student’s acceptability and preferences regarding exercise as a potential treatment for depression. This chapter provides a brief overview of the rationale for employing a qualitative research design, as well as my philosophical assumptions relating to the study. This is followed by the justification for the sample size used in the study, recruitment procedures, and a description of the participants is presented. The data collection process is also outlined, and a description of the data analysis, issues of trustworthiness, ethical considerations, and data representation is discussed.

2.1 Rationale for Qualitative Research

Many researchers acknowledge the need for more qualitative research within the area of exercise and mental health to further inform the development of effective exercise interventions that will be accepted by both patients and physicians (Crone et al., 2006; Faulkner & Biddle, 2001; Mason & Holt, 2012). Qualitative methodology implies an emphasis on discovery and description, and the objectives generally focus on extracting and interpreting the meaning of experience (Bloomberg & Volpe, 2015). The association between exercise and mental health is dynamic and mediated by a range of biological and psychological factors (Crone et al., 2006). The application of in-depth qualitative research to explore the subjective experiences of exercise and depression management may be useful in presenting insights on how individual’s perceive exercise in the context of mental health care, which traditional quantitative methods (i.e., questionnaires), may not touch upon (Green & Thorogood, 2014). Adopting a qualitative approach accepts that participants’ experiences and perceptions need to be explored in order to understand issues related to acceptability towards a treatment and the effect participation can have on one’s life. Therefore, a qualitative approach was deemed most appropriate to address the objective of this study.
2.2 Philosophical Assumptions

For the qualitative researcher, complex, constructed realities exist, and the process of inquiry is a matter of interpreting the interpretations of others (Bloomberg & Volpe, 2015). There are many ways of interpreting subjective experiences, and qualitative researchers have adopted the paradigms approach to examine the philosophical assumptions and methodological commitments to inform their work. Guba & Lincoln (1994) define a paradigm as an individual’s set of core beliefs and worldviews determined by their relationships between their place in it and the parts of it. For this study, I adopted a constructivist paradigm approach. Within the constructivist paradigm, the goal of inquiry is to understand the natural setting of the phenomena under study through the interpretation of human meaning. Important elements of the constructivist theory include (1) the assumption that human beings rationalize their experience by creating a model of the social world and how it functions and (2) that language is the most essential system through which humans construct reality. According to Guba & Lincoln (1994) constructivists adhere to relativist ontology, a subjective and transactional epistemology, and a hermeneutical and dialectical methodology.

Relativist ontology refers to the idea that realities are socially constructed, local, specific, and dependent on the person who constructs them (Guba & Lincoln, 1994). In the literal sense, this follows the belief that what exists is relative to the conceptual frameworks people form to create the world around them. A constructivist holds a transactional and subjectivist epistemological position where there is no separation of the researcher from the participant and findings are created through the process of interaction between the two (Guba & Lincoln, 1994). For a constructivist, knowledge is a function of a system of transactions of discourse, generating knowledge as we engage in conversation (Guba & Lincoln, 1994). Society sanctions a particular reality, and shapes our internal standard for knowledge. Therefore, a constructivist has the task of differentiating between knowledge and assertion or opinions; leading to the hermeneutic and dialectic methodology employed by constructivists. Hermeneutics is the study of theory and the practice of understanding and interpretation (Guba & Lincoln, 1994). This approach is sensitive to the meanings expressed through language with particular attention being paid to contextual elements. It is built on the assumption that interpretation is not a straightforward activity but involves a critical reflection on the structure of understanding through active questioning and reflection to expose and examine deeper hidden meanings (Guba & Lincoln, 1994). The back and forth conversations used in the current study, guided by the semi-structured interviews,
allowed for a fluidity between the researcher-participant interaction and importance was placed on the interpretation of constant verbal and non-verbal feedback.

Labonte & Robertson (1996) argue for the acceptance and legitimacy of the knowledge generated from the constructivist paradigm and conclude that this paradigm is particularly suited to the goals of health promotion, such as understanding the processes involved in changing lifestyle behaviours. Therefore, the constructivist paradigm was deemed appropriate for the current study, given that student perceptions of exercise as an acceptable treatment for depression may be constructed through their experiences, and the meanings they associate with participation in exercise and depression management. The aim was to understand students’ acceptance and preferences regarding exercise as a treatment for depression. Through my interactions with the participants, I was involved in the interpretation of their experiences and reported on the meanings and realities the students communicated through the interviews. The assumptions within the constructivist paradigm fit well within the ATI framework; where an understanding of the treatment setting, student experiences, attitudes, and beliefs can contribute to individual characteristics which may influence the perceptions students have toward exercise as a treatment for depression, and their willingness to accept and participate in an exercise-based depression treatment option.
2.3 Sample Size

Employing purposive sampling, fifteen University of Toronto students were recruited to participate in the current study according to predetermined inclusion criteria relevant to the research objectives. Students were recruited based on the following inclusion criteria: (1) student at the University of Toronto; (2) self-identified as seeking treatment for depression; (3) inactive (i.e., not meeting the Canadian Physical Activity Guidelines) (Canadian Society for Exercise Physiology, 2011); (4) able to read and speak English. No student was excluded on the basis of gender, age, or clinical diagnosis.

Data saturation is currently the gold standard by which purposive sample sizes are determined in health science research (Guest, Bunce, & Johnson, 2006). Data saturation is considered ‘reached’ when no new information or themes are observed when additional data is collected. Guest, Bunce, & Johnson (2006) suggest that in homogenous samples, data saturation is usually reached at 12 interviews. Data saturation is further found to be influenced by the objectives of the study; this is seen within the large variation (n= 3 – n= 40) in sample sizes reported within the qualitative exercise and depression literature (Azar et al., 2010; Faulkner & Biddle, 2004; Mason & Holt, 2012; Aidan Searle et al., 2011). A sample size of 15 university students was found to reach data saturation through patterns in thematic expressions that satisfied the research questions.

Data saturation was documented by inductively analyzing interview transcripts for patterns of thematic expression throughout the data, through the process of transcribing and coding interviews in sets of six, creating a cumulative audit trail (Guest et al., 2006). Patterns in participant accounts were found to be consistent after 13 interviews were conducted. Time allowed for two additional interviews, however, no new patterns developed and recruitment was terminated, for a final sample size of 15.
2.4 Recruitment

Participants were recruited with the help of the University of Toronto Campus Health and Wellness Center. The Health and Wellness Center provides students with assessment, treatment, and referrals for a broad range of illnesses, including emotional and psychological problems. Through purposive sampling, recruitment efforts were targeted towards students who were actively seeking treatment for depression from university health services and who expressed interest in exercise in the context of mental health. This was hoped to provide relevant data to understand interest, beliefs, and perceptions that influence interest in exercise as a treatment for depression in the university setting.

At the time of recruitment for the current study, the Health and Wellness Center assisted in identifying students seeking mental health services by promoting participation in the MoveU.HappyU pilot program. MoveU.HappyU is a 6-week physical activity counselling and supervised exercise program for students seeking mental health services pilot feasibility study, with similar eligibility criteria of the current study. Given I was actively involved in the recruitment process for the MoveU.HappyU pilot study, promoted participation in the current study and identified students who were seeking support for symptoms of depression. This was done by responding to student expressions of interest in the pilot program and providing them with information and eligibility criteria for the current study.

Beginning in February 2016, students were identified and recruited through two methods: (1) direct expressions of interest in the current study, through recruitment posters (Appendix A) with contact information and study eligibility criteria posted in the Health and Wellness Center waiting room, and (2) Providing students who expressed interest in the MoveU.HappyU program with the opportunity to participate in the current study, if students self-reported meeting the study eligibility criteria. Working with this center helped recruit participants from this hard to reach population given the accessibility of the clinic being on campus, the trust students have in the center, and the high number of students who seek mental health support through the clinic.

Recruitment was ongoing for three months and through e-mail communication, screened participants for study eligibility criteria, and arranged one-on-one interviews.
2.5 Data Collection

Prior to the commencement of the interview, informed consent was obtained, and participants completed a short self-report questionnaire package to collect descriptive data on demographics, physical activity, and depression severity (Appendix B). Qualitative data was obtained through in-depth semi-structured interviews following an interview guide developed based on the objectives of the study (Appendix C).

2.5.1 Self-report questionnaire package

Self-report questionnaires can be found in Appendix B.

Demographic Questionnaire

A brief self-report demographic questionnaire was administered to aid in the description of the sample. The questionnaire was adapted from the Canadian Student Health Survey (CSHS, 2013), an extensive survey on mental health and addictions in post-secondary students in Canada. The variables from the CSHS that were included in the demographic questionnaire were age, gender, student status (i.e., program and year of study), ethnicity, and living situation.

Major Depression Inventory (MDI)

The Major Depression Inventory (MDI) is a self-report mood questionnaire developed by the World Health Organization’s Collaborating Center in Mental Health (2001). The MDI is a 10-item self-rating inventory used to measure depression through an individual’s self-reported symptoms over a 2-week period. The questionnaire is brief and can be scored according to both the DSM-V and the ICD-10 algorithms for depressive symptomatology (Bech, Rasmussen, Olsen, Noerholm, & Abildgaard, 2001) or can be used to measure depression severity by the simple total sum of the items (Olsen, Jensen, Noerholm, Martiny, & Bech, 2003). For the purpose of this study, the total MDI score was reported to describe depression severity and interpreted as coping with no depression (score of < 20), mild (score of 20-24), moderate (score of 25-29) or severe (>29) depressive symptoms (Olsen et al., 2003). The MDI has been found to have an acceptable sensitivity and specificity in both adult and adolescent populations for classifying depression severity (Cuijpers, Boluijt, & van Straten, 2008). Given that students were actively seeking mental health support, and may not have been clinically diagnosed with MDD, the MDI was deemed acceptable for describing participants’ depression severity.
International Physical Activity Questionnaire- Short Form (IPAQ-SF)

The IPAQ-SF provides an estimate on one-week data of the total volume of physical activity. The items are structured to provide separate scores on walking; moderate-intensity; and vigorous-intensity activity, as well as a total combined score to describe overall level of activity. Although both categorical and continuous indicators of physical activity are possible to obtain from the IPAQ-SF, categorical scoring was used to classify and describe physical activity participation based on the recommended physical activity guidelines. Individuals were classified as inactive, minimally active, or HEPA active (health enhancing physical activity; a high active category) (“Guidelines for Data Processing and Analysis of the IPAQ-SF,” 2004). Individuals who engage in three or more days of vigorous activity for at least 20 minutes per day, or five or more days of moderate-intensity activity or walking for at least 30 minutes per day, or five or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 600 MET-min/week are classified as minimally active. Individuals who engage in vigorous-intensity activity on at least three days achieving a minimum for at least 1500 MET-minutes/week, or seven or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 3000 MET-minutes/week are classified as HEPA active. Individuals who do not meet the criteria to be considered minimally active or HEPA active are classified as inactive. The IPAQ-SF has been recommended as a cost-effective method to estimate physical activity. Over-reporting has been identified as an issue, however, the IPAQ-SF has been found to be as good as other established self-report methods (Booth et al., 2003, Lee, 2011).

2.5.2 Interviews

While focus groups have been successfully used to explore the perceptions and beliefs about exercise in older adult populations, this may not be the best method to use among students with depressive symptoms (Costello, Kafchinski, Vrael, & Sullivan, 2011). Students seeking treatment for depressive symptoms may not be comfortable sharing their exercise or depression management experiences in group settings, limiting their ability to participate and contribute to the discussion. Therefore, I chose to conduct one-on-one interviews with participants, allowing for a comfortable setting for open discussion to occur. The length of the interviews ranged between 40 and 90 minutes and a semi-structured interview guide consisting of open-ended questions was used to elicit discussion on exercise and depression management experiences (See
Appendix C for Interview Guide). All interviews were audio recorded and privately conducted in a meeting room at the Mental Health and Physical Activity Research Center, conveniently located in the Athletic Center of the downtown University of Toronto campus. Past exercise and physical activity experiences were explored, and exercise was defined to participants as participation in planned, structured, repetitive and purposeful activities, such as going to the gym to maintain or improve health and fitness.

The semi-structured interview approach facilitated in-depth discussion with participants concerning their perceptions, attitudes, and preferences for exercise as a treatment for depression. To encourage participant talk during the interview, time-lining of experiences, a method of graphic elicitation, was used (Sparkes & Smith, 2013). This encourages participant’s recall of past experiences by having the participant draw a timeline and jotting down their past exercise experiences in a linear fashion. This helped participants engage in deeper reflection by visually representing any changes in behaviours, as they unfolded over time and improved my rapport with the participant. An example of a participant’s exercise time is shown in Figure 1.

![Figure 1. Example participant exercise experience timeline.](image-url)
2.5.3 Interview Guide

The interview guide was designed to elicit discussion on experiences of exercise, depression management, and preferences for exercise in the context of depression treatment. Guided by an ATI approach, the questions in the interview guide explored students’ beliefs, attitudes, and preferences to reveal potentially common characteristics in students’ accounts to inform their acceptability for exercise as a depression treatment. The interview guide consisted of the following sections: participant background and context, exercise perceptions and experiences, acceptability for exercise as a treatment option for depression, and preferences for an exercise intervention for the treatment of depression.

The first few questions under the section “background and context” were used as icebreakers and aimed to gain participant rapport by engaging in small talk with students about the degree they are pursuing, how they heard about the study, and what they can expect from the interview. This allowed the participant with some time to become comfortable in the interview setting and provided them with an opportunity to ask any questions they might have. Matters discussed in the second section of the interview focused on facilitating conversations regarding students’ past and current experiences participating in exercise and physical activity and related to students perceptions, beliefs, and feelings towards exercise engagement. These questions aimed to elicit individual, social and environmental contexts that may influence motivation for exercise participation. The third section of the interview guide allowed for discussion on their experiences of depression management and interest in exercise as a treatment for depression. This section included questions regarding student’s treatment seeking behaviours, awareness of mental health resources available to them and expectations of treatment, and knowledge, perceptions and interest in exercise in the context of depression treatment. Given the participant interest in exercise, the final section aimed to facilitate further discussion on preferences for an exercise program delivered for the purpose of depression management and treatment.

As recommended by Sparkes & Smith (2013) the initial interview guide was piloted with a friend to ensure discussion flow and was adjusted according to any emerging topics or discrepancies in the understanding of the questions. The data collected from the pilot interview was not used in the final data analysis. The interview guide can be found in Appendix C.
2.6 Description of Participants

Fifteen university students (13 females) between the ages of 18 and 30 years (mean age of 22 years), met the eligibility criteria and took part in a semi-structured individual interview. Interviews were held between February and April 2016. Details of the demographic characteristics of the sample are provided in Table 2. The majority of participants were undergraduate students (n = 12), with three participants identified as graduate students, and students’ year of study at the University of Toronto ranged from 1 – 5 years.

Although all participants self-identified as coping with depressive symptoms and seeking mental health support, the Major Depression Inventory (MDI) was used to describe students’ level of depression severity. Completed by self-report at the time of the interview, approximately half of the participants (n = 8) had MDI scores below the cutoff for mild depression. However, MDI scores ranged from no depression (n = 8) to severe depression (n = 4) and approximately half of the participants were on antidepressant medication at the time of interview (n = 7). Given that the MDI assesses how individuals have been feeling over the last two weeks, MDI scores should be interpreted with caution since, at the time of the interview, students were actively seeking treatment or being treated by a mental health professional. Moreover, MDI scores may have been influenced by how long students had been managing their depression, antidepressant use at the time of interview, and if they had ever received a clinical diagnosis. However, these scores may depict a more accurate representation of student’s level of perceived need, with one student who reported an eight-year depression management history and an MDI score of 26, interpreted as “moderate depression.” Interpreting the results of the IPAQ-SF, the majority of students reported being inactive (n = 9), and no students reported engaging in sufficient levels of physical activity for health benefits (i.e., meeting the Canadian Physical Activity Guidelines of 150 minutes/week of moderate to vigorous physical activity). Students’ activity participation was largely comprised of walking. Table 2 depicts the sample demographics, antidepressant use, depression severity, and activity level.
<table>
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<th>Gender</th>
<th>Age</th>
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<th>Living Arrangement</th>
<th>Degree/Year</th>
<th>Antidepressant Use</th>
<th>MDI</th>
<th>Depression severity</th>
<th>Walking (MET-min/week)</th>
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<td>Graduate (MN)/Year 2</td>
<td>Yes</td>
<td>45.00</td>
<td>Severe Depression</td>
<td>264.00</td>
<td>Inactive</td>
</tr>
<tr>
<td>Julie</td>
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<td>White</td>
<td>Family Off-Campus</td>
<td>Undergraduate/Year 3</td>
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<td>16.00</td>
<td>No Depression</td>
<td>528.00</td>
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<tr>
<td>Mira</td>
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<td>Family Off-Campus</td>
<td>Undergraduate/Year 3</td>
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<td>132.00</td>
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<tr>
<td>John</td>
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<td>22</td>
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<td>Family Off-Campus</td>
<td>Undergraduate/Year 5</td>
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<td>24.00</td>
<td>Mild Depression</td>
<td>1980.0</td>
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<td>Rose</td>
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<td>White</td>
<td>Roommate Off-campus</td>
<td>Graduate (Ph.D.)/Year 1</td>
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<td>Natalie</td>
<td>Female</td>
<td>19</td>
<td>Other</td>
<td>Roommate Off-campus</td>
<td>Undergraduate/Year 2</td>
<td>Yes</td>
<td>29.00</td>
<td>Moderate Depression</td>
<td>577.50</td>
<td>Minimally Active</td>
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</tbody>
</table>

Notes: *Pseudonyms have been used to protect the identity of all participants. *b* Roommate/Friend/Partner Off-campus . *c* On Antidepressant at time of interview
2.7 Data Analysis

Interview audio recordings were transcribed verbatim, and transcript data was subjected to Braun and Clarke’s (2006) Thematic Analysis (TA) method to identify, analyse and report patterns within the data. Nvivo10 (QSR International, 2014), qualitative data management software was used to code and organize transcript data into topics covering exercise and depression treatment experiences, perceptions and preferences. Braun and Clarke’s (2006) six-phases of TA guided an inductive (data driven) analysis of the transcripts.

The first two phases of TA facilitated the development of codes. The first stage, immersion, involved familiarizing myself with the data. This was undertaken during the detailed transcription of the audio recordings, as well as through the process of reading and rereading the transcripts and noting initial ideas. Following this, the second stage involved using a data-driven method to establish initial codes, by searching for interesting features across the data set and meaningfully grouping the data. Codes were identified inductively through the process of searching for concepts, ideas, themes, and categories which were organized into a coding framework and used to interpret the data based on the objectives of the study. Coding involved the process of identifying and labeling potentially interesting features, phrases, behaviours, processes or stages and events. For example, when participants were asked to discuss why they were not as active as they would like to be, students expressed how they felt uncomfortable in a gym setting because they did not know how to use any of the machines, how their depression made them lazy and demotivated to do anything, and how the inactivity of their friends and family discouraged them from being active, these experiences were coded as three separate units. These primary units were coded as ‘low exercise confidence’, ‘discouraging depressed mood’ and ‘inactivity of others’. Guided by the objectives of the study, initial codes were grouped and formed temporary themes to organize participant accounts.

Once all of the data was coded and collated, the third stage of TA, searching for themes, was undertaken by reconciling and mapping all initial codes into potential themes and grouping relevant data into each theme. The fourth phase of TA involves reviewing themes; this occurred once the main themes, through initial thematic mapping, were identified. Thematic maps were reviewed, and themes were refined to make sure they were well representative of the collated extracts. For example, the three initial codes presented above were grouped into the theme
‘Exercise Barriers’ and all data extracts coded as, ‘low exercise confidence’, ‘discouraging depressed mood’, and ‘inactivity of others’ were reviewed to confirm they accurately described the theme ‘exercise barriers.’ Phase five of TA, defining and naming themes, began once the final refinements to the thematic map were made. In this stage, I went back to the coded extracts, arranged them into coherent and internally consistent accounts with an accompanying narrative. A detailed analysis of the themes was conducted and subthemes were identified and given clear definitions and titles. Regarding the example of the initial theme labelled as ‘exercise barriers’, at this stage of the analysis, became a subtheme of ‘Feasibility of Engaging in Exercise as a Treatment’. The sixth phase of TA, producing the report, involved the final analysis and write-up of the findings from the study. Throughout the writing process, I constantly referred back to the interview transcripts, primary codes, and the final thematic map to ensure I was accurately presenting students’ accounts and that data extracts were relevant to each of the themes and sub-themes identified. The findings were then further interpreted in relation to the research questions and how they are situated within the current literature.

The aim of the analysis was to provide a rich description of the interview data with themes reporting an accurate reflection of the content of the entire data set. Conducted within a constructivist framework, TA guided the examination of the data to report themes that support the socio-cultural contexts, and structural conditions which enable the individual accounts that were provided. Taking into consideration the ontological and epistemological positions of the constructivist paradigm, it was important that I remained reflexive during both data collection and analysis; this was done through engagement in a continuous examination and explanation of how I influence the research study, documented by keeping a reflexive journal. Keeping a reflexive journal assisted in the consideration of my prior assumptions, beliefs, and attitudes during data analysis, accepting that I added subjectivity to the results while striving to describe the participants accurately and appropriately.
2.8 Trustworthiness

Trustworthiness within qualitative research consists of the efforts in which the researcher critically evaluates the quality of the study. Lincoln and Guba (1985) use the terms credibility, dependability, transferability and confirmability to address how ‘trustworthy’ the data is and to control for potential biases throughout the study. Consistent with a constructivist paradigm, multiple strategies were employed throughout the research process to establish the credibility, transferability, and confirmability of the data (Bloomberg & Volpe, 2008; Lincoln & Guba, 1985).

Credibility aims to identify whether the knowledge generated from the findings is accurate and credible from the standpoint of the researchers, the participants and the reader (Bloomberg & Volpe, 2008). My experience as a physical activity counselor and a researcher for the MoveU.HappyU pilot program provided me with the opportunity to spend time interacting with students seeking mental health treatment services and allowed me to develop relationships and build rapport with many of the students who were interviewed in this study. Additionally, I had the opportunity to speak to students in the university counselling setting during the recruitment process for the MoveU.HappyU program allowing me to develop an understanding of the process students engage in while seeking treatment for depression. I am also a student, of similar age and with student life experiences which allowed me to be comfortable during the interviews as I was able to speak to students as I would talk to any of my own peers. I felt this was very beneficial to developing my rapport with participants, as many students mentioned that they also felt comfortable sharing their experiences with me. Peer debriefing was also used throughout the research process, adding credibility to the study, through communication between my thesis committee members and myself (Bloomberg & Volpe, 2008). Throughout the entire research process, my supervisor (G.F) and I shared ideas, and he challenged my thinking towards my research findings. Furthermore, during committee meetings, my supervisor (G.F) and two committee members (C.S and K.AN) provided insights into the research design and the structure of the findings.

Transferability refers to how well the study is able to portray the data collected as representative of the realities of the participants in the research setting to allow the reader to decide whether the emerging knowledge can be applied to their own settings (Bloomberg & Volpe, 2008). By using a “thick description”, this study aimed to address transferability by reporting a range of
experiences to provide an accurate representation of the reality of the students who participated in the research. This was accomplished by providing demographic descriptions of all the students interviewed as well as through an emphasis on having participants speak for themselves by presenting original direct quotations from the students’ interviewed (Braun and Clark, 2006).

Confirmability refers to the degree to which the findings of a study are shaped by the participants and not the researcher’s bias, motivation, or interest. To establish confirmability I aimed to maintain a self-reflexive attitude at all stages of the research process, acknowledging that I am a significant part of the research process and that my assumptions and perspectives will influence how I collect, interpret and report the data. In order to maintain a self-reflexive attitude, I made regular entries in a journal where I monitored, recorded and reflected on any methodological decisions I made and reasons for making them (i.e. recruitment avenues used, when to terminate data collection, and any revision I made to the interview guide or my interviewing style), as well as my own subjective perspectives throughout the research process (Bloomberg & Volpe, 2008). I also recorded any thoughts I had regarding my interactions and experiences with all the students I interviewed, before and after each interview I conducted.

I would also like to acknowledge that I have preconceived notions on the impact exercise and physical activity participation can have on psychological well-being. Through my experience as a university student, physical activity counsellor, and researcher for the MoveU.HappyU pilot program, I have witnessed first-hand, improvements in energy levels, confidence, and self-perceptions in myself and others. I have also exercised with students seeking mental health treatment (including a few of the students who participated in this study) and worked with them on improving their exercise knowledge and abilities. However, I did not interact with these students or treat them differently during the interviews or my analysis of the transcript data. I also recognize that each person’s exercise and depression management experiences are different and by acknowledging my researcher bias, I was able to give voice to the students and have their experiences drive the findings of this research study.
2.9 **Ethical Considerations**

Prior to recruitment, ethical approval was obtained from the Research Ethics Board at the University of Toronto. All students were compensated for their involvement in the study ($10 Starbucks Gift Card). It is also important to consider factors that may influence the ability of an individual to participate effectively in the qualitative research process. Therefore, the provision of informed consent, issues of power, and the research setting were considered. Students’ written and informed consent (Appendix D) was obtained before the administration of the self-report questionnaire package and their participation in the interview. In this study, techniques to improve the consent process included a discussion of the purpose of consent with the participant, which involved actively reading through the consent form with the participant and answering any questions that the individual had before signing. Also at this time, students were informed that they might experience emotional distress when discussing their experiences seeking depression treatment, were not required to answer any questions that made them uncomfortable, and they were able to terminate the interview at any time. Furthermore, cards with details of various mental health resources available on- and off-campus were kept on-hand during the interviews and provided to students who showed signs of distress. All students were actively seeking treatment for their depression and were comfortable discussing their depression management. However, three students expressed signs of emotional distress during the interview which was managed by taking a break from the interview where the recorder was paused, and the student was given as much time as they needed before restarting the interview. Students who expressed signs of emotional distress were also given the option to terminate the interview, however, all of the students were able to complete the interview and answer all of the questions in full. When conducting interviews in a one-on-one setting, issues of power within the researcher-participant relation must also be considered to minimize the power differential (DeRoche & Lahman, 2008). DeRoche and Lahman (2008) suggest that researchers should attempt to have procedures in place within the process of doing research to empower the participants. During the interviews, I used strategies to empower students by providing them with control over the audio recorder and by using appropriate verbal and non-verbal language during the interview in an attempt to reduce the uneven participant-researcher power relationship. Furthermore, the setting was considered when conducting the interviews, by
providing participants with a private, accessible, comfortable, and safe environment for open discussion to take place.
2.10 Presentation of Findings

The following chapter presents a realist tale of the findings, a commonly used narrative form to communicate qualitative research (Van Maanen, 1988). The findings are organized according to the themes that were developed to understand students’ perceptions of exercise in the context of depression treatment and provided insight into students’ acceptability of exercise as a treatment for depression. Subthemes are presented within each theme and aim to describe and highlight the findings from the main themes by providing details that support and explain themes established during the inductive analysis of the interview data. Furthermore, original direct quotations from the students’ interviews are presented within the text to portray multiple perspectives and capture some of the richness and complexities of students’ perceptions. Students’ names have been replaced by pseudonyms to maintain participant confidentiality.
Chapter 3
Findings

3 Overview

Students discussed various experiences, beliefs, attitudes, and preferences that informed their perceptions of exercise as a treatment for depression. The inductive data analysis explored major themes to contextualize students’ acceptability of exercise as a treatment for depression. The themes presented in this chapter provide insight into students’ interest in exercise as a treatment for depression, factors that influence students’ participation in exercise and the feasibility of engaging in exercise as a treatment, students’ attitudes towards participating in exercise as a treatment, and their exercise program preferences. An overview of the themes and subthemes presented in this chapter are depicted in Figure 2.

![Figure 2. Overview of Themes and Sub-themes.](image_url)
3.1 Interest in Exercise as a Treatment

Patterns in student accounts of their exercise and depression management experiences identified three subthemes that characterize students’ interest in exercise as a treatment for depression. First, the majority of students’ discussed experiences of prior interest in engaging in exercise or enjoyed participating in physical activity in the past and expressed they were interested in re-engaging in exercise and physical activity. Second, students’ knowledge of the psychological benefits of exercise shaped their beliefs’ on the role of exercise in countering negative symptoms of depressed mood. Third, all students held an interest in alternative approaches to managing depression either before attempting more traditional treatment options and/or through experiences of a lack of therapeutic effect of previous treatment attempts.

3.1.1 Prior Interest and Participation – ‘Getting back in the habit.’

Although all of the students were inactive at the time of the interview, all students discussed past experiences where they were interested in engaging in structured exercise. The majority of students described engaging in structured exercise for short, sporadic periods of time:

… between grade 12 and year 1, I took a gap year, and during that time I used to workout in my room, so I was doing like a high-intensity thing, like 30 minutes. I liked doing it [exercise], in the beginning, I was tired, but then I kept going, so that was good. (Nancy)

I have never been able to make it [exercise] stick, I mean a couple of times, maybe in my first year here, I would go to the gym, a couple of times, but I would go two or three times at the most, but that would be the most. (Sam)

…when I was in grade 12 I joined the gym and I had a trainer, which was about 4 hours per week, and sometimes I [would] go on my own …(Zang)

Five students reported engaging in regular structured exercise in the past (i.e., exercising at a gym on a regular basis). For example, Rose described how she held a positive exercise identity in the past:
I was really athletic growing up um like in high school I played soccer, I danced competitively and skied competitive, so exercise has sort of been a part of who I was, ..., like in university [undergrad] I was always signed up for gyms, but like not my first couple of years in university, but then I played soccer recreationally and baseball recreationally, like beer league in the summer, just for fun. And then I got really, involved, ..., I developed my own routine of exercise, and I was really involved, kind of, in my routine like I would go 3-4 times a week and I had gym buddies like I just lived and breathed that kind of lifestyle. (Rose)

The majority of students discussed that they enjoyed participating in a wide variety of sports and physical activity with friends and family on a recreational/leisure basis. For example, Kathy did not discuss prior experiences engaging in structured exercise, however, with encouragement from her parents she expressed that she enjoyed participating in a wide range of sports and physical activity growing up:

I have been doing ballet since I was like 4, I have been doing a lot of sports since I was very young, thanks to my parents that signed me up for everything, so yeah I used to do horseback riding, tennis and badminton. (Kathy)

Similar to Kathy, the majority of students described how physical activity was fun and an important part of their life in the past, such as when Colbie said: “Well I was always into some kind of sports, before that I was into karate you know I always loved sports, I was always playing them with my cousins.” Many students also discussed experiences of their physical activity and sport participation fostering life-long friendships and providing them with an opportunity to spend quality time with family and friends:

My dad encouraged us because I have four younger sisters, and he put us all in, and myself and 2 others ended up staying in it [taekwondo] and being fairly competitive and got our black belts. I found it [taekwondo] kind of weird at first a little bit, and I didn't want to join, but I was happy I did, I still have friends from it [taekwando], that I made in taekwondo and yeah even thinking about it I still have really good memories, and I love it [taekwondo] still. (Allison)

Many students expressed interest in exercise as a treatment for depression as it would provide them with the opportunity to make exercise and physical activity an important part of their lives
again. For example, Rose described her interest in getting back into the habit of exercising because she was active in the past. “I want to develop those habits now, because they were there in the past so I want to make these habits a part of my life for a really long time, instead of kind of like these sporadic periods of my life.” Similar to Rose, many students who described prior attempts at increasing their exercise participation perceived that exercise as a treatment for depression would be the perfect opportunity to make a real change in their exercise habits.

3.1.2 Benefits of Exercise for Depressed Mood

All students described an interest in exercise as a treatment for depression through their awareness of the mental health and well-being benefits of being active. Moreover, students held positive perceptions of the role exercise can play to counter-act the negative symptoms associated with depression. A few students described experiences of gaining the knowledge of the benefits of exercise for mental well-being through friends and family and the experiences of others:

Friends, because they are kind of in the same situation I am in so they told me, ‘after I exercise I feel a lot better, even if you have a lot of school work just take a couple of minutes and do something, you’ll feel better.’ (Julie)

... my friend did running for many many years, and it [running] was one of her stress relievers,...I think one of my parents said it [exercise] would be good to try to get oxygen levels up through cardio. (Natasha)

For the majority of students their awareness and beliefs about the benefits of exercise for depressed mood, was primarily gained through reflecting on their own past personal experiences:

I think my past experiences with exercise and physical activity is a huge factor but then also because I have heard before that physical activity treats depression and prevents depression, so between those two things and my past experience plus the concrete evidence. (Allison)

... it's really true because I thought to myself every time I exercise every time I go for a run that completely changes my day I feel stress-free really calm I’d come
home [and] be motivated I would go [and] I would self-study and feel healthy. (Janice)

All students perceived participation in exercise facilitates mental well-being by providing them with an opportunity to engage in a meaningful activity that is “good for them”:

It [exercise participation] makes me feel like I am doing something good with my life and my time, something other than school, and it [exercise] is actually productive, it’s something that isn't sitting on a couch, actually being out there, and a lot of it is knowing that it [exercise] is good for me. (Natalie)

The majority of students described how their depressed mood made them lazy and unproductive, and they perceived that participation in exercise would allow them to feel productive, increase their energy levels and motivation to complete other tasks:

When you go and do exercise; it [exercise] kind of motivates me to do other things during the day. You feel more productive with your time like you did this [exercised], so I could probably do more during the day. (Mira)

My mood is uplifted pretty well every time after I would work out, so I notice that after working out I have more energy, and I am more motivated to do homework and get stuff done after I work out. (Julie)

Additionally, four students described how their depressed mood kept them at home and disengaged from normal activities. These students perceived that participating in exercise would motivate them to leave the house. For example, Lisa described her interest in exercise when she said, “I think that maybe if I go exercise more often, I would like to go outside more, and like going to classes.”

A few students expressed that their depressed mood was a hindrance to their academic performance and described their perception of exercise participation increasing focus and cognitive ability. For example, Zang described her interest in exercising to improve her focus as she recalled experiencing improvements in her concentration levels when she was exercising regularly:
When I exercised, I would feel more concentrated after, and I can memorize a lot of things during that period, so I think that [exercise] would be beneficial for studying, but you have to be constantly exercising, instead of like me.

Additionally, the majority of students expressed belief in the benefit of exercising for stress reduction, as Natalie mentioned: “It’s [exercise] definitely a stress reliever, like probably the single best one, that I don’t even have to second guess, it’s just I feel better automatically.” A few students also expressed the meditative effects of exercise on their mood, such as when Anna said, “It [exercise] definitely helps my mood, it is really good to clear my mind, it is like a reset button for me.”

Many students also expressed interest in participating in exercise to improve their self-perceptions and feelings of control, as Colbie described her perception of how exercise helps her feel in control: “…feeling like you are in control of something like I am in control, I can change this [exercise behaviour] if I want to, you know?” Similarly, Anna mentioned, “I feel like all the time when you are exercising, you are doing something different, you keep pushing further, it [exercise] makes you feel like everything is attainable and achievable.” Rose described how her “body image has been affected by not exercising” and that she was interested in participating in more exercise because, as she said, “generally it [exercise] makes me feel better and like [improves] my self-image.” Furthermore, three students believed that participating in exercise would lead to improvements in their self-esteem and confidence.

3.1.3 Openness to Alternative Approaches – ‘Another tool in the tool-box.’

All students expressed openness to exploring depression treatment options available to them and discussed experiences related to their depression management that led to their interest in exercise as a treatment. Students’ level of experience in seeking depression treatment varied; six students were seeking treatment for the first time, five had been seeking treatment for less than one year and four had greater than one year of experience managing their depression. All of the students who were seeking treatment for the first time expressed that they were open to trying alternative approaches to managing their depression, and described a preference to avoid antidepressants:

When I went to the health and wellness center, I was looking at my options and medication was one of the options and I was prescribed medication but I never took
it because I wanted to try the natural methods first and see if I could just kick myself and try to get more active and see if it helps me, rather than just resorting to medication. (Julie)

The majority of students who were more experienced in seeking treatment also described an initial preference to avoid antidepressants, however, many were eventually prescribed antidepressant medications. A few students described that they felt antidepressants were helping their mood and expressed they were interested in exercise as an adjunct treatment that would further improve their health behaviours and well-being. Additionally, one student described how she was interested in exercise to alleviate the negative side effects of antidepressants such as weight gain. However, many students who had tried antidepressant medications in the past described negative side-effects leading to an interest in avoiding medication altogether and an openness to trying alternative treatments. For example, Anna described how her negative prior experience of the side effects of antidepressants contributed to her interest in exercise to manage her depression, “Exercise was my last resort, after taking medication, I took antidepressants for a little while, but it gave me really bad nausea, so I was like this sucks, and I couldn't eat, so I stopped that.”

Many students also described experiences trying various psychotherapy approaches (i.e., online and group CBT and counselling). However, many of these students expressed mixed feelings about the amount and quality of psychotherapy they received, which may have contributed to their interest in alternative therapies. For example, Mira was informed that her counselor had left, and she was unable to receive any further appointments, as she recalled “I was just like I don’t know why this [getting an appointment] was taking so long. I think I had to go in twice before they even put me on a waitlist and it was just kind of like frustrating.” Two students described that they did not feel a ‘connection’ with the counselor and therefore stopped therapy. Anna described a situation where she felt the counselor was not responsive to her issues:

    And then the one-on-one, I feel like, (sigh) I don't know, I feel like my issues that I was bringing up, I felt like my therapist seemed like she really didn't care, like they seemed inconsequential to her, she would yawn or she would kind of be like, but again that might just be an anxiety thing that I might be projecting on her, so I don't know, I just felt like our connection wasn't there. (Anna)
Three students discussed feeling the need for additional support outside of counselling. For example, Natalie was on medication and attended psychotherapy sessions and described how she felt the need for additional support during the intersessional period and how knowing alternative treatments to fill the gap between receiving therapy would have helped:

> It was just like relying on medication and talking, which I found that it only helped for a little while like I was sitting there, and I would feel better cuz I could get it off my chest, but um I wouldn't feel much better beyond that because you know its scheduled so it’s kind of like you have to wait for the next time, …, I guess knowing alternate treatments, would have been really good, like stuff other than psychotherapy and just like counselling, just generally things I could do. (Natali)

Many students who were more experienced in seeking and receiving treatment, also described how the treatment-resistant nature of their depression led to the consideration of exercise in the context of depression management. Sam described how trying various approaches for his depression management resulted in considering exercise:

> It was sort of at that point of time here is something [exercise] you can try, at that time people were literally throwing everything and the kitchen sink at me, I was seeing a psychiatrist, I was seeing a psychologist, like independently, I was taking antidepressants, that was on top of that, it was literally a try everything and let’s see what works. (Sam)

Like Sam, many students with experience trying various treatments perceived depression as a chronic condition, and expressed an understanding of the importance of trying various therapies to find what works best for them. These students expressed interest in adopting exercise as a self-management strategy for their depressed mood and described exercise as “another tool in the tool-box.” As, Natasha said, “I have been told before it is like a tool box, like trying as many things as possible.”
3.3 Feasibility of Engaging in Exercise as a Treatment

Although students expressed interest in engaging in exercise as a treatment for depression, students also described various factors that influence their perceptions of the feasibility in taking up a recommendation to exercise. Students described barriers to participating in exercise through discussion of their depression symptoms, low exercise confidence and anxiety as hindering their motivation to engage in exercise. Students also explained how support was a critical factor associated with exercise participation as it was central to their perceptions of the feasibility and credibility of engaging in exercise as a treatment. Additionally, students expressed that exercise recommendations must be framed as a relevant treatment for depression, tailored to students’ level of motivation and ability to overcome barriers to changing their exercise behaviours.

3.3.1 Barriers – ‘you have no desire to do anything.’

All students described how the physical symptoms associated with depression, including fatigue and exhaustion, and the emotional symptoms, including a disinterest in their health and negative self-perceptions, were barriers to engaging in exercise. Students expressed that when they were experiencing a depressive episode, they lacked the energy to do anything, let alone exercise. As Sam put it, “literally speaking sometimes it is hard to get out of the bed or out the door, so certainly physical activity is not something you are thinking about.” Similarly, John mentioned he had convenient access to a gym, but attributed his depression as a barrier to working out: “Generally the depression, it keeps me lazy at home and not in the mood to do anything, just lie in bed, so I don't even go to the gym at my own condo.” In addition to experiencing low energy levels, students described a disinterest in their health and negative self-perceptions associated with their depressed mood:

You just want to sleep all day you have no desire to do anything. The main problem is that you just don’t care. You are ready to just destroy yourself, by doing nothing or over-eating. (Colbie)

Similar to Colbie, Janice highlighted her depressed mood as a major barrier to her participation in exercise as she described how the accumulation of the emotional symptoms of depression contributed to a disinterest in engaging in activities that normally would not be a problem:
when I am in a depressed mood, suddenly everything just takes a toll on me, I just have this negative mental of, oh I don't want to do this, I can’t do this, I don't want to get out of my house, I don't want to get out of bed, I don't want to brush my teeth, I don’t want to take a shower, suddenly the barriers that seem not so big,.., they just rise, they just become impossible. (Janice)

Additionally, many students described feelings of low exercise confidence and anxiety as barriers to their participation in exercise. Five students expressed that they had low exercise confidence and described experiences of how this negatively impacted their perceptions of the feasibility of engaging in exercise, especially in public settings. For example, Natalie explained, “In terms of going to the gym, I did feel before, that like you know, I don't know how to use anything, and I would feel judged almost, so like I never really went to the gym.” A few students also described feelings of anxiety related to their confidence in exercising as a barrier to exercise engagement, as Natasha explained, “like if I feel sad, or I am angry or something, that would be a barrier [to exercising], and I feel anxiety about that, or I think about how I look at the gym.” Similarly, Anna described how her anxiety hindered her ability to engage in physical activity in public settings, “Because I have so much anxiety, I don't like biking or running in public streets, I don't like working out alone in a gym, lots of stuff where I feel people are looking at me, I don’t like.”

Students also discussed how social factors acting as barriers to their exercise engagement. The majority of students described experiences of feeling discouraged to engage in exercise when they perceived a lack of social support from their surrounding environments. Many students expressed how a lack of exercise interest and the inactivity of others hindered their own engagement in exercise. For example, when asked how active the people around him are, John said: “Not at all, my parents don’t do anything, they do not encourage me to be active.” Similarly, Mira mentioned, “My family is very inactive, I don’t find them active at all … my mom and my sister are very inactive, they just sit at home, it is very discouraging actually because the home environment is just like blah.”

The majority of students described that their past physical activity, sport and exercise participation was primarily facilitated through the encouragement, involvement and support from friends and family. Therefore, many students described how a loss of social support was a barrier to their exercise engagement. For example, Zang explained how her parents played a
significant role in her past physical activity participation when she was growing up. They provided her with support and encouragement which led to her participation in traditional Chinese dance for ten years. She also recalled participating in yoga with her mom, and she used to swim with her dad. However, Zang moved to Canada by herself in Grade 10, and when asked why she did not continue being physically active she said, “Partially because I moved, also because my parents weren’t around.” Similarly, many students who had moved away from home to pursue their education also described how the absence of socially supportive environments contributed to feelings of a lack of relatedness to their new social and physical environments, hindering their motivation to engage in exercise. As Rose said:

> Probably because of this feeling of, I don’t want to use the word loneliness, because I don’t feel lonely, but I feel totally out of place, …, so I do find myself at home a lot, alone, so I am like, I just kind of like want to nest at home and like not going to the gym. (Rose)

Moreover, all students expressed that on their own, overcoming the barriers of exercise is challenging and discussed a need for support to take up exercise.

### 3.3.2 Support – ‘Motivating myself is almost impossible.’

All students described how support was considered a critical factor associated with their motivation to take up exercise as a treatment for depression and overcome barriers to exercise. For example, many students described how overcoming a lack of motivation due to their depressed mood was possible, but expressed that external motivational support was required in doing so. As Zang said, “Even when you are feeling depressed, you can still do well, and I think it depends on the person. I think you just need someone to motivate you to exercise because motivating myself is almost impossible.”

All students expressed the need to receive informational support regarding the benefits of exercise for depression and the availability of exercise opportunities from clinicians and mental health professionals as it adds credibility to exercise in the context of depression treatment. As Anna said: “I feel like HCPs [Health Care Practitioners] are the first point of contact so they would be good to recommend [exercise], and it is good to have that authority telling you this would help.” Similarly, Nancy mentioned that if doctors were supportive of exercise as a
treatment, she would be more likely to try it, “Doctors can also recommend it [exercise] if they see the students need it, yeah if they say it is good, I would probably more likely try it.”

Emotional and practical support from family and friends was also perceived to be beneficial to students’ motivation to engage in exercise as a treatment for depression. The majority of students described the importance of social support, specifically engaging in exercise with family and friends, influencing their motivation to exercise. For example, Kathy mentioned how she is motivated to go to the gym when her sister attends with her “I always want my sister to come with me [to the gym], but she doesn't really always want to go, but if she agrees to go, then I would go with her.” Similarly, Anna described how having a friend to work out with motivates her to exercise “Definitely having a friend, that motivates me … there are a lot of people that I can ask to work out with, and I have a friend, she’s always being like here more exercises [to try]!” Many students also described how emotional support from family friends by providing encouragement to engage in exercise, would influence their acceptance and participation in exercise as a treatment for depression. In many cases, students described how advice, guidance, and information were perceived as providing them with encouragement to take up exercise when it was received from family and friends who were viewed as knowledgeable about exercise. For example, Kathy mentioned taking exercise ‘seriously’ when her Dad recommended it to her because she noted that he is ‘pretty active’ himself:

Yeah my dad [recommended exercise], he knows I don't exercise, so he really emphasized for me to exercise, so I follow his advice. I took it seriously, … when we were in Switzerland, he played ping pong, yeah he is really passionate about it, so he is pretty active, I think he might be the most active person in my family. (Kathy)

On the other hand, three students described experiences of encouragement from inactive family and friends actually discouraged their exercise engagement:

Yeah my dad did that [recommended exercise], but you know I told you, my dad is not active at all, so I was like you know out of all people you are telling me that, he was like you should go to the gym, it’s almost like he was just playing everything off. The more he told me to do it, the more I actually
pushed it away, I was like you know, just stop, I don’t want to hear about this anymore. I just completely rolled it off as a possibility. (Natalie)

All students also expressed the need for support from exercise professionals to take up and adhere to exercise as a treatment for depression. For students with low exercise experience, support from exercise professionals was viewed as important to provide guidance on how to exercise correctly and give feedback on exercise progress. For example, Sam explained how he was unable to adhere to exercise in the past: “…probably because it was on my own, and there was no feedback, perhaps I was dealing with it [structured exercise] for the first time, and I don’t know how to measure myself.” Additionally, the majority of students viewed exercise professionals as critical in providing accountability and encouragement to adhere to exercise as a treatment for depression.

3.3.3 Framing – ‘Not just a general recommendation to exercise.’

When and how exercise is offered as a treatment for depression was also considered important in influencing students perceptions of the feasibility and relevance of exercise treatment. Through discussion on past depression management experiences, students expressed an initial need to deal with their depression as fast as possible. In a few cases where exercise was initially recommended, students viewed exercise participation as needing too much effort. As when Anna said: “Actually that walk in doctor did tell me I should be exercising, but I was like that sounds like a lot, give me the drugs.” Furthermore, all students expressed that when dealing with depression for the first time, depressed mood and lack of motivation hindered the ability to change unhealthy behaviours. Kathy highlighted this point, “when people are really depressed, they don't have motivation to do anything so they don't want to change something in themselves … Like if you tell them oh you should exercise, they might not want to do it right away.” These accounts highlight that the timing of when exercise is recommended as a treatment option is likely important.

Students who described experiences of receiving a general recommendation to exercise for mental health, expressed that they felt exercising was not relevant to treating their depression. For example, Colbie described her experience:

P: My dad’s doctor, who lived near our place,…, I went to him for the first few years before I knew there was this [university health services], he was always
against pills, and he told me try to exercise as much as you can, it will make you feel better and he was totally up for that. (Colbie)

I: So what happened with that? You got the knowledge from a doctor, and it [exercise] didn’t work? or did it? did you try it?

P: Yeah, like I started and everything, but I guess I wasn’t really motivated enough, like I said the root of my problem was just that I needed to get my old life back, my routine, to go to school and then go home and go out with my friends, you know just have a normal life, no, exercise could complete that. Exercising alone would just make me feel even more lonely. (Colbie)

Most students mentioned that a general recommendation to exercise might not have been appealing when first seeking treatment. As Allison put it: “A big one would be if people viewed it [exercise] as beneficial, I think if they didn't they would have no motivation to go [exercise].” However, with hindsight, many students reported that they might have considered exercise earlier in their depression management if it was recommended to them, and framed in a way that provided them with information on the relevant potential benefits of exercise for depression. As Natasha explained, “I have never been recommended it, it probably would have been a good idea, especially when I was isolated the first few years, I didn't move much.” Similarly, Mira recalled:

“I feel when I was more severely depressed I think I needed that kind of productivity around me because I had such low motivation to do anything, so like getting yourself to the gym and seeing all that productivity around you, I think it would be motivating.” (Mira)

Therefore, students expressed that they would be more inclined to take up exercise as a treatment for depression if the recommendation to exercise was framed in a way that aligns with their individual beliefs about the benefits of exercising for depression and their ability to engage in exercise. Therefore, the majority of students expressed that they would be motivated to take up a recommendation to exercise if a guided, structured and specific exercise program, aimed at alleviating their symptoms of depression, was recommended to them over a general lifestyle change recommendation. Such as how John expressed he would be interested in exercise as a
treatment, “knowing that there is a program that was designed specifically for students with depression, not just the recommendation of a general program at the athletic center.”

Students’ perceptions of taking part in exercise as a treatment further highlighted that unless exercise was framed as a formal treatment for their depression, it would likely not be taken seriously. As Sam put it, “unless it is a very formalized prescription, it feels like this is not a serious problem, and you don't need treatment.” Many students also expressed the need to be presented with evidence that provides support for the effects of exercise on depression. Such as when John mentioned that he would be more inclined to take up exercise: “If there was scientific proof showing that there was a link between exercising and depression.” Furthermore, all students perceived that participating in an exercise program would provide meaningful support and direction to engage in changing exercise behaviour and assist them in overcoming barriers to exercise.
3.4 Exercise Program Attitudes and Expectations

Throughout the interviews, students discussed various reasons that shaped their attitudes towards why they would participate in an exercise program delivered in the context of depression treatment. Students identified three expected benefits they would receive from such a program. First, participants perceived that their engagement in an exercise program would provide them with the opportunity to integrate exercise into their daily life, by changing their perceptions of the effort required to make time for exercise. Second, an exercise program was expected to provide a comfortable, non-judgmental environment that fostered feelings of social relatedness. Third, students expected an exercise program to facilitate the adoption of transferrable self-regulatory skills, such as self-monitoring, goal-setting, and time management, to assist in making other positive lifestyle changes.

3.4.1 Integrating Exercise into Daily Life – ‘Making time for exercise.’

The expectation of an exercise program to facilitate the integration of exercise into daily life was expressed by the majority of participants. All students discussed how engaging in an exercise program dedicated to improving mental health would allow them to feel like they are doing something good for themselves. This was evident in the way Colbie described her interest in participating in an exercise program because it would positively impact the way she perceives exercise: “Just incorporating working out in your everyday life, not as a chore, just something that you get to enjoy and not thinking about your everyday problems, just doing something good for yourself.” Similarly, Kathy perceived that a program would help her make exercising a priority in her life by, “… scheduling, it will teach me to make time for these things because they are important.” Janice also mentioned how her expectations of participating in an exercise program would facilitate the integration of exercise into her life, make better use of her time, and lead to positive effects on her mood and well-being:

Have it [exercise] incorporated into your schedule and have it [exercise] be that structured. So like you won’t allow yourself to be sad, like usually with depression, you take time out of your schedule and you have whatever feelings you have, for however many hours, and you are not using that time very wisely, it is not like wasted, but you could have been doing something that is really good for you. (Janice)
The majority of students described interest in developing an exercise routine, which they could continue to follow after participating in an exercise program. As Julie mentioned, “I need a routine, so I need something that is kind of timed out and scheduled, so having something in my time that is always at the same time every day, makes it a lot easier.” Students expressed optimistic outcome expectations for an exercise program to facilitate the maintenance of exercise behaviours. By developing a routine during a structured and guided exercise program, students’ expressed the expectation that they could make exercise a habit, and their perceptions of the effort required in scheduling exercise into their day and sticking to it would be reduced.

3.4.2 Fostering Social Relatedness – ‘There are more people like me.’

Although many students preferred an exercise program to be delivered on a one-on-one basis, students also expressed an expectation for an exercise program in the context of a depression treatment to provide a comfortable, non-judgmental environment to explore exercise and foster feelings of social relatedness in exercise settings and possibly extend to friendships outside of the program. As Julie mentioned, “I guess you don’t need to necessarily have friends in the program, but at least you know ice breakers could work and get people to get to know each other, and not just be exercise buddies.”

Many students described interest in participating in an exercise program where they felt they would be able to relate to others experiencing similar situations. John described this notion when he mentioned that an exercise program for students with depression would provide a comfortable and relatable environment: “Meeting new people, it would be in a way like a mini support group, with other people experiencing the same thing.” Similarly, Kathy described how she felt about interacting with other students participating in the same program:

I think it is important; I would be willing to work out with other people, maybe not a huge group, maybe one or two other people, if I know they are also going through the same thing, it might help me. (Kathy)

Interacting with others in the same exercise program was also perceived by many students as providing them with motivation to continue to adhere to the program and maintain exercise behaviours, as Natasha explained:
I think it makes it more fun and then makes you more motivated to go, people asking you if you will go, and where are you, and what you hope to achieve, so that would be a cool aspect of it that motivates you. (Natasha)

Additionally, four students described interest in an exercise program as it would provide them with a sense of community. As Anna put it, “…because of these problems with like loneliness, and it would feel like there are more people like me, kind of like a community you would build, it would be really interesting to do that.” Lastly, many students expressed that participation in an exercise program would provide them with the ability to join recreational sports teams and pursue exercise opportunities with others outside of the program.

3.4.3 Self-Regulatory Skills – ‘You can relate it to your life.’

All students expressed the expectation of an exercise program to provide them with the opportunity to adopt exercise self-regulatory skills through planning, goal setting, and self-monitoring, which would translate to self-regulatory skills that can be used outside of the exercise setting. Such as how Natasha simply put it: “Scheduling and goal setting are really important because you can relate it to your life.” All students expressed that their exposure to these skills within a structured exercise program would facilitate a positive change in their ability to manage their time and motivation to adopt other positive lifestyle changes. For example, Janice believed exercise helped with discipline and mentioned, “I am hoping that if I incorporate exercise, healthy eating lifestyle will just happen.” Similarly, many students mentioned how committing to an exercise program would help facilitate a commitment to themselves to change bad habits, help them study more efficiently and motivate them to engage in other activities. As Allison mentioned, “…learning to commit yourself to it, by planning it [exercise] out, that would help build a change in time management.” Additionally, students expressed that engaging in an exercise program would facilitate the self-monitoring of changes in their mood and the development of healthy coping mechanisms. Natalie commented on her expectations of an exercise program to provide her with skills she could apply to coping with her depression:

I guess a lot of it has to be about realistic goal setting and time management and skill building, not just physical skills but like actually forming maybe coping methods or like you know I guess figuring out what’s good for you in terms of
health, or also monitoring yourself or the changes you are experiencing, because a lot of times, just knowing you are trying to help yourself makes you feel better. So like a lot could be oriented to the emotional side but with using activity as a means. (Natalie)

Lastly, students perceived participation in an exercise program would facilitate feelings of accomplishment, as Sam mentioned, “…stepping up capabilities, or getting you to improve on something, I feel like could foster a sense of pride, like I can do this so I want to sort of continue, that could be a driver.” All students expected an exercise program to provide them with the opportunity to spend quality time working on themselves and develop a sense of wellbeing, which they hoped would translate into their day-to-day life.
3.5 Exercise Program Preferences

Through discussion with participants of their interest in exercise as a treatment for depression, all students described a preference for participating in a structured and supervised exercise program to facilitate a change in their activity levels. Although students were interested in increasing their exercise engagement, they also recognised that changing habits is not easy, and expressed a preference for an exercise program to acknowledge their inactivity levels and facilitate a gradual increase in exercise participation. All students identified how the design and delivery of an exercise program could influence program participation and satisfaction. Students also described the importance of an exercise program to provide them with the tools and resources to develop exercise self-efficacy and support self-directed behaviour for maintaining exercise post-program participation.

3.5.1 Supervision - ‘On my own, I won’t do it.’

Upon discussion of preferences for the delivery of an exercise program, participants expressed the need for support and feedback and preferred supervised exercise sessions vs. self-directed program schemes. As Natalie said:

I know for me, my ethic, in terms of sticking to something is a little bad, so I know that for me, I would want something that is physical and present, where I have to come in and do something, you know like to have someone for accountability, to know that I am actually trying my hardest. So like for me personally like just the classical old fashioned way of actually being there and not just remote self-help stuff. (Natalie)

The majority of students expressed a preference for one-on-one or small group based program delivery styles, as many students mentioned the need for accountability and external motivation to engage in exercise. As Julie said:

I like one-on-one, or like group based, I feel like that with online, I forget or just do it at the last minutes, but if it is like group based or if it is one-on-one, it is more regular, and it's an actual person. I don't know; I am more of like an engage with people a little bit, rather than on my own because then I won't do it. (Julie)
However, many students expressed hesitation towards exercising in a group based setting. Five students expressed that exercising in a group would be distracting, and seven students expressed they were uncomfortable exercising in front of others because they were self-conscious of their exercise abilities. The quote from Kathy illustrates the difficult balance that needs to be considered in relation to delivering a group-based program for students with depression:

I don’t feel comfortable working out in front of other people, I feel like maybe people judge, like once I went to the gym, and there were a lot of people, and I felt anxious, and that a lot of people were judging. If there are other people with similar experiences I think I would still be a little anxious, but I would be receptive to it. (Kathy)

Although the majority of students preferred an exercise program to be delivered on a one-on-one basis, many students recognised the importance of including a social aspect to an exercise program in the context of a depression treatment. This was evident through the way Allison described how depression could cause social isolation, and introducing a social aspect at some point during the program would be beneficial:

I think it would be really great to have like a peer aspect to it,…, I think a big thing with depression is that a lot of people draw inward a lot, so I mean exercise would be beneficial, but also the social aspect would be important. I think maybe half way through or a little bit of the way through it would be important to introduce that aspect. (Allison)

All students discussed a preference for an exercise program to be structured in a way that provides guidance and accountability. However, there was no consensus as to whether the exercise program should be delivered on a one-on-one basis or through group-based activities. This likely reflects variability in individual preferences, although there was interest in group based activities if students could relate to other participants in some way.

3.5.2 Ramping Exercise - ‘Need to start slow.’

All students expressed the need for an exercise program to align with their exercise ability. Given that all students were inactive, students expressed a preference for an exercise program to
be structured in a way that gradually increases exercise participation to avoid feeling discouraged with not being able to keep up:

I am not an active person, to begin with, so thinking of those high-intensity interval training things, it is a little bit daunting, you don’t, because you feel like you are just a beginner so you won’t be able to keep up, so starting off with more low intensity and working your way up is a lot better. (Julie)

Students described a preference to ease into exercise, with a preference for exercise programs to start off by offering short, low-intensity bouts of exercise. The majority of students viewed 30-45 minute exercise sessions as a realistic starting point: As Natasha reasoned: “Probably half an hour, I guess you can say you can watch a television show in a half an hour, so you could probably work out for a half an hour.” Similarly, Rose said, “I feel like 30 minutes is good, as in I think that 30 minutes is a good start for people who are beginning.”

These accounts highlight the need to frame exercise programs in a way that would appeal to inactive students’ views of the feasibility in making time for engaging in exercise and providing students with the rationale behind exercising for a certain length of time. This notion was further expressed by many students who described a preference for the length and frequency of exercise sessions to be dictated by evidence for the greatest improvements in depression symptoms. As Sam mentioned:

I think structure, I don’t have an issue with attending a class three times a week for an hour or so on, or if you wanted to do something each day, if you are doing something that is for treatment of depression it has to be serious, but not just that, it needs to be perceived to be serious. I think there is definitely a component that is has to be evidence-based amount of time. (Sam)

For the most part, students discussed broad activity and exercise preferences, and this was attributed to their inexperience with structured exercise participation. For example, when asked what activities should be included in the exercise program, Nancy replied saying she is, “unsure about or familiar with a lot of exercising,” highlighting the need for the variety and intensity of activities offered by the program to be based on evidence, or, as Nancy put it, “so that there is an effect.” However, many students had mixed feelings towards an exercise program promoting low-intensity or walking as the main activity. For example, John said, “a walking program
would not be too enticing, I would probably question the effectiveness of the program.” The majority of students discussed how walking was already the main form of activity they were currently participating in and expressed a disinterest in increasing their walking behaviour. However, many students recognised the importance of starting off with low-intensity activities, especially when coping with low mood and energy levels. As Julie mentioned, “…when I am in a low mood there is nothing that will get me moving, maybe like walking possibly. Otherwise I am just way too tired to do anything.” All students identified that participating in an exercise program would provide them with the opportunity to increase their exercise abilities and therefore expressed the need for an exercise program to build up exercise intensity.

Given that the majority of participants did not perceive themselves as physically active, there was an agreement among participants regarding the need to start off with low-intensity exercise to avoid feeling discouraged. Furthermore, while the majority of students preferred a structured exercise program, this was not expressed with regards to the type of exercise offered by the program. Students commonly referenced the individualized nature of activity preferences. For example, some students mentioned that repetitive exercises would make them bored and preferred an exercise program to promote, as Anna said, “things [activities] where you don't feel like you are actually doing exercise.” While others expressed that an exercise program needed rigidity to properly learn how to exercise, such as when Janice said: “For me it would be discipline, with the schedule and stuff like that, learning to properly exercise.” Therefore, the majority of students expressed their preference for an individualized approach to exercise activities, where a program would provide an opportunity to ‘try out’ various activities and exercise intensities, to find what works best for them, and to avoid losing interest.

3.5.3 Gaining the skills – ‘doing it on my own.’

Students expressed a preference for an exercise program delivered as a treatment for depression to provide them with the tools required to maintain physical activity behaviour change. The majority of students discussed how the development of exercise skills was necessary to build exercise self-efficacy to facilitate confidence in their ability and interest in exercising on their own, as Mira mentioned, “I think stuff like skill building would be good, just so you know that person knows the skills now, and they can do it on their own.” Similarly, Kathy described her preference for an exercise program to develop her exercise self-efficacy, “…showing what types of exercises I can do, like stretching, a bit of both, more intense exercises. Yeah also like skills
and how to use the machines, so if I decide to go to the gym after the program, I will know how to use them.”

Building self-directed behaviour by providing support into maintenance through more remote intervention styles was also expressed as important:

… with regards to remote access or online I am not saying I wouldn't be open to trying it but if I did there would have to be a component of, ‘okay is this working for this person’, or it might be good as a maintenance component, where after the directed 6 or 12 weeks or what have you, you make it a part of their routine, and you would use this to maintain that. (Sam)

Additionally, many students expressed a preference for exercise facilitators to motivate students to engage in active opportunities outside of the program, by providing them with information on where and how they can be active on their own:

…the exercise part being the most of it [exercise program], where you would be learning new skills and exercises, and in the counselling part probably referrals to other things, offered already at the athletic center or on campus, like the counselor letting me know about swimming classes or other things. But there should be a little push by the counselors to sign up for these types of programs. (John)

The need for structured support in starting and adhering to an exercise intervention for depression remained a recurring issue for the majority of participants.
4 Overview

The objective of this study was to explore the acceptability and preferences of students regarding exercise as a potential treatment for depression offered in the university setting. The following sections discuss potential factors that explain the students’ interest in exercise as a therapeutic option, pragmatic issues related to the promotion, design and delivery of exercise-based treatments for students seeking depression treatment, and outlines recommendations to support the uptake of and participation in exercise-based treatment for depression.

4.1 Improving Potential Uptake

An important focus of this research was attempting to identify why individuals were interested in exercise. All students considered exercise to be an acceptable treatment option for their depression symptoms which provided unique insights into the characteristics of students who would most likely participate in exercise as a treatment for depression. As the first qualitative study to explore the acceptability of exercise for students seeking depression treatment, the findings presented are novel in that they provide evidence that it may be possible to identify individuals who are more predisposed to consider exercise as a treatment option; this may help clinicians prescribe exercise as an antidepressant more efficiently. Furthermore, findings provide some guidance as to how exercise as a treatment option should be framed and delivered to students.

4.1.1 Who is interested in exercise as a treatment for depression?

This study shed light on some common factors that appeared to underpin interest in exercise as a treatment option. These characteristics included: prior interest and enjoyment in exercise and physical activity, belief in the benefits of exercise on psychological well-being, and an open attitude towards alternative approaches to managing and treating depression symptoms. These characteristics may be informative for clinicians when considering recommending exercise to students. The factors underpinning students’ interest in exercise also provide support for the advancement of ATI research by highlighting possible aptitudes of individuals who may respond most favourably to a recommendation to exercise. These factors may also be useful to
consider when evaluating the effectiveness of exercise-based depression treatment in comparison to traditional therapies for individuals seeking depression treatment.

In the current study, the majority of students discussed past experiences of recreational physical activity and sports participation as well as prior interest in engaging in structured exercise. Although for some, experiences participating in planned exercise were short lived and sporadic, the findings provide evidence that students were interested in exercising in the past and that physical activity was an enjoyable and important part of their life at some point, possibly contributing to their current motivation to engage in exercise (Brunet & Sabiston, 2011). Furthermore, students’ prior personal experiences influenced their knowledge, awareness and more importantly their beliefs in the benefits of engaging in regular exercise on their psychological well-being. Students’ perceptions of the consequences or the adverse effect of depression on their lives were also found to relate to students beliefs’ in the benefits of engaging in exercise for managing their depression (Baines & Wittkowski, 2013). An individual’s beliefs are likely to impact an individuals’ interest in implementing certain coping methods over others for overcoming psychological problems (Furnham & Henley, 1988). Moreover, beliefs also possess significant implications for the potential success of interventions offered by health professionals (Faulkner & Biddle, 2004; Ross & Hardy, 1999). In line with previous research on the psychological benefits of exercise participation, students expressed interest in exercise through their perceptions of the mental health benefits of exercise engagement including, feeling productive, increased energy levels, and positive effects on self-esteem and body image (Biddle & Mutrie, 2008; Williams et al., 2007). Although the current study did not include a non-depression treatment seeking comparison group, these findings contrast previous research demonstrating that depressed individuals make fewer recalls of positive physical activity experiences, report less enjoyment from physical activities (Azar et al., 2010; Seime & Vickers, 2006) and less positive mood and energy through exercise compared to non-depressive individuals (Pomp, Fleig, Schwarzer, & Lippke, 2012). The findings from the current study suggest that exercise-based depression treatment programs may be more appropriately suited for individuals with a prior interest in exercise and who hold positive beliefs as to the benefits of exercise for psychological well-being (Seime & Vickers, 2006).

The findings from the current study also provide evidence for the appropriateness of exercise-based depression treatments for individuals who present to mental health services with an open
attitude to exploring alternative treatment options available to them, with a commitment to figuring out what works best for their depression symptoms. Additionally, many students discussed a preference for avoiding antidepressant medication; this is important to consider given that antidepressants are commonly prescribed in the treatment setting (Olfson & Marcus, 2009). In some cases, this preference to avoid antidepressant medication facilitated interest in exploring alternative treatment options, including exercise. On the other hand, students also expressed an acceptance for exercise as a treatment after experiencing a lack of therapeutic response from other therapies; leading to a change in their expectations regarding the treatment they initially received or sought for their depression (Mota-Pereira et al., 2011). For example, for some students who expressed an initial need to deal with their depressed mood quickly, initially interpreting their depression as an acute problem, medication was the preferred treatment option. However, if the student experienced negative side effects or a lack of response to antidepressants, they modified the way they interpreted their depression. This modification in the way students interpreted their depression (i.e., acute vs. chronic and cyclical) was associated with changes in the strategies used to manage their condition (Petrie & Weinman, 2006).

Moreover, if depressed mood is perceived as chronic and cyclical in nature, students expressed that exercise may provide them with a long-term solution or ‘tool’ for managing their depression symptoms. These findings highlight the importance of patient-centered care approaches; where doctor-patient conversations on attitudes, beliefs, and preferences are important in treatment decision making and may contribute to the acceptance of exercise as a treatment (Karasz et al., 2012; Weinstein, 2012)

4.1.2 How can we better target these students?

Students articulated the multifaceted process involved in the development of interest in exercising as a treatment for depression and provided practical insights into the factors that influence their motivation to start an exercise program in the context as a treatment for depression. The barriers and issues in motivation to exercise discussed by students are well documented in mental health patients referred to exercise therapy (Crone et al., 2005; Din, Moore, Murphy, Wilkinson, & Williams, 2015; Faulkner & Biddle, 2004; Markland & Tobin, 2000; Moore et al., 2011; Williams et al., 2007). Consistent with previous findings, students discussed barriers in their motivation to exercise through their experiences of depressed mood contributing to low energy levels (Faulkner & Biddle, 2004), and lack of motivation to engage in self-care and healthy habits (Daley, 2002). Students also expressed a lack of confidence in
active settings (Moore et al., 2011), and the inactivity of their surrounding social networks (i.e., family and friends) as barriers to participating in exercise (Azar et al., 2010a; Crone et al., 2005; Crone et al., 2006; Searle et al., 2011; Seime & Vickers, 2006). Consistent with previous findings, students discussed the need for support and guidance to motivate them to exercise and assist them in overcoming the barriers to exercise (Callaghan et al., 2011; Weinstein, 2012).

Students expressed the need for informational, emotional and physical support (i.e., encouragement and participation of others) from individuals who were knowledgeable on exercise (i.e., exercise professionals, active friends and family members) to overcome the barriers to exercise participation (Moore et al., 2011; Rollnick, Miller, & Butler, 2008). However, students also discussed the centrally important role clinicians play as a first contact and primary source of informational support on depression and its treatment (Simon, Loh, Wills, & Härter, 2007). Students discussed the need for support from individuals they perceived as knowledgeable and credible in the treatment of depression (i.e., clinicians and mental health professionals) to provide them with information on the benefits of exercise and to refer to appropriate exercise opportunities. These findings are in line with previous studies of general practitioner exercise referral schemes, where medical sanctioning of programs and framing exercise engagement as part of a treatment plan has been identified as an important motivator for exercise participation and may increase the perceived credibility and relevance of exercise as a treatment for depression (Markland & Tobin, 2010; Serrano Ripoll et al., 2015; Singh, 1997). The findings also support the body of literature that advocates for the need for formal inclusion of exercise into depression patient treatment plans (Crone et al., 2006; Taylor & Faulkner, 2014).

Additionally, the manner in which the advice to exercise is presented was also identified by students as further influencing their motivation to take up exercise as a treatment for their depression (Morton, Biddle, & Beauchamp, 2008; Serrano Ripoll et al., 2015). Students seeking treatment for depression have a diverse range of individual circumstances (i.e., how they perceive their depression and where they are in treatment, the level of support available to them, their level of confidence in participating in structured exercise and anxiety related to exercising in public facilities) that influence their perceptions of the feasibility of taking up a recommendation to exercise. These findings relate to the theme ‘Promoting uptake through overcoming initial anxieties’ discussed in Moore et al.’s (2011) qualitative study which
interviewed health professionals referring patients to exercise schemes. One clinician interviewed in Moore et al.’s (2011) study mentioned how during initial telephone contact, advertising the availability of patient-only classes in which fitter mainstream users would not be present had led to positive responses, similarly another talked of sending out information packs detailing what the scheme would entail prior to program entry (Moore et al., 2011). There is a need to target referring clinicians and equip them with strategies (such as the ones described above) to help students to overcome anxieties about the exercise environment while providing education and interpersonal support to assist students’ confidence and motivation.

Furthermore, broadly targeted, one size- fits all interventions or general recommendations to make lifestyle changes (i.e., increasing physical activity levels) may be difficult to justify (Serrano Ripoll et al., 2015). Students expressed that in order for an exercise recommendation to be perceived as a feasible option, referral to an evidence-based, supervised and structured exercise program was preferred. Recent trials promoting habitual physical activity through counselling have been largely unsuccessful in positively changing mood compared to individuals only receiving usual care (e.g., Chalder et al., 2012; Mailey et al., 2010) and therefore, referral facilitated exercise programs may be necessary for many individuals. However, based on the availability of resources, this may have important implications for the feasibility of promoting exercise as a treatment for depression.
4.2 Improving Potential Participation

All students expressed interest in exercise as a treatment for depression and therefore provided useful insight into the design and delivery of an acceptable program for students interested in exercise and seeking treatment for depression. Students discussed how their preferences and expectations of an exercise program could influence their participation in and satisfaction with exercise as a treatment. Within the exercise and mental health literature, qualitative studies have primarily explored the experiences of participants either during or after taking part in an exercise program. Further, research on the acceptability for exercise programs has mainly examined attitudes, preferences, and barriers to exercise through self-report questionnaire methods (Busch et al., 2016; Usher, Stanbury, Cheeseman, & Faulkner, 2007). The current study contributes novel findings to the body of literature by providing a deeper understanding of the underpinning attitudes of individuals interested in participating in an exercise program for the treatment of depression, as well as the exercise preferences of individuals seeking treatment. These findings provide useful information to support the promotion and development of exercise programs for depression treatment.

4.2.1 Attitudes toward participating in an exercise program

Students generally held optimistic views regarding their participation in an exercise program as a treatment for depression. Students described an interest in an exercise program to facilitate the integration of exercise into their daily life, foster feelings of social relatedness and develop exercise self-regulatory skills that would potentially translate into enhanced self-regulation in daily living. These findings contribute to the current literature on the effectiveness of exercise programs in maintaining exercise participation in individuals with mental illness.

All students expressed their participation in an exercise program would assist in developing an exercise regime and changing their perception of the effort required to integrate exercise into their daily lives (Faulkner & Biddle, 2004). Students discussed how their participation in a structured exercise program would also facilitate the development of routine exercise, increase exercise self-efficacy and make time for doing something good for one’s self. Furthermore, in order to maintain a new behaviour it is important to incorporate new behaviours into one’s schedule leading to improvements in scheduling self-efficacy (Kennett, Worth, & Forbes, 2009). Increasing feelings of self-efficacy has also been shown to lead to an increase in the effort and time individuals commit to a task and is considered to be one of the most consistent predictors...
of exercise adherence (Bandura, 2010). These findings suggest that participating in an exercise program may be viewed as something greater than just the idea of exercising, by promoting a sense of capability (Danielsson & Rosberg, 2015; Mason & Holt, 2012). The experience of participating in an exercise program may allow students with the opportunity to view themselves differently, as someone who is capable of exercising even though depression debilitates many other dimensions of life (Danielsson & Rosberg, 2015). The enhanced capability can be related to the psychological constructs of self-efficacy and self-determination theory, previously pointed out as a suitable framework for understanding and promoting exercise and physical activity within mental health services (Sørensen, 2006; Wilson, Mack, & Grattan, 2008) and the primary care setting (Fortier et al., 2011).

Consistent with research demonstrating the importance of social integration into exercise environments in enhancing the individuals’ motivations for exercise, students placed considerable emphasis upon their participation in an exercise program to foster feelings of social relatedness within the program and develop feelings of social relatedness outside of the program (Moore et al., 2011). This was expressed through perceptions of exercising with others as supporting or discouraging exercise program participation and satisfaction. Interpreting these findings from a self-determination perspective (Deci & Ryan, 2008), participating in exercise where others are perceived as ‘more experienced exercisers’ may have a detrimental impact on participation, by undermining internal motivation and thwarting students’ need to feel competent (Din et al., 2015; Moore, Raisanen, Moore, Din, & Murphy, 2013). Students expressed the expectation for an exercise program to provide a social environment where they felt they could relate to others participating in the same program for the same reasons and engage in exercise in a comfortable setting where students could develop competence together in becoming independent exercisers (Moore et al., 2013).

Arguably one of the more significant findings from this study was that students perceived that participating in an exercise program, designed and delivered as a treatment for depression, would facilitate the development of healthy coping mechanisms and transferrable self-regulatory strategies to improve well-being. Previous literature exploring the body in depression identifies physical therapy as a way for individuals with depression to ‘sense something more’, a contrast to the feeling of deadlock in depression described as a perceived numbness, stiffness, and encapsulation, which interrupt the person’s intentional acts and keep him or her from engaging
in life (Danielsson et al., 2016.). Although in the current study, the body in depression was not explored, these findings broadly relate to how students viewed their participation in an exercise program would provide them with the means to adopting a productive lifestyle and relate to previous literature suggesting that exercise programs should aim to develop critical skills that are transferrable to the community setting and between activities (Daley, 2002). Students identified the importance of the development of individual coping and self-regulatory strategies (i.e., goal setting, self-monitoring, planning) focused on improving their health and well-being. These findings support the application of behaviour change strategies delivered through an individualized behavioural counselling component integrated within exercise programs, for the promotion of self-regulatory behaviours to motivate and sustain exercise behaviour (Michie, Johnston, Francis, Hardeman, & Eccles, 2008; Williams & French, 2011). Physical activity counselling has been previously identified as a useful technique to provide patients with the support they need to overcome barriers to becoming active (O’Sullivan et al., 2010). Furthermore, the development of self-regulatory skills through participation in an exercise program was perceived by students as providing a ‘gateway’ to an improved lifestyle.

Therefore, the findings from the current study provide support for the literature on exercise and physical activity counselling, which suggests that it is important that exercise therapy incorporates practical strategies that give individuals the physical and psychological tools to sustain their exercise behaviour and experience positive psychological gains from exercise once the therapy comes to an end (Daley, 2002; O’Sullivan et al., 2010)

4.2.2 Exercise Program Preferences

Although students expressed interest in a physical activity counselling component, there was considerable emphasis placed on the importance of supervised exercise sessions (Searle et al., 2014). These finding relate to Callaghan et al.’s, (2011) study, suggesting that exercise combined with other features may be more beneficial than exercise alone. Although all students expressed an interest in exercising, they also discussed the need for an initial push or external motivational support to begin exercise. In contrast to adults with depression, who prefer exercise programs be provided in the home (Busch et al., 2016), students described a preference to attend an exercise facility and work with exercise facilitators to provide accountability, guidance and feedback on progress (Busch et al., 2016; Crone, 2007; Searle et al., 2014). Students had low perceptions of their exercise abilities and expressed they did not possess the behavioural self-regulatory skills required to engage in exercise on their own. Therefore, students described a
preference for initial one-on-one sessions with exercise facilitators to assist them in planning exercise, setting realistic goals and monitoring exercise progress (Richardson et al., 2005; Searle et al., 2014). Furthermore, students’ anxiety about exercising in the presence of experienced exercisers, worries about assimilating into an unfamiliar social environment, or uncertainties in being expected to do exercises they were not able to do (Moore et al., 2011), highlights the importance of referring students to trained exercise facilitators administering an exercise program (Richardson et al., 2005; Searle et al., 2014). Additionally, consistent with previous findings, students expressed hesitation towards exercise programs delivered remotely (i.e., online), although they were open to the idea of using an online exercise program as a maintenance tool after completing an in-person exercise program (Searle et al., 2014).

In line with the exercise treatment guidelines for the management of depression (Ravindran et al., 2016), students described the need for a program to start by offering short (30-45 minute), low- moderate intensity exercise sessions to avoid initial feelings of discouragement due to their inactivity levels (Stanton & Reaburn, 2014). Students also expressed interest in a program to ramp the length of sessions, intensity of exercise and the variety of activities offered to them to develop their exercise confidence and maintain interest in the program (Faulkner & Biddle, 2004). The findings were found to contrast with previous exercise intervention RCTs conducted in student populations, where only aerobic exercise (Hemat-Far et al., 2012; McCann & Holmes, 1984; Nabkasorn et al., 2006) or only physical activity behavioural counselling with self-monitored walking (Mailey et al., 2010) was administered. Although students’ exercise preferences were broad, students preferred an exercise program to be designed based on evidence. However, in contrast to previous studies, students discussed that they were not interested in participating in a walking program (Busch et al., 2016; Crone, 2007). Students’ perceived their participation in an exercise program would provide them with an opportunity to ‘explore’ various types of exercise (i.e., aerobic and strength training), and find what works best for them in a supportive exercise setting. These findings provide support for the previous literature on the need for individual tailoring of exercise interventions (Callaghan et al., 2011; Richardson et al., 2005).

The exercise program preferences of students may further influence their participation in exercise once recommended as a treatment for depression by a health professional. The findings support previous research suggesting that general exercise scheme referrals and written lifestyle
change recommendations may be less suited to meet the needs of patients with mental health concerns (Crone et al., 2008). Students’ perception on the feasibility of taking up a recommendation to exercise was highly dependent on how the recommendation was presented to them and the level of support available for implementing the recommendation (Serrano Ripoll et al., 2015). While previous UK exercise schemes involve referral to a leisure center (Mental Health Foundation, 2005), students expressed a preference for an exercise recommendation to be accompanied by referral to a structured and supervised exercise program designed for students seeking depression treatment. The development of, and referral to, such programs may be necessary to appropriately promote exercise as an effective antidepressant, meet the needs of students seeking treatment for depression, and facilitate the acceptance of exercise when offered as a treatment for depression in the university setting.
4.3 Strengths and Considerations

This study provides valuable insight into students’ acceptability and preferences of exercise as a treatment for depression, although there are a few considerations that must be addressed. The first consideration that should be made is that I am a novice researcher. However, my active role as a physical activity counselor (PAC) for the MoveU.HappyU program provided me with first-hand experience working with students and increased my ability to develop rapport with participants during the interviews. My hands-on experience in administrating an exercise program (PAC and facilitated exercise sessions) for students seeking treatment for mental health issues placed me in a position of strength from which to investigate the experiences of the students in this study. Secondly, my role as a PAC assisted with the recruitment of participants. Purposive sampling based on specific inclusion criteria was used to recruit students seeking depression treatment from university health services by targeting recruitment efforts towards the health and wellness center on campus. However, given that both the current qualitative study and the MoveU.HappyU physical activity counselling pilot program were promoted in the centre at the same time, the majority of students recruited were, in fact, interested or looking to participate in a physical activity program. This may have influenced their accounts of their exercise and depression management experiences, and the findings may be different if recruitment for the current study occurred at a time when the pilot program was not being offered to students. However, this can also be considered a strength of the study, as this provided an optimal opportunity to investigate the characteristics, views and preferences of these specific students who are not only seeking treatment for depression, but also interested in the role exercise may play in alleviating depression; this further allowed for the exploration of exercise program preferences and various issues relating to student participation in exercise as a treatment. The findings from this study can also contribute to increasing the reach of future interventions to better identify, target, and meet the needs of students who are interested in exercise as a treatment for depression to improve adherence and outcomes of exercise programs.

The majority of students interviewed were female, and although female students do generally report higher rates of depression, the difference between the prevalence of depression in male and female students is not large (weighted mean 29.9% in females’ vs. 24% in males) (Ibrahim et al., 2013). Furthermore, females are more likely to seek treatment for depression and mental health concerns; this may have contributed to the considerable interest from female students to participate in the current study. Given the low number of males interviewed it was not possible
to explore gender differences in exercise and depression management experiences and preferences. Future research could explore whether such differences do exist.

The sample of participants in the current study is representative of the depression levels of students at the University of Toronto. University of Toronto specific data from obtained from the American College Health Association National College Health Assessment identifies that while 20.7% of students reported depression as affecting their academic performance in 2013, only 7.9% of students were actually diagnosed or being treated by a professional for depression (American College Health Association, 2013). This should be considered in light of the fact that although students were actively seeking treatment for depression, almost half of the students in this study were found to have no depression based on MDI scores. However, this may also be considered a particular strength of this study, where students with varying degrees of depression (from no depression to severely depressed), expressed interest in exercise and acceptance of exercise as a treatment for depression with similar issues related to their perceptions and preferences. Yet care is required in considering whether the current findings are transferable to the context of students with a clinical diagnosis of MDD.

The use of the semi-structured interview guide as a tool to collect the data provided rich first-hand accounts and unique insights from students actively seeking treatment for depressive symptoms. Applying an ATI research paradigm to the development of the semi-structured interview guide used to collect data, provided a pragmatic approach to exploring student interest in exercise in the context of depression management and treatment. Furthermore, exploring experiences, perceptions, and preferences in this way allowed for the recognition that students’ exercise and depression management experiences vary, as do the multitude of factors that contribute to their interest and preferences for exercise as a treatment for depression. However, the ‘one-shot’ interview is a limitation and conducting further interviews over the course of a semester might have revealed further insight.
4.4 Conclusion and Future Directions

Student perceptions of exercise as a treatment for depression contribute to the knowledge surrounding the acceptability and feasibility of promoting exercise programs in university counselling settings. Furthermore, the findings from this qualitative study provide insights into how students’ attitudes and preferences regarding an exercise program can potentially influence program participation and satisfaction. As a result, the findings from this study provide implications for the promotion and development of future exercise interventions delivered to students seeking treatment for depression. Furthermore, the findings from this study are in line with the University of Toronto’s Mental Health Report recommendations for applying a systems approach to mental health awareness and treatment; which includes increasing supportive and inclusive conditions for students that involve multiple stakeholders so that a greater range of appropriate intervention therapies can be offered to students (University of Toronto, 2014).

Future research applying the ATI framework is required to test if students interested in exercise as a treatment for depression can be better targeted through the aptitudes identified in this study and assess the effectiveness of exercise interventions delivered to students seeking treatment for depression. Additionally, in line with a patient-centered approach, where mental health professionals frequently consider the individual's attitudes, beliefs and preferences during treatment decision making (Karasz et al., 2012); the findings may further assist in the development of a protocol to guide mental health professionals in their decisions to consider exercise for particular students. Therefore, conversations with patients on their past interest in exercise, beliefs of the benefits of exercise on depressive symptoms and understanding the individual’s openness to engaging in alternative depression management approaches, may assist mental health professionals in referring individuals, who may respond more favourably, to exercise-based treatment options (Seime & Vickers, 2006; Weinstein, 2012).

This qualitative exploration of the experiences and preferences regarding exercise and depression management of students seeking depression treatment also provides support for the use of theories of self-determination and self-regulation in understanding student’s motivations and interest in exercise as a treatment for depression (Ryan & Deci, 2000). Apparent through
students’ discussion on their need for clinician support to motivate participation in exercise as a treatment for depression, collaborative approaches that include referral to exercise professionals are required to increase the uptake of exercise in the treatment setting (Tulloch, Fortier, & Hogg, 2006). Therefore, the development of stronger partnerships between exercise professionals and those who deliver mental health services is required so that exercise programs are included in initial treatment plans for exercise to be perceived by individuals as relevant to the treatment of their depression. Future research is needed on how to better equip mental health professionals with information regarding the benefits of participating in exercise for psychological wellbeing, as well as opportunities for their patients to take part in exercise, for an exercise-based treatment option to be considered credible and feasible by patients. These findings support previous research on the need for clinicians to have an awareness of the extent the goals of various treatments for depression management are perceived as appropriate by patients (Johnston et al., 2007). Rather than a general recommendation to exercise, professional referral to exercise programs, framed in a way that considers students’ barriers to motivation, is necessary to facilitate perceptions of the feasibility of engaging in exercise as a treatment for depression.

Additionally, exercise-based depression treatment programs need to consider students’ exercise experience and ability levels. The findings from this study provide evidence that students prefer participating in an exercise program that delivers facilitated exercise sessions that ramp time commitment, exercise intensity and encourage the development of self-regulatory skills to become independent exercisers. However, the contrast between the preferences for the structure of an exercise program the students interviewed in this study described, and the exercise program preferences described by the participants in Busch et al.’s (2016) study, suggest that the exercise program preferences for the treatment of depression in students are different from adults with depression. Moreover, while including a group/social component is beneficial if the group is perceived as relatable, the findings from this study suggest that initial one-on-one sessions may be necessary to familiarize students with the exercise setting and increase exercise self-efficacy. Future research should consider these preferences when designing exercise for depression programs for student populations.

In conclusion, the sample of students seeking treatment for depression who participated in the current study were interested in exercise and found exercise to be an acceptable treatment option. As previously discussed, students’ acceptability of exercise as a treatment for depression
was informed by: (1) interest in exercise as a treatment, (2) perceived feasibility of engaging in exercise, (3) attitudes and outcome expectations, and (4) exercise program preferences. The findings identify a particular profile of students, who should be targeted and referred to exercise as a treatment for depression. However, there is a need for clinician support during the recommendation of exercise-based treatment options, for exercise to be perceived as a credible treatment for depression. Furthermore, referral to exercise programs delivered by exercise professionals to aid students in overcoming barriers to becoming physically active is required to facilitate exercise participation. These findings strengthen the case for the acceptability of exercise as a treatment for depression in students and provide useful insights into the exercise program preferences of students that should also be considered when designing exercise for depression programs, as they may differ from those of depressed adults. Further research is required to test the feasibility and effectiveness of applying the findings in the clinical setting.
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Exploring Perceptions of Exercise as Treatment among Students Seeking Treatment for Depression

We are looking for student seeking treatment for depression to participate in a study exploring their perceptions of exercise for the treatment and management of depression. For your participation, you will be compensated with a $10 Starbucks Gift Card.

To participate in this study you must be:
- University student
- Above the age of 18
- Seeking treatment for depression from the Campus Health Services
- You must be able to read and speak English.

Your involvement in this study will involve:
- Completion of a questionnaire package on questions regarding personal demographics, physical activity levels and mental health.
- Participation in one 75 minute, one-on-one meeting

In the meeting you will need to discuss your past exercise experiences and your perceptions on exercising for mental health benefits. Furthermore, you will be asked questions relating to your opinion and preferences on for an exercise intervention for student seeking treatment for depression.

For more information please contact Janine Omran at janine.omran@mail.utoronto.ca or 647-993-9967
Appendix B – Self-Report Questionnaires

Demographic Questionnaire

1. How old are you?
   _______ years old

2. What is your gender?
   □ Male
   □ Female
   □ Transgender
   □ Two-spirited

3. How do you describe yourself?
   □ White
   □ Black
   □ Hispanic or Latino
   □ Asian or Pacific Islander
   □ Native/Aboriginal/First Nation/Métis/Inuit
   □ Other
   □ Prefer not to answer

4. Which of the following best describes your housing situation?
   □ I live in a campus residence
   □ I live with roommates/friends/partner off-campus
   □ I live with family off-campus
   □ I live alone off-campus
   □ I live in housing associated with a fraternity or sorority
   □ Homeless/no fixed address
   □ Other

5. Are you a:
   □ Full-time student (Undergrad student 12 credits or Grad student 9 credits+)
   □ Part time student (Undergrad student less than 12 credits or grad student less than 9 credit)

6. What program are you in? _______________________________________________

7. What year of study are you in? ___________
### Major Depression Inventory (MDI)

The following questions ask about how you have been feeling over the past two weeks. Please put a tick in the box which is closest to how you have been feeling.

<table>
<thead>
<tr>
<th>How much of the time ...</th>
<th>All the time</th>
<th>Most of the time</th>
<th>Slightly more than half the time</th>
<th>Slightly less than half the time</th>
<th>Some of the time</th>
<th>At no time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Have you felt low in spirits or sad?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2 Have you lost interest in your daily activities?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3 Have you felt lacking in energy and strength?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4 Have you felt less self-confident?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5 Have you had a bad conscience or feelings of guilt?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6 Have you felt that life wasn't worth living?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7 Have you had difficulty in concentrating, e.g. when reading the newspaper or watching television?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8a Have you felt very restless?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8b Have you felt subdued or slowed down?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9 Have you had trouble sleeping at night?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10a Have you suffered from reduced appetite?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10b Have you suffered from Increased appetite?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Total score [ ] [ ]
INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

1. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

<table>
<thead>
<tr>
<th>days per week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>□ No vigorous physical activities</td>
</tr>
</tbody>
</table>

2. How much time did you usually spend doing vigorous physical activities on one of those days?

<table>
<thead>
<tr>
<th>hours per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>minutes per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>□ Don’t know/Not sure</td>
</tr>
</tbody>
</table>

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

<table>
<thead>
<tr>
<th>days per week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>□ No moderate physical activities</td>
</tr>
</tbody>
</table>

4. How much time did you usually spend doing moderate physical activities on one of those days?

<table>
<thead>
<tr>
<th>hours per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>minutes per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>□</td>
</tr>
</tbody>
</table>
Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

□ [ ] days per week

□ No walking → Skip to question 7

6. How much time did you usually spend walking on one of those days?

□ [ ] hours per day

□ [ ] minutes per day

□ Don’t know/Not sure

The last question is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the last 7 days, how much time did you spend sitting on a week day?

□ [ ] hours per day

□ [ ] minutes per day

□ Don’t know/Not sure

This is the end of the questionnaire, thank you for participating.
Appendix C – Interview Guide

Introduction and Instructions

Hello, my name is Janine, and I am a graduate student in the Faculty of Kinesiology and Exercise Sciences. Thank you for agreeing to participate in my study. I would just like to remind you that I am interested in your past exercise experiences, your perceptions of exercise for mental health benefits (benefits and/or barriers) and your preferences for an exercise program if developed. Before beginning the interview, please read over and sign the consent form and complete the questionnaire package. If you have any questions, please let me know.

Review informed consent and letter of information with the participant and read the confidentiality portion aloud to the participant. 

Before we begin, I would like to remind you that our discussion will be audio recorded, but you may ask me to turn the recording off at any point if you feel uncomfortable (Turn on and test recorder).

Background and Icebreaker Questions
1. What program are you studying?
2. How did you find out about this study?

Physical Activity Experiences and Perceptions
1. Have you ever participated in any structured exercise (i.e., signing up for a gym) or been part of a sports team, maybe in high school or during your time in university? Hand paper to the participant and ask them to timeline any past exercise experiences. Provide them with researchers own exercise timeline as an example.
   a. Can you explain….
   b. Do any experiences stand out or do you have any clear memories of a specific experience?
   c. What makes these experiences stand out?
   d. Did anyone or anything encourage you to participate in these experiences?

Now I would like to talk about your current exercise and physical activity participation.
2. How much exercise do you currently do?
   a. Would you consider yourself physically active? – Do not ask if they say none.
b. Are you part of any sports teams or clubs?
   i. Which ones? How did you get involved?

3. Do you participate in any exercise during your leisure time?
   a. Do you enjoy any sports? Which ones? Any reason why those sports in particular?
   b. What are the other types of activities you participate in?
   c. Where do you participate in activity/sports?

4. Can you think of any exercise you participate in during non-leisure time?
   a. Such as during school/ work, transport or anything such as household chores?

5. How do you feel when you participate in exercise?
   a. Good? Bad? Why?

6. Would you like to participate in more exercise?
   a. Why or why not?

7. Can you name some barriers to participating in exercise that may prevent you from being as active as you would like to be?

8. Does your mood influence your ability to be active?
   a. In what way? Can you describe a time where your mood interfered with being active?

9. What helps or motivates you to be active?
   a. Any others? What makes them stand out?

10. How active are the people around you?
    a. Do they encourage you to be active?

11. What are the most important benefits (mental health and otherwise) of exercise to you?

Acceptability of Exercise for the Treatment of Depression
1. Can you tell me a little about what lead you to health services?
   a. What were you looking for from health services?
      i. What kind of information would you have liked to receive from health services?
ii. Is there any specific treatment you were expecting?

iii. Why do you think such treatment would help?

b. What lead you to seek information on treatment options at this point in time?

c. Is there anything or anyone that encouraged you to talk to health and wellness?

2. Before seeking out campus health services, did you try to get mental health related information from other campus services, maybe online or from family or friends?

a. Can you describe these experiences?

b. Have you tried any of the methods recommended from seeking this information?

i. Why or why not? Did anything change? Would you recommend these to a friend?

3. How about exercise? What if you were recommended to exercise, how would you feel about that?

a. Has anyone ever recommended exercising for mental health to you? Can you tell me about that?

b. What about other students like yourself seeking help for depression? Do you think they would be receptive? Why or why not?

4. Have you ever come across any information maybe online, on campus, through friends or family on the mental health benefits of exercise?

a. If so, can you tell me a little about how you got this information and what you thought about it?

5. Have you ever been “prescribed” exercise or have been told to participate in exercise to alleviate symptoms of depression?

a. Can you tell me about that experience?

6. What types of exercise do you think benefit mental health?


b. Why?

7. How confident are you in overcoming the barriers to exercise that you spoke of when you are in a good mood?

a. What about when you are in a depressed mood?
8. What is your level of interest in a program developed specifically to treat depression among university students using exercise?
   a. High, low, why?

9. What factors do you think would influence your participation in such a program if it existed?
   a. Individual? Social? Environmental?
   b. What do you think is the best way to get students with depression to sign up for an exercise program?

Preferences for an Exercise Intervention for the Treatment of Depression
1. If you were to participate in an exercise program aimed to alleviate your depressive symptoms, are there any activities you would like to see promoted in this program?
   a. Would you participate in a program that promoted low-intensity activities, such as walking?
   b. How much time do you think should be spent engaging in exercise activities recommended by the program? (How long would you be willing to exercise for? 10-minute bouts? 20-minute bouts? 30-minute bouts?)

2. If you have a choice of the method of delivery of the exercise program, how would you prefer to receive the intervention?
   a. Self-help vs. group based vs. one-on-one, online?
   b. Any reasons why?

3. What kind of features would you like to see in the program?
   a. Skill building? Scheduling? Social?

4. Would you like to be able to interact with others participating in the same program?
   a. Why or why not?

5. Is there anything else you would like to share?

Thank you for participating in this interview, just as a reminder everything you have shared with me if confidential and if you have any further questions, please contact me.
Appendix D – Consent Form

UNIVERSITY OF TORONTO
FACULTY OF KINESIOLOGY & PHYSICAL EDUCATION

LETTER OF INFORMATION AND CONSENT

Title of the study: Exploring Perceptions of Exercise as Treatment among Students Seeking Treatment for Depression

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INTRODUCTION:
You are invited to participate in this study to better understand the acceptability of an exercise intervention among university students seeking treatment for depression. You are receiving this invitation because you indicated interest in this study either through Campus Health and Wellness or by responding to posters in the Health and Wellness Clinic. The purpose of this study is to explore exercise experiences and perceptions that will contribute to the development of an exercise treatment option suitable and acceptable for students. We would like to know more about the use of exercise in reducing symptoms of depression.

OBJECTIVE:
Research shows that exercise can play a major role in improving depressive symptoms. The objective of this study is to examine whether exercise is an acceptable and feasible treatment option for students seeking treatment for depression.

PURPOSE OF THE STUDY:
The purpose of this study is to explore the perceptions and experiences of students with depression symptoms seeking help from the campus health services to gain an understanding of the level of acceptability and their preferences for an exercise intervention.

STUDY PROCEDURES:
Between 18 and 24 students will be recruited to participate in one 75 minute meeting with Janine Omran, a graduate student in the Faculty of Kinesiology and Physical Education at the University of Toronto. The interview will take place at the Mental Health and Physical Activity Research Centre (MPARC) interview room at the University of Toronto Athletic Center located at 55 Harbord Street, Toronto, ON. During this meeting, you will participate in an interview where we will discuss your past exercise experiences and your perceptions of exercising for mental health benefits. Furthermore, you will be asked questions relating to your opinion and preferences for an exercise intervention for students seeking treatment for depression. The interview will be audio recorded for more accurate data collection and transcribed for analysis. There will be no follow up, but you may be asked if you would like to be contacted in the future if and when a program is developed.

POTENTIAL BENEFITS
Participants may get no direct benefit from participating in the study although the findings from this study will provide a deeper understanding of the experiences of exercise in students with depression and their aptitude for exercise in the treatment of depression. The findings will also help inform and lay the groundwork for the development of an acceptable, effective and evidence-based exercise program for students with depression. We also hope that the discussions around exercise may benefit and motivate participants to pursue a more active lifestyle outside of the study context.

**POTENTIAL RISKS AND/OR DISCOMFORTS:**
There are no known risks associated with participation in this study. The interview will be recorded, but the data will be stored in a safe, encrypted archive, a summary of your transcribed data will be made available to you upon request. Your name and any other identifying information will also not be disclosed to anyone outside of the researchers conducting this study. You may feel anxious when meeting with the researchers or during the interview. Although some levels of anxiety can be expected, you are not required to remain in any situation causing anxiety or discomfort. You are not required to answer any questions that make you feel uncomfortable.

**COMPENSATION:**
You will be compensated for your participation in this study ($10 Starbucks Gift Card). You will also receive a summary report at the completion of the study. You will not be reimbursed for travel or parking costs.

**CONFIDENTIALITY:**
All information collected for this study will be kept strictly confidential. There will be no identifiable information in the questionnaires as your responses will be coded by participant identification number. The results from this study may be published and presented at scientific conferences. However your identity will not be revealed in the combined results. By signing this consent form, you give us permission to use your data in the preparation of published articles and research presentations. Given the novelty of the study, data collected will be stored confidentially for an indefinite time period for the purpose of potentially informing the development or evaluation of an acceptable and effective exercise program for students with depression.

The research study you are participating in may be reviewed for quality assurance to make sure that the required laws and guidelines are followed. If chosen, (a) representative(s) of the Human Research Ethics Program (HREP) may access study-related data and/or consent materials as part of the review. All information accessed by the HREP will be upheld to the same level of confidentiality that has been stated by the research team.

**VOLUNTARY PARTICIPATION AND/OR WITHDRAWAL:**
Your participation in this study is strictly voluntary. You may refuse to participate, or you may discontinue your participation at any time without explanation, and without penalty, until the data have been analysed and written up for publication. If you decide not to participate, or if you discontinue your participation, there will be no consequences for your medical care or your participation in any other research studies. Your data will be destroyed and will not be used.

**QUESTIONS AND CONTACT INFORMATION:**
If you have any questions concerning the procedures of this study or desire further information, please contact Janine Omran by e-mail at Janine.omran@mail.utoronto.ca.
If you have any questions about the treatment or rights of research participants, you may anonymously contact the University of Toronto Office of Research Ethics at: ethics.review@utoronto.ca | 416-946-3273
DECLARATION OF CONSENT

Title of the study: A Qualitative Study on the Exercise Perceptions of Depressed University Students

I have read the content of this consent form, and I agree to participate in this research study. I have had the opportunity to ask questions, and all my questions have been answered to my satisfaction. I have been given sufficient time to consider the above information and to seek advice if I choose to do so. I will be given a copy of this signed consent form. By signing the consent form, I have not given up any of my legal rights.

Participant:
I have read and reviewed the Information, and Consent Form, and the study was explained to me. My questions were answered to my satisfaction. I was given the time to think about whether I want to take part in this study. I am aware that my involvement in this study will involve:

- Completion of a questionnaire package on questions regarding personal demographics, physical activity levels and mental health (may take up to 10 minutes to complete)
- Participation in one individual audio recorded interview lasting approximately 60 minutes

I agree to take part in this study according to the conditions set in this Information and Consent Form. A dated and signed copy of this Information and Consent Form will be given to me.

__________________________________________
Name
Signature of the research participant
Date

Researcher:
I have received the consent form dated: ________________________________

__________________________________________
Name
Signature of researcher