Addressing Obesity in Schizophrenia: An Ecological Approach

by

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy

Exercise Sciences
University of Toronto

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Abstract

Individuals with schizophrenia are at high risk for obesity. Contemporary treatment approaches have concentrated on improving diet and physical activity behaviour. Guided by the Medical Research Council Framework, this thesis aimed to identify modifiable environmental factors that may influence the dietary and physical activity behaviours of clients at a psychiatric facility and examine the efficacy of intrapersonal and environmental components of a broad ecological intervention.

Study one explored what environmental factors at the facility influence diet and physical activity. Participants identified that obesogenic elements involved aspects of the social and built environments and that both intrapersonal interventions and environmental changes are needed to improve physical activity and dietary behaviour.

Based on the findings of the first study, study two examined the feasibility of exercise counseling amongst individuals with schizophrenia and its effect on increasing moderate and vigorous levels of physical activity (MVPA). Findings showed that exercise counseling is feasible. Accelerometer results showed that levels of MVPA decreased
throughout the study, but levels of mediating psychological variables of physical activity increased.

Study three examined the use of point-of-choice prompts to increase stair use at the hospital. Overall, no significant changes in stair use between the study phases were found, but male staff members increased their stair use throughout the study.

Using multiple research methods, this thesis has made several contributions to the understanding of physical activity and dietary behaviours in individuals with schizophrenia. Novel solutions are needed to move beyond lifestyle interventions and address multiple individual and environmental factors that cause weight gain in this population.
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I would first like to thank Dr. Guy Faulkner for guiding me through my PhD thesis. Over the past few years, you have not only exposed me to new and exciting areas of research, you have also challenged me to think critically about how we conduct research today and how we need to proceed in the future. You also taught me important lessons about managing responsibilities and obligations in academia and the broader communities in which we work and live. For all that you have imparted on me, I am extremely grateful for the opportunity to have been one of your students. I hope that our working relationship continues into the future.

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I had a lot of fun writing this thesis and I am proud that I had the chance to engage in critical research that will help people with mental illness improve their health and lives. It was challenging and rewarding work. But my work is not finished yet and there is still much to be done about ensuring that people with mental illness receive high quality health care. Mental illnesses will impact approximately one in five Canadians in their lifetime and individuals of all ages, incomes, educational levels, and cultural backgrounds will be affected. We need to work together to eliminate mental health stigma in our communities, continue to provide inclusive and accessible strategies to help one another in times of need, and ensure that we keep mental health a priority. I look forward to the road ahead. Carpe diem.
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Chapter 1

Introduction

Schizophrenia is a serious mental illness that is characterized by psychotic symptoms (e.g., hallucinations, delusions), disorganized speech and behaviour, negative symptoms (e.g. avolition, alogia, blunted or flattened affect), and serious neurocognitive and social cognitive deficits (American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders (4th ed) (DSM-IV), 1994). Individuals who live with schizophrenia experience distortions of reality, changes in thinking and perceptions, difficulties in social situations, and problems with daily functions. Based on current estimates from epidemiological studies, approximately 15.2 in 100,000 individuals develop schizophrenia annually with a lifetime prevalence of 4 in 1,000 individuals (McGrath, Saha, Chant, & Welham, 2008). Although it has been reported that schizophrenia occurs with the same frequency amongst men and women, a recent meta-analysis has shown that men are at 1.4 times greater risk of developing this serious mental illness than women (McGrath et al., 2008). Additionally, men tend to develop schizophrenia at a much younger age than women and as a result of this earlier diagnosis, they have a worse prognosis of recovery.

Individuals who live with schizophrenia also develop other serious morbidities. Several reviews and studies have confirmed that 35-70% of individuals with schizophrenia have an additional morbidity (Casey & Hansen, 2009). Three recent studies conducted by McEvoy and colleagues (2005), Carney and colleagues (2006), and Lambert and colleagues (2003) confirm and highlight the numerous morbidities associated with this illness. In 2005, McEvoy and colleagues assessed baseline findings for 1460 participants from the Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) Schizophrenia Trial. The CATIE trial assessed cardiovascular and metabolic syndrome risk factors in individuals living with schizophrenia. Of the 689 participants who had fasting laboratory results, 40.9% were diagnosed with metabolic syndrome as outlined by the National Cholesterol Education Program (NCEP) criteria and, therefore, had an
increased chance of developing coronary artery disease, stroke, and type 2 diabetes. In 2006, Carney and colleagues undertook a retrospective analysis of longitudinal data obtained from a private insurance provider in the state of Iowa. The medical records dated from the years 1996 to 2001 were examined for individuals with schizophrenia or schizoaffective disorder and compared against those with no psychoses. Individuals who were diagnosed with schizophrenia or schizoaffective disorder were more likely to have one or more comorbidity than individuals not diagnosed with a psychosis. In 2003, Lambert and colleagues conducted a review that examined the medical comorbidities experienced by individuals with schizophrenia due to lifestyle behaviours, medication usage, and the neglect of the healthcare system to address their medical needs. The results of their review identified that individuals with schizophrenia are at increased risk of obesity (Body Mass Index (BMI) > 30), related morbidities such as diabetes, hyperlipidemia, cardiovascular disease, and malignant neoplasms. Lambert and colleagues identified that time and resource restrictions, stigma, lack of appropriate follow-up, and neglect of physical conditions by psychiatrists contributed to the poorer physical health of individuals with schizophrenia. These researchers also identified that individual factors (e.g., poor treatment compliance, communication and comprehension difficulties, unawareness of physical problems) exhibited by clients made examinations, follow-up, and treatment difficult. Unfortunately, such high rates of obesity related comorbidity and healthcare neglect not only contribute to a poorer state of physical and mental health (Casey & Hansen, 2009), but also a decreased life expectancy of approximately 20 to 25 years (McGrath et al., 2008).

Given the high prevalence of obesity and related comorbidities in individuals with schizophrenia, multidisciplinary researchers have called for action to address this growing problem (American Diabetes Association, American Psychiatric Association, American Association of Clinical Endocrinologists, North American Association for the Study of Obesity, 2004). Researchers have stressed that more work needs to be done at the clinical and organizational levels to provide individuals with schizophrenia primary care that addresses obesity and related comorbidities (Folsome, 2009). Obesity is a complex syndrome. Increases in body weight can be attributed to caloric intake that is greater than energy output, where calories can be expended through basal metabolic rate,
thermogenesis, and physical activity (Holt & Peveler, 2009). There are several potential causes of weight gain in people with schizophrenia. First, symptoms associated with schizophrenia may lead to unhealthful diets and decreased physical activity (Holt & Peveler, 2009). Several studies have shown the diets of individuals with schizophrenia to be worse than those in the general population, with individuals with schizophrenia consuming high levels of fat and carbohydrates and low levels of vital vitamins and fiber found in fruits and vegetables (Brown, Birtwistle, Roe, & Thompson, 1999; Chuang, Mansell, & Patten, 2008; Strassnig, Brar, & Ganguli, 2003a). Neurocognitive impairments often found in individuals with schizophrenia may potentially impact an individual’s ability to recognize, plan, and prepare healthful and nutritiously rich meals (Vella & Pai, 2011). Negative symptoms in the form of anhedonia and flattened affect, potentially caused by neuroanatomical abnormalities in the mesolimbic dopamine system, may impact the way individuals with schizophrenia respond to pleasure and rewards from food (Elman, Borsook, & Lukas, 2006). Given these forms of negative symptoms, individuals with schizophrenia may require larger quantities of stimulating and palatable food products, often rich in sugar and fat, in order to satisfy cravings or to reach a state of contentment. Negative symptoms in the form of lower levels of motivation may also play a key role in decreasing one’s ability to participate in any form of physical activity (Devlin, Yanovski, & Wilson, 2000; Holt & Peveler, 2009). Additionally, social isolation that may arise from stigma associated with mental illness may provide individuals living with schizophrenia with fewer opportunities to be active (Vella & Pai, 2011).

Second, psychological stress may also exacerbate weight gain in individuals with schizophrenia (Rege, 2008). Psychological stress has been well documented in this clinical population (Betensky et al., 2008). Prolonged periods of stress have been found to cause endocrine abnormalities like increased hypothalamus-pituitary-adrenal arousal leading to increased secretions of cortisol, a hormone that helps restore homeostasis after the onset of stress (Rege, 2008). Increased secretions of cortisol have also been shown to be associated with increased levels of lipoprotein lipase, an enzyme responsible for lipid metabolism, leading to increased storage of triglycerides in adipose tissue.
Third, current research suggests that antipsychotic medication may play an important role in increasing adiposity in people with serious mental illness (Rege, 2008). Researchers suggest that different antipsychotic medications have different impacts on neurotransmitters, energy expenditure, caloric intake, and metabolic effects (Newcomer, 2005; Rege, 2008). For instance, second generation antipsychotics like clozapine and olanzapine have been shown to cause greater weight gain in individuals with schizophrenia than newer antipsychotics like ziprasidone and aripiprazole (Newcomer, 2005; Rege, 2008). Researchers have shown that clozapine and olanzapine intake has been associated with decreased energy expenditure, often leading to low habitual activity. These antipsychotic medications have also been shown to have great affinity to serotonin and histamine receptors, which may stimulate energy intake by increasing appetite. Additionally, clozapine and olanzapine have the greatest impact on blood sugar, potentially affecting appetite and energy intake. Additionally, recent research has also pointed out that different genetic factors may also exacerbate weight gain for individuals taking antipsychotic medication (Lett, Wallace, Chowdhury, Tiwari, Kennedy, & Muller, 2012). Specifically, the HTR2C gene and the rs7799039 of the leptin gene have been associated with antipsychotic related weight gain, by potentially having an impact on an individual’s appetite.

Given that antipsychotics are an essential component of treatment for schizophrenia (van den Oord, Adkins, McClay, Lieberman, & Sullivan, 2009), approaches that focus on modifiable factors of obesity are being explored. To date, behavioural and pharmacological approaches have been used to treat physical inactivity and unhealthful diet to decrease weight gain in individuals with schizophrenia (Faulkner & Cohn, 2006). Although these approaches have had modest success, individuals with serious mental illness continue to become and stay obese. Several researchers propose a strategy that not only addresses individual behaviours, but also ecological elements that may cause obesity (Egger & Swinburn, 1997). A broad strategy that acknowledges various factors of obesity, including the environment, is the ecological model (Egger & Swinburn, 1997). This model considers obesity to be the result of biological, behavioural, and environmental influences mediated by components such energy intake (e.g., diet) and energy expenditure (e.g., physical activity) moderated by physiological adjustments (e.g.,
metabolism). This ecological model demands a multidisciplinary approach to promoting physical activity and healthful eating behaviours through collaborative partnerships that can strategically plan interventions and policy changes. The aim of this model is to create complex interventions that address behaviour change at intrapersonal and environmental levels.

Empirical research that relates obesity to the environment has found that the built environment can promote unhealthful eating behaviours and physical inactivity (Booth et al., 2001; Papas et al., 2007). Healthful environmental strategies combined with behavioural interventions can potentially help individuals with schizophrenia, who live and receive treatment in hospitals and community settings that struggle to provide healthful environments, decrease their obesity by eating healthfully and becoming physically active. As such, the aim of this thesis was to identify obesogenic elements in a psychiatric facility where individuals with schizophrenia reside and receive treatment, and then develop and pilot intrapersonal and environmental interventions to address the growing problem of obesity.

This doctoral thesis was conducted at the Centre for Addiction and Mental Health (CAMH), Canada’s largest mental health and addiction teaching hospital and one of the world’s largest academic mental health and addiction research centres. CAMH has over 530 inpatient beds and over 3,000 physicians, scientists, and staff who provide services and conduct research across multiple sites in the Greater Toronto Area. Specifically, the first study of this thesis provided the necessary information about the CAMH environment as to how it impacted the dietary and physical activity behaviours of individuals with schizophrenia who live and receive treatment at the hospital. The findings from this study provided the necessary input to construct interventions to increase physical activity that operate at different levels of the ecological model. Study two examined the efficacy of exercise counseling, an intrapersonal level intervention, which was designed to offer clients motivational support and encouragement to be physically active as well as information about scheduling and program offerings at the hospital. Study three assessed the efficacy of point-of-choice prompts to increase stair use between two floors of a five-floor building at the CAMH. This ‘proof-of-principle’ study
also examined whether environmental modifications are possible in a psychiatric environment and whether such modifications can increase levels of incidental physical activity.
Chapter 2

Review of the Literature

2 Schizophrenia

2.1 Overview and Phenomenology

Schizophrenia is a serious mental illness that is identified by a compilation of psychotic, disorganized and negative symptoms and psychosocial and occupational dysfunctions (DSM-IV, 1994). Unless a single delusion or hallucination is extremely bizarre, no single symptom can be used definitively to diagnose schizophrenia. Symptoms can be generally divided into positive or negative symptoms and neurocognitive and social cognitive dysfunctions. Positive symptoms can be described as an excess or distortion of normal function. These symptoms include delusions (i.e., erroneous beliefs), hallucinations (i.e., perceptual distortions), disorganized speech and thinking (i.e., tangentially, incoherent speech), and grossly disorganized (i.e., purposelessness, unpredictable silliness or aggressiveness, difficulties with daily living) and catatonic behaviours (i.e., decreased reaction to stimuli). Negative symptoms represent a diminishment or loss of normal function. These symptoms include affective flattening (i.e., decreased range and intensity of emotional expression), alogia (i.e., diminished fluency and productivity of speech), and avolition (i.e., reduced ability to adhere to goal-oriented tasks). Neurocognitive deficits represent a major component of the illness that disrupts social and occupational outcomes and are experienced by nearly 70% of individuals who live with schizophrenia (Brekke, Raine, Ansel, Lencz, & Bird, 1997; Palmer, Heaton, Kuck, & Braff, 1997; Weinberger & Gallhofer, 1997). Cognitive dysfunctions include problems with attention, declarative memory, information processing, motor dexterity, and planning and executing goal-directed behaviour (i.e., executive functions) (Weinberger & Gallhofer, 1997). Social cognition describes how individuals think of themselves and others in the social world (Penn, Sanna, & Roberts, 2008). Social cognitive deficits include three primary domains, which include a decreased ability to process perceptions of emotions (i.e.,
identifying and understanding emotions revealed in facial expressions or tones of voice),
Theory of the Mind (i.e., ability to represent human mental states and/or infer the
intentions of others), and attribution theory (i.e., interpreting the causes of positive and
negative events of one’s life).

Individuals who live with schizophrenia do not exhibit all of the symptoms listed above.
In order to be diagnosed with schizophrenia, the following criteria, as stipulated by the
Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, 1994), must be fulfilled:

a) Characteristic Symptoms: At least two of the following symptoms are present
for one month: delusions; hallucinations; disorganized speech; disorganized or
catatonic behaviour; or negative symptoms. If a delusion is considered bizarre
or a hallucination is a running commentary of the person’s life or is two or
more voices conversing with each other, only one characteristic symptom is
necessary for a diagnosis of schizophrenia;

b) Social and Occupational Dysfunction: Functioning after the onset of the
illness is noticeably below the level of functioning before onset in the areas of
interpersonal relations, occupational performance, academic achievement, or
personal hygiene;

c) Duration: Characteristic symptoms are present for one month and persist for a
minimum of six months;

d) Schizoaffective and Mood Disorder Exclusion: Characteristic symptoms
cannot be accounted for by schizoaffective disorder or mood disorder with
psychotic features;

e) Substance and General Medical Condition Exclusion: Characteristic
symptoms cannot be accounted for by physiological effects due to substances
or a general medical condition;
f) Pervasive Developmental Disorder Exclusion: If a previous diagnosis of pervasive developmental disorder is present, prominent hallucinations or delusions must be present for a minimum of one month.

2.2 Subtypes

The criteria listed above describe a general diagnosis of schizophrenia, but many subtypes of this serious mental illness exist. A person is diagnosed with a subtype of schizophrenia based on the most prominent symptoms present. Given that symptoms can change over the course of the illness, subtype classifications may change as well. Although these subtypes are presented in the DSM-IV, the schizophrenia work group for the American Psychiatric Association, which has been tasked to provide input on the fifth edition of the DSM, has recommended that schizophrenia subtypes be excluded from the new edition (American Psychiatric Association, 2012). According to the DSM-IV (1994), subtypes of schizophrenia include: paranoid; disorganized; catatonic; undifferentiated; and residual.

Paranoid schizophrenia is generally characterized by a preoccupation with one or more delusions or frequent auditory hallucination. Delusions tend to be persecutory or grandiose and may be linked to hallucinations. Individuals who live with paranoid schizophrenia usually have a preserved cognitive state and do not exhibit disorganized speech, disorganized or catatonic behaviour, or flat or inappropriate affect. Onset tends to occur later in life and prognosis (i.e., occupational functioning, independent living) is better than other subtypes of schizophrenia (DSM-IV, 1994). This disorder is the most prevalent subtype of schizophrenia (Stompe, Ortwein-Swoboda, Ritter, Schanda, & Friedmann, 2002).

Individuals diagnosed with disorganized schizophrenia exhibit disorganized speech (e.g., incoherence, trailing off), disorganized behaviour (e.g., no goal-oriented behaviour, aimlessness, poor hygiene), and flat or inappropriate affect (e.g., unprompted laughing, incongruity, no expression). This subtype of schizophrenia tends to have an early onset, and is highly correlated with a poor premorbid condition and a continually deteriorating
course (DSM-IV, 1994). Hallucinations or delusions are not dominant symptoms with this subtype of schizophrenia, but may be present.

Catatonic schizophrenia is characterized by a minimum of two of the following symptoms: 1) motor immobility, catalepsy, or stupor; 2) excessive motor activity or purposeless activity not influenced by external stimuli; 3) extreme negativism; 4) posturing; and 5) echolalia or echopraxia. Although these symptoms represent the dominant symptoms of catatonic schizophrenia, individuals diagnosed with this subtype also experience hallucinations, delusions, disorganized behaviour, flat or blunted affect, and negative symptoms. In recent years, industrial nations have seen a decline in the incidence of this subtype of this disorder (Stompe et al., 2002; Tateyama et al., 1999).

Individuals who are diagnosed with undifferentiated schizophrenia exhibit delusions, hallucinations, disorganized speech, disorganized or catatonic behaviour, or negative symptoms, but do not meet specific criteria for paranoid, disorganized, or catatonic subtypes (DSM-IV, 1994). Individuals may show insufficient symptoms or too many symptoms to meet other subtypes.

The residual subtype is characterized by an absence of prominent positive and disorganized symptoms of schizophrenia, but negative symptoms or two characteristic symptoms may still be present in a lesser form.

2.3 Cultural Variations

Although positive symptoms like delusions or hallucinations may at first seem easy to diagnose, careful attention needs to be paid to cultural variations where a delusion or hallucination in one culture may be perfectly acceptable in another (Carpenter-Song, Chu, Drake, Ritsema, Smith, & Alverson, 2010; Versola-Russo, 2006). Cultural conceptions, values, and beliefs not only shape symptom formation, but also how individuals receive social support and treatment and experience stigma (Carpenter-Song et al., 2010; Versola-Russo, 2006). Clinicians need to be mindful of their own social and cultural influences so as to not be biased in their diagnosis of this mental illness. For example, several studies have confirmed that Black individuals are more likely to be
diagnosed with schizophrenia than White individuals (Reininghaus et al., 2010), with one study reporting that Blacks are four times more likely than Whites to be diagnosed with this mental illness (Barnes, 2004). Researchers have attributed this higher rate of schizophrenia amongst Black individuals to many factors, including clinician bias (Strakowski, Shelton, & Kolbrener, 1993), socio-economic issues (Versola-Russo, 2006), and other environmental factors (Cougnard et al., 2007).

2.4 Etiology

Currently, two main theories have been proposed to explain the pathogenesis of schizophrenia (Tandon, Keshavan, & Nasrallah, 2008). First the neurodevelopmental theory states that schizophrenia is the result of underlying environmental and genetic factors (Rapoport, Addington, Frangou, & Psych, 2005). This theory hypothesizes that abnormalities in brain morphology caused by either environmental or genetic factors predispose an individual to the development of schizophrenia. Additionally, this theory dictates that obstetric complications such as trauma or illness may have an impact on the neurodevelopment of the fetus and that such complications may lead to the development of schizophrenia in later life. The other main theory of the pathophysiology of schizophrenia is the neurodegenerative hypothesis that describes schizophrenia as a deteriorating neurological event (Christopoulos, Massouri, Fotopoulos, & Hamogeorgakis, 2006). This hypothesis is mainly supported by the development of worsening psychotic symptoms over time, increasing lengths of time to recovery after successive episodes, and treatment refractory.

In addition to these two theories, many environmental aspects have been studied to try to explain the development of this serious mental illness. For instance, it has been suggested that individuals born during late winter or early spring months have had a higher rate of developing schizophrenia (Davies, Welham, Chant, Torrey, & McGrath, 2003). The rationale for this theory rests with higher rates of influenza during these months and increased potential for women to encounter obstetric complications related to influenza that may lead to neurodevelopmental abnormalities (Wohl & Gorwood, 2007). Additionally, other researchers have suggested that being born or living in an urban
centre can lead to the development of schizophrenia (Cougnard et al., 2007; McGrath & Scott, 2006; Pedersen & Mortensen, 2006). These researchers have hypothesized that higher rates of schizophrenia in urban areas are attributed to higher rates of physiological and psychological stress due to overcrowding and higher rates of pollutants in the environment. However, recent research conducted by Menezes and colleagues (2007) has shown that the city of San Paulo, Brazil, which is one of the most densely populated and polluted cities in the world, has a low rate of schizophrenia. Closely linked to urban living, researchers have also shown that migrants have a high risk of developing schizophrenia, regardless of whether they have personally migrated or have a recent familial history of migration (Cantor-Graae & Selten, 2005). Although many theories have been proposed to explain the development of schizophrenia, no definitive cause has yet been shown.

2.5 Treatments and Outcome

Given the number of potential causes of schizophrenia, it is necessary to examine a variety of treatment options that deliver optimal benefit and improve overall quality of life. In particular, close attention needs to be paid to potential environmental causes of schizophrenia, especially issues that relate to poverty as these issues can have a profound impact on housing, diet, physical activity, and other aspects of lifestyle and can exacerbate an individual’s mental health condition and increase the chances of developing various comorbidities (Cantor-Graae, 2007).

The main objective of the treatment for schizophrenia is to minimize clinical symptoms and lessen the risk of relapse (Mahgerefteh, Pierre, & Wirshing, 2006). Currently, integrative treatment approaches are seen as successful models of care given that researchers and clinicians have empirically demonstrated that such models have positive effects on not only physical and mental health outcomes, but also client quality of life and treatment satisfaction (Druss, Rohrbaugh, Levinson, & Rosenheck, 2001; Tandon et al., 2010). Integrative treatment models involve various allied health care professionals who deliver individualistic and stage specific treatments and ensure that numerous outcome dimensions of schizophrenia are fulfilled (Druss et al., 2001; Tandon et al., 2010). Such
approaches provide services and medication that address primary and ancillary symptoms of schizophrenia; rehabilitative and humanitarian needs such as assistance with instrumental activities of daily living, housing, income, and other resource related issues; and family wellbeing (McEvoy, 2007). Another important feature of the integrative approach is that services are in place to prevent and treat morbidities associated with schizophrenia (Mahgerefteh et al., 2006). Several reviews have shown that even though numerous comorbidities are associated with this mental illness (Carney et al., 2006; Lambert et al., 2003), excessive weight gain is perhaps the most serious morbidity given its severe negative physical and mental health consequences (American Diabetes Association, American Psychiatric Association, American Association of Clinical Endocrinologists, North American Association for the Study of Obesity, 2004).

2.6 Obesity

Obesity is a serious health condition that has been linked to numerous life shortening morbidities (Zhang, Rexrode, van Dam, Li, & Hu, 2008). According to the 2010 Canadian Community Health Survey, 19.8% of men and 16.5% of women were considered obese and 41.1% of men and 27.2% of women were overweight (Statistics Canada and Canadian Institute for Health Information, 2011). Even though the majority of Canadians are either overweight or obese, people living with schizophrenia are at equal or greater risk for obesity than individuals their same age (Cohn, Prud’homme, Streiner, Kameh, & Remington, 2004). Individuals with this serious mental illness are nearly 1.5 to 3 times more likely to be obese than those in the general population (Allison et al., 1999; American Diabetes Association, American Psychiatric Association, American Association of Clinical Endocrinologists, North American Association for the Study of Obesity, 2004; Carney et al., 2006; Cohn et al., 2004; Tirupati & Chua, 2007). Rates of the metabolic syndrome, cardiovascular diseases, and diabetes range from 1.5 to 2 times higher than in the general population (Carney et al., 2006; Cohn et al., 2004; McEvoy et al., 2005). In a study that examined 240 in- and outpatients at the CAMH, researchers found that 31% of men and 43% of women were obese (Cohn et al., 2004). Researchers also screened clients for metabolic syndrome using the Adult Treatment Panel III guidelines which required three of the following five criterions: 1) abdominal
obesity (waist circumference $\geq 102$ cm for men and $\geq 88$ cm for women; 2) fasting hypertriglyceridemia ($\geq 150$ mg/dL); 3) low fasting high density lipoprotein ($\leq 40$ mg/dL for men and $\leq 50$ mg/dL for women); 4) high blood pressure ($\geq 130/85$ mmHg); and 5) high fasting glucose ($\geq 110$mg/dL) (National Institute of Mental Health, 2001). Using these guidelines, 42.6% of men and 48.5% of women met the criteria. Other researchers have found higher rates of both obesity and the metabolic syndrome in individuals with schizophrenia. Findings obtained by Tirupati and Chua (2007) in their cross sectional study of 221 clients at a psychiatric facility in Australia, showed that 59% of individuals were considered obese, and 68% had the metabolic syndrome. When comorbidities related to obesity are examined, researchers have found high rates of cardiovascular diseases and diabetes. A retrospective analysis conducted by Carney and colleagues (2006) found that individuals with schizophrenia had rates of obesity, diabetes with complications, congestive heart failure, and stroke between 2.11 and 2.73 times higher than a comparison population. Such high rates of obesity and related comorbidities also indicate poorer mental health status (Dixon, Postrado, Delahanty, Fischer, & Lehman, 1999), decreased quality of life (Allison, Mackell, & McDonnell, 2003; Faulkner, Cohn, Remington, & Irving, 2007; Strassnig, Brar, & Ganguli, 2003a; Strassnig, Brar, & Ganguli, 2003b) and shortened life expectancy (Hennekens, Hennekens, Hollar, & Casey, 2005; McGrath et al., 2008).

2.7 Current Approaches to Weight Loss in Schizophrenia

Given the physical and mental health implications of obesity and related comorbidities, researchers have been exploring various strategies to control weight in individuals with schizophrenia. To date, treatment approaches have solely concentrated on the individual, mainly relying on interventions that have consisted of behavioural and pharmacological strategies (Beebe, 2008; Faulkner & Cohn, 2006; Faulkner, Cohn, & Remmington, 2007; Loh, Meyer, & Leckband, 2006). In a review that examined behavioural approaches to weight management in individuals with schizophrenia, Loh and colleagues (2006) found that behavioural programs mainly consisted of behaviour modification, caloric restriction,
or psychoeducation. Although weight management programs that were based on behaviour modification were most effective, where clients lost a mean weight of 39.98 lbs. (range -7.28 lbs. to -102 lbs.), they noted that most studies were methodologically unsound, short in duration, and largely anecdotal. Given their findings, Loh et al. (2006) suggested that behavioural programs might have an impact on weight in this population, but that more rigorous longitudinal research is required. In two separate reviews of interventions to control weight gain in schizophrenia, Faulkner and Cohn (2006) and Faulkner, Cohn, and Remmington (2007) examined the effects of both pharmacological and non-pharmacological strategies to manage anti-psychotic related weight gain in individuals with schizophrenia. They found that lifestyle management interventions that focused on individual behaviour did produce a small to moderate decrease in weight, but that such approaches were mainly structured in an atheoretical manner, varied widely in delivery, and neglected to acknowledge the psychiatric facilities and services that provide care to the individual. As such, researchers propose that in addition to addressing individual behaviours through integrative treatment approaches, environmental approaches are required that facilitate opportunities and access to healthy diets and physical activity (Egger & Swinburn, 1997; Faulkner, Gorczynski, & Cohn, 2009). Such strategies may show a greater impact on weight gain and prove to be more inclusive to individuals who are often excluded from current health promotion campaigns by virtue of their mental illness (Booth et al., 2001).

2.8 Ecological Models

Ecological models are based on the ‘ecological perspective’, which describes an individual’s interaction with the physical and sociocultural environment (Kikbusch, 1989; Sallis & Owen, 2002). Ecological models of behaviour dictate that behaviour is influenced by an individual’s environment, where certain behaviours are encouraged or limited (Sallis & Owen, 2002). Based on the influences on behaviours proposed by McLeroy and colleagues (1988), Sallis and Owen (2002) suggested that behaviour is shaped by four factors. These include: intrapersonal factors (i.e., psychological and biological variables); sociocultural factors (i.e., society’s values, beliefs, and attitudes); the physical environment (i.e., built and natural); policies (i.e., laws, rules, and...
regulations). Physical and social environments are particularly important because they provide a specific ‘behavior setting’ for behaviour to occur (Sallis & Owen, 2002). Behavior settings are designed to either enhance or restrict particular behaviours. By gaining a better understanding of the factors that influence a particular behavior setting, interventions can be designed to optimize behaviour change.

Recent research has identified specific environmental factors that promote obesity by increasing energy intake and decreasing energy expenditure (Swinburn, Egger, & Raza, 1999). Researchers have classified such behavior settings to be ‘obesogenic.’ According to Swinburn and colleagues (1999, p. 564), the ‘obesogenicity’ of an environment has been defined as “the sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations.” Such environments are extremely complex given the numerous ecological factors that influence physical activity and diet (Swinburn et al., 1999). Although such environments are extremely complex, researchers have designed ecological interventions to encourage healthful behaviour changes.

2.9 Environmental Interventions to Increase Physical Activity

Several systematic reviews have examined the use of environmental interventions to promote physical activity (Foster & Hillsdon, 2004; Kahn et al., 2002; Sallis, Bauman, & Pratt, 1998; Task Force on Community Preventive Services, 2001). One review by Foster and Hillsdon (2004) identified 17 studies that examined the impact of environmental interventions on physical activity. Studies in this review were divided into two sections: 1) studies that examined physical environment alterations that provided new opportunities for physical activity; and 2) studies that examined environments that promoted individuals to use more stairs. All three of the studies that evaluated the impact of changes to the physical and built environment indicated a small positive effect. Each of these studies investigated a combination of changes to the physical environment such as the impact of adding new fitness facilities and showers in the workplace, policy changes to support the improvement of cycling routes to work, and distributing
educational material to encourage physical activity. Of the 14 studies that investigated environments that provided stair usage prompts, most observed a short-term effect for three months, while one study reported sustained stair usage for six months. Foster and Hilsdon (2006) concluded that environmental interventions do have a profound impact on the level of health enhancing physical activity, but that future research needs to address several study limitations like selection and measurement biases that limit the generalizability of the findings. Additionally, researchers need to consider using comparison or control groups in order to fully attribute changes to the intervention and not other changes in the environment.

2.10 Environmental Interventions to Improve Diet

With respect to diet and the food environment, Papas and colleagues (2007) identified several environmental aspects that influence the amount and type of food individuals consume. Main factors that influenced increased unhealthful food consumption included close proximity to fast food outlets and convenience stores from home, high density of convenience stores in a community, and decreased cost of unhealthful food products available for purchase. Similar findings have been noted in other reviews (French, Story, & Jeffery, 2001; Lake & Townshend, 2006). One particular review, that examined the effectiveness of environmental interventions that addressed the food environment to reduce obesity, found that successful environmental interventions consisted of increasing the availability of nutritious foods, addressing point-of-purchase locations and strategies, and offering systematic reminders and training to health care workers to provide nutritional counseling to clients (Matson-Koffman, Brownstein, Neiner, & Greaney, 2005).

2.11 Addressing the Gaps in the Literature

An important advantage of ecological interventions is that they have the ability to reach marginalized communities (Swinburn et al., 1999). Certain interventions, which are designed solely on behavioural and educational approaches, are limited in their reach and success because of lower educational attainment in the target population, low income,
language barriers, and accessibility issues related to chronic illness (Gallbally, 1997). Ecological interventions transcend some of those issues and deliver intrapersonal, interpersonal, and environmental interventions that can provide essential social support and motivation to individuals who require it and environmental modifications to accommodate individuals who may be severely impacted by their mental illness and not able to participate in structured programs. Although ecological models are seen as helpful and inclusive frameworks that can address healthful behaviour change at the intrapersonal, interpersonal, environmental, and policy levels, their use has been limited with only one ecological intervention being implemented in a setting that affects the diet of individuals with serious mental illness (Cohn, Grant, & Faulkner, 2010). This intervention did away with buffet food delivery and implemented tray service meals on a single unit, which limited the amount of food clients consumed.

Given that ecological interventions should be explored for their potential use, to date only one study has examined the obesogenic environment of a psychiatric setting (Faulkner et al., 2009). In this recent study, the Analysis Grid of Environments Linked to Obesity (ANGELO) framework (Swinburn et al., 1999), a tool used to deconstruct obesogenic environments by size and type, was used at CAMH to identify obesogenic factors that may be causing individuals with schizophrenia to gain weight (Faulkner et al., 2009). Of the 25 semi-structured interviews that were conducted with healthcare professionals and key stakeholders, the major obesogenic elements that were identified included buffet service food delivery, client-operated food services that sell unhealthful food products, limited client budgets, high food costs, staff shortages, lack of educational programming, inconsistent care practices, and low motivation amongst clients to change unhealthful behaviours. From the factors that were raised, five interventions were suggested: 1) eliminating unhealthful food available in vending machines; 2) implementing a water policy; 3) restructuring food delivery; 4) changing client and survivor run food operations; and 5) promoting opportunities for habitual physical activity. Although this study identified various obesogenic elements, it only examined the issue from the perspective of health care professionals and key stakeholders, not clients and survivors. Before any broad ecological intervention can be implemented and evaluated, a full
examination of client and survivor perspectives of the obesogenic environment needs to be conducted. Such an examination would ensure that all interventions would be structured with the requirements and input of the community and seen as warranted, acceptable, and feasible (Israel, Schulz, Parker, & Becker, 1998; Medical Research Council (MRC), 2006).

2.12 Ecological Interventions within Psychiatric Settings: Purpose and Rationale

Given that poor diet and physical inactivity are common among individuals with schizophrenia (Brown et al., 1999; Henderson et al., 2006; Lindamer et al., 2008), ecological interventions may provide inclusive strategies to help manage weight in this population. In order to create, pilot, and evaluate ecological interventions, a thorough needs assessment of a particular environment needs to be conducted to understand specific needs and gauge acceptability (Altschuld & Witkin, 2000; MRC, 2006; Swinburn et al., 1999). As such, the specific purposes of this mixed methods thesis are to identify modifiable environmental factors that may influence the dietary and physical activity behaviours of both in- and out-patient clients at the CAMH Queen Street facility and examine the efficacy of intrapersonal and environmental components of a broad ecological intervention. The first study of this thesis examined clients’ perceptions of obesogenic environmental elements and the types of interventions clients would like to see implemented to address overweight and obesity in the hospital. The specific objectives of this qualitative study were:

1) To identify and examine environmental factors in and around the CAMH (Queen Street Facility) that may influence diet and physical activity; and

2) To identify priorities for interventions and further research based on identified modifiable environmental factors.

By conducting interviews with clients, this study identified and prioritized modifiable environmental elements that are considered obesogenic. Ultimately, this study determined what ecological interventions clients would like to see implemented in order
to assist with increasing physical activity and improving dietary behaviours. Specifically, clients called for interventions that encouraged and motivated them to be healthy through individualized care approaches and ecological changes that made the environment more accessible to physical activity. In essence, clients called for a complex ecological intervention, one that addresses behaviour change on multiple levels through both intrapersonal and environmental components.

2.13 Creating Complex Interventions

Ecological interventions are seen as extremely complex because they have multiple components that operate on multiple levels (Sallis & Owen, 2002). Before the overall effectiveness of a complex ecological intervention is established, individual components of the overall intervention must undergo a series of steps to show that they are feasible and efficacious (MRC, 2006) (See Figure 1). When discussing complex ecological interventions to decrease obesity, researchers are faced with the difficulty of addressing two primary behaviours: diet and physical activity (Egger & Swinburn, 1997; French et al., 2001). Each of these behaviours are extremely complex and difficult to alter given the numerous intrapersonal, interpersonal, environmental, and policy level forces that influence them (French et al., 2001). Because of the complexity of each of these behaviours, it must be determined whether a component of an obesity centered ecological intervention has an impact on either behaviour. In order to accomplish this, each component must be examined and evaluated individually for its effect on a particular behaviour (MRC, 2006). After individual efficacy has been shown, the efficacy of a component altering both behaviours can then be determined. Through a set of efficacy trials and pilot studies, a broad and complex ecological intervention to address obesity can be constructed through the integration of efficacious components. Essentially, these steps help measure the magnitude of effect each component of a complex intervention has on altering a particular behaviour (Beebe, 2007b; Michie & Abraham, 2004).
Although the importance of organizational, community, and societal changes to the environment that foster healthful eating and physical activity cannot be overstated, the role of intra- and interpersonal interventions located within the ecological model cannot be overlooked. Through the use of intra- and interpersonal interventions, researchers gain a better understanding of the psychological mediating factors and social relationships responsible for behaviour change (McLeroy et al., 1988). The key to constructing a successful complex ecological intervention that would foster healthful eating and physical activity is to recognize the importance of all components of the ecological model and the valuable contributions each level makes to strengthening an overall intervention (Sallis, Cervero, Ascher, Henderson, Kraft, & Kerr, 2006).

As such, the second and third proposed studies indirectly examined the effects of intrapersonal and environmental interventions on obesity, respectively. Although researchers have identified both diet and physical activity behaviours as mediators for obesity (Glanz, Lankenau, Foerster, Temple, Mullis, & Schmid, 1995; King et al., 1995), the proposed studies only concentrated on altering physical activity behaviour. Given that both dietary and physical activity behaviours are very complex and difficult to alter because they are both influenced by different psychological and environmental factors (French et al., 2001; Marcus et al., 2006; Ogden, 2003), interventions that alter either behaviour need to be examined for their efficacy separately. Intrapersonal and
environmental interventions that aim to promote healthful eating were not conducted within the context of this dissertation.

The second study built on the findings of the first study and offered clients motivational support and encouragement to be physically active. This intrapersonal intervention was theoretically informed and conducted using an exercise counseling framework designed by Griffin (2006) and Hospes and colleagues (2009). This single-case experimental design study examined the efficacy of this intervention on increasing moderate and vigorous physical activity in order to facilitate weight loss. The specific questions of this single-case case experimental design study were:

1) Would individuals with schizophrenia adhere to the exercise counseling protocol and would they find it acceptable?

2) What effect does exercise counseling have on increasing moderate and vigorous levels of physical activity?

3) What effect does exercise counseling have on mediating psychological variables theoretically underpinning changes in physical activity?

The purpose of the third study was to modify an environmental element in the CAMH Queen Street facility to increase physical activity amongst individuals who live with schizophrenia. This study followed the suggestions of both stakeholders and clients and encouraged all individuals who live, visit, and work at the hospital to accumulate more incidental physical activity. Specifically, this study examined the impact of point-of-choice prompts placed on stairs and near elevators on stair use between two floors of unit 1 at the Queen Street facility. Stair use is a moderate to vigorous physical activity and has been associated with reduced incidence of cardiovascular disease and weight loss (Boreham, Kennedy, Murphy, Tully, Wallace, & Young, 2005). Longitudinal research has shown that seven minutes a day of stair use can provide significant health benefits (Yu, Yarnell, Sweetnam, & Murray, 2003). The staircase that was observed in this study was chosen for a number of reasons. Primarily, it was accessible to clients, visitors, employees, and volunteers, but more importantly, it was located in an area that lies
between client living quarters and the unit cafeteria where clients eat several times daily. This staircase presented an opportunity for all individuals on the unit to accumulate some of the moderate to vigorous physical activity needed to see health gains. Although it was highly unlikely that individuals would accumulate the necessary minutes of moderate to vigorous physical activity needed daily to experience weight loss through the use of this staircase alone, this study illustrated the potential for making small environmental modifications to increase incidental physical activity. The specific questions of this study were:

1) Will point-of-choice stair riser banners and posters prompt individuals who live, visit, and work at the hospital to use stairs more often between the fourth and fifth floors?

2) Will stair use vary according to day of the week?

3) Will stair use between the fourth and fifth floors vary by sex and hospital status?

A final chapter will summarize the findings from each study and then discuss overall conclusions, novel contributions, lessons learned, and future directions. For a thesis overview, please see Table 1.
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Data Collection &amp; Analysis</th>
<th>Primary Focus</th>
<th>Secondary Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>Clients diagnosed with schizophrenia who live or have lived at CAMH</td>
<td>Interviews, photovoice; thematic analysis</td>
<td>What environmental factors in and around the CAMH (Queen Street Facility) influence diet and physical activity?</td>
<td>What are the priorities for interventions and further research based on identified modifiable environmental factors?</td>
</tr>
<tr>
<td>Two</td>
<td>Clients diagnosed with schizophrenia who are overweight or obese</td>
<td>Questionnaires, accelerometer; Single-case experimental design, visual inspection, t-tests</td>
<td>What is the feasibility of exercise counseling amongst individuals with schizophrenia?</td>
<td>What effect does exercise counseling have on increasing moderate and vigorous levels of physical activity? What effect does exercise counseling have on mediating variables underpinning changes in physical activity?</td>
</tr>
<tr>
<td>Three</td>
<td>Clients, visitors, staff, volunteers</td>
<td>Observation, motion-sensors; ANOVA, Chi-Square</td>
<td>Will point-of-choice stair riser banners and posters prompt individuals who live, visit, and work at the hospital to use stairs more often between the fourth and fifth floors?</td>
<td>Will stair use vary according to day of the week? Will stair use vary by sex or hospital status?</td>
</tr>
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Table 1. Thesis overview

2.14 Significance

Obesity is a serious health concern for individuals with schizophrenia. Although behavioural and pharmacological interventions have had some success in decreasing weight in this population (Faulkner & Cohn, 2006), such approaches are not always
suitable for individuals who experience profound negative symptoms, disorganized behaviour, and cognitive deficits. Through the use of ecological interventions that address behaviour change at various levels, more inclusive strategies can be created that provide opportunities for all individuals to become healthy. The findings of this research will help expand knowledge on the use of the ecological model within psychiatric facilities in order to foster healthful behaviours for all individuals regardless of illness severity.
Chapter 3

Study 1: Dissecting the 'obesogenic' environment of a psychiatric setting: Client Perspectives

3 Introduction

Given the high rate of obesity and metabolic syndrome amongst clients with schizophrenia at the CAMH and the modest effects of behavioural and pharmacological interventions (Cohn et al., 2004; Faulkner & Cohn, 2006; Gorczynski & Faulkner, 2010), ecological interventions are needed to address the various environments that may be perpetuating unhealthful dietary and physical activity behaviours. Unhealthful diets and physical inactivity are two lifestyle behaviours that have been shown to play a critical role in the development of obesity in individuals with schizophrenia (Brown et al., 1999; Henderson et al., 2006; Lindamer et al., 2008).

3.1.1 The Need to Explore Ecological Solutions

Currently, ecological models are seen as helpful and productive frameworks for constructing health promotion interventions because they ensure that behaviour change is addressed at the intrapersonal, interpersonal, environmental, and policy levels (McLeroy et al., 1988; Sallis et al., 2006). Each of these levels is seen as an integral component of the overall ecological model. Because ecological interventions involve a variety of groups and organizations and interventions that operate at different levels, they are considered complex (MRC, 2006). Before ecological interventions are created, piloted, evaluated, and implemented, researchers must conduct a thorough needs assessment of a particular environment (Altschuld & Witkin, 2000; MRC, 2006; Swinburn et al., 1999). Altschuld and Witkin (2000, p. 253) define a needs assessment as “the process of determining, analyzing and prioritizing needs, and in turn, identifying and implementing solution strategies to resolve high-priority needs.” One framework that can be used to
identify a community’s needs and prioritize ecological interventions to decrease obesity, is the ANGELO framework (Swinburn et al., 1999).

3.1.2 The Analysis Grid for Environments Linked to Obesity (ANGELO) Framework

Given the complex nature of environments, Swinburn and colleagues (1999) have created the ANGELO framework to help identify modifiable obesogenic environmental elements, deconstruct them by size and type, and create environmental interventions that are both feasible and acceptable to the target population. The ANGELO framework will be described below with examples given from a qualitative study that investigated the obesogenic environment of the Queen street hospital site of the Centre for Addiction and Mental Health (CAMH) from the perspective of professional stakeholders (Faulkner et al., 2009).

According to the ANGELO framework, environmental sizes may be classified as either microenvironmental settings or macroenvironmental sectors. Microenvironmental settings are locations where individuals often purchase or consume food or partake in physical activities. Such settings are usually geographically distinct, small, and highly influenced by individuals. Examples of microenvironmental settings include hospitals, workplaces, homes, and neighbourhoods. Macroenvironmental sectors are groups of industries, services, and supporting infrastructure that influence dietary and physical activity behaviours. Sectors influence a wide population and work at regional, national, and international levels. Macroenvironmental sectors are very complex structures and difficult to change due to their size, interconnecting layers, and economic and political priorities. Examples of macroenvironmental sectors include healthcare systems, transportation systems, governmental policies, and food manufacturing and marketing.

The ANGELO framework further deconstructs an obesogenic environment according to its type. Environmental types include physical, economic, political, and sociocultural. Physical environments refer to ‘what is available.’ This type of environment includes not only physical structures and their accessibility, but also the availability of educational
programs, professional services, and technological advances. For example, the physical environment at the CAMH encompassed food outlets that clients had access to and these included vending machines, cafeterias, client-run food programs, restaurants, convenience stores, and supermarkets. Additionally, a lack of and no access to dietary educational programs and professional services were seen as obesogenic factors that pertained to food. With regards to physical activity, the physical environment included structures and factors that provide opportunities for leisure, occupational, and incidental physical activity. At the CAMH, obesogenic factors that decreased the physical activity of clients included an inability to use staircases; a limited number of recreation therapists and other allied healthcare professionals to provide services, education, and adequate supervision; and a lack of exercise equipment on unit floors.

The economic environment describes the costs associated with food and physical activity. There are many economic factors associated with food. Not only are aspects of food production and distribution major components of the economic environment, but issues related to an individual’s income are salient as well. At the CAMH, on a micro and macro scale, the cost of food production influenced the quality of food that was served to clients either in tray service or buffet form. The quality of the hospital meal often influenced whether clients would visit low cost food services, such as convenience stores or diners, outside the hospital for additional meals and snacks. The low cost of these alternative food options provided clients an opportunity to purchase unhealthful food with limited funds. With respect to physical activity, the cost of equipment and physical activity programs influenced the quality of services available at the hospital, which in turn had a direct effect on the amount of physical activity performed by clients. Stakeholders often mentioned that high initial and recurring costs prevented the purchase of new equipment and the ability to organize physical activity programs.

Political environments are composed of the rules associated with food and physical activity. Laws, regulations, and formal and informal policies govern both dietary and physical activity behaviours. With respect to food, stakeholders mentioned various formal policies that determined what kinds of food are served and at what time they are served at in a hospital. Stakeholders also mentioned informal rules such as friends and family
members being allowed to bring in unhealthful meals for clients. As for physical activity, both informal and formal rules influenced activity levels. Informal rules included the length of time clients spent watching television on the ward, while formal rules, regulations, and laws shaped how often clients were able, if at all, to leave the unit floor.

The sociocultural environment refers to how a community or society regards food and physical activity. A fabric of attitudes, beliefs, and values determined by gender, age, ethnicity, and religion influence social and cultural norms that have a tremendous effect on the way people behave. Stakeholders at the CAMH indicated that in addition to low incomes, stigma impacted clients as to which stores and restaurants they frequented. Some stakeholders mentioned that certain locations did not make clients feel welcome and treated them as outsiders. With respect to physical activity, stakeholders said that there was a culture of ‘hanging out’ at the CAMH that promoted cigarette smoking and physical inactivity. It was mentioned that clients and survivors had limited options to socialize in organized groups or any vocational opportunities that promoted physical activity.

After environments have been deconstructed by their size and type, researchers are left with a list of identified obesogenic elements. The ANGELO framework assists researchers in rating the obesogenic elements on three criteria: validity (i.e., what is the supporting evidence?); relevance (i.e., how big of a problem is it?); and changeability (i.e., how modifiable is it?). Once all elements have been rated, they are then stratified by research or intervention priorities. Research projects further evaluate the validity, relevance, and changeability of the obesogenic element, while intervention projects develop strategies and interventions to address the obesogenic element.

For the current study, the ANGELO framework was used for a number of reasons. First, it has been used successfully in a psychiatric setting and has been shown to be an effective tool for dissecting an environment according to different types and sizes and identifying environmental causes of sedentary behaviour and unhealthful eating (Faulkner et al., 2009). Second, the ANGELO framework allows researchers to assess their findings and determine where environmental changes can be implemented. Third,
the framework allows individuals to prioritize findings according to where further research is necessary and where interventions can be implemented. Lastly, it is a tool that is highly transferable, as it can be used easily in different settings.

3.1.3 The Client Perspective: Research Purpose and Rationale

In order to create complex ecological interventions that address obesity in this population, both dietary and physical activity behaviours must be examined thoroughly. Before any interventions can be implemented, environmental factors that influence diet and physical activity must be identified, examined, and prioritized. Although the perspective of stakeholders has already been obtained (Faulkner et al., 2009), no clients have yet been asked for their perspective on the CAMH environment. Their insight would help create participant oriented and directed interventions that are deemed relevant that could promote healthful eating and physical activity amongst the clients. By involving clients, a collaborative partnership would be created with consumers where they provide input and identify issues, concerns, and needs in the CAMH environment, suggest possible solutions that acknowledge current community strengths and resources, and help direct discussion and future research where deficiencies are perceived. Their input would give voice to marginalized individuals who have traditionally been excluded from the research process, create a broad base of knowledge that will help strengthen the CAMH community, and help encourage buy-in from clients to any proposed interventions (Israel et al., 1998). As such, clients were asked to participate in a qualitative study that aimed to fulfill the following objectives:

1) To identify and examine environmental factors in and around the CAMH (Queen Street Facility) that may influence diet and physical activity; and

2) To identify priorities for interventions and further research based on identified modifiable environmental factors.
To the best of my knowledge, this was the first study conducted in Canada that assessed environmental aspects that influence physical activity and diet amongst individuals with schizophrenia.

3.2 Methods

3.2.1 A Qualitative Approach

A qualitative study was used for a number of reasons in order to assess the needs of the clients and gain a deeper understanding of the environmental factors that influence diet and physical activity from the perspective of clients. Primarily, qualitative research is concerned with producing knowledge and social meaning (Patton, 2002). This form of interpretive research concentrates on the depth of a phenomenon or various issues. Through an inductively driven process and reflexive manner, qualitative research has the ability to capture a rich and deep understanding of an individual’s lived experience and generate theory (Hesse-Biber & Leavy, 2006). Several studies that have investigated issues related to exercise, physical activity, and diet in individuals with serious mental illness have utilized qualitative methods (Carter-Morris, & Faulkner, 2003; Crone, 2007; Crone & Guy, 2008; Crone, Smith & Gough, 2005; Faulkner & Sparks, 1999; Owens, Crone, Kilgour, & El Ansari, 2010).

There are several reasons why qualitative research is necessary when structuring interventions for individuals with schizophrenia and why it was chosen for this needs assessment (Faulkner & Carless, 2006). First, schizophrenia is an extremely heterogeneous mental illness with symptoms varying with subtype, phase, sex, and age (McCormick & Flaum, 2005; McEvoy, 2007; McGrath et al., 2008). As a result of these differences, individuals experience many comorbidities and undergo a variety of treatments (McCormick, & Flaum, 2005; McEvoy, 2007). Given these differences, qualitative approaches can provide a greater understanding of how clients experience mental illness and how it impacts their physical activity and dietary behaviours. With more in-depth knowledge, complex interventions can be proposed and structured in a culturally sensitive manner that take into consideration the various differences associated
with the illness and unique circumstances of the individual (MRC, 2006). The use of qualitative research can also gauge whether such interventions would be feasible and acceptable to the greater community and more likely to receive buy-in from both clients and the administration. Through naturalistic approaches, qualitative research not only studies individuals in their context, but also takes into consideration many factors that shape a particular issue or situation (Patton, 2002).

Second, given the heterogeneity of mental illness and the need to provide interventions that take into account various factors, research methods that pertain to a homogenous group of individuals may be difficult to conduct. Because qualitative research usually involves small groups of individuals to reach a point of data saturation (Croach & McKenzie, 2006; Patton, 2002), it is a suitable form of research in a population where a homogenous group of individuals may be difficult to come by (Patton, 2002).

Third, qualitative research uses inductive approaches that embrace the views of individuals with schizophrenia, or insider perspectives. These perspectives help structure new theories and new ways of conducting research. It is also a useful method of investigating topics about which little information is known. Given that serious mental illness is delineated by a set of socially constructed values and meanings and that such values and meanings change over time and with different populations, interpretive approaches can help guide what areas of research need attention and what interventions are necessary at the current time. Although deductive approaches recognize insider perspectives, they operate by proving or disproving hypotheses constructed by researchers, or those with outsider perspectives. Such approaches may not be sensitive to the current context of the mental illness.

### 3.2.2 Philosophical Assumptions and Paradigms

A paradigm represents an epistemological foundation or a framework of beliefs of how knowledge is produced (Guba & Lincoln, 1989). All research, qualitative or quantitative, is guided by a paradigm; where a set of beliefs, values, and methods are used to attain knowledge (Patton, 2002). For this study, a social constructivist perspective was utilized,
which asserts that knowledge is produced by studying the social interactions of individuals and their multiple constructed realities (their different perceptions) of such interactions (Guba & Lincoln, 1989). The constructivist perspective is based on ontological relativity that maintains that statements about existence depend on a particular worldview and no worldview can be solely determined by empirical data (Guba & Lincoln, 1989; Patton, 2002). In essence, social constructivist researchers attempt to study the world around them by examining how individuals interact, taking into consideration the various experiences and perceptions different individuals have, and by exploring the social meaning that individuals give to their interactions (Hesse-Biber & Leavy, 2006). Because different individuals understand social reality differently, each individual can contribute to a greater understanding of a particular context.

A social constructivist approach to this study was necessary because clients and survivors may experience serious mental illness differently, as identified by their symptoms, and how the hospital and its surrounding community can impact their diets and physical activity behaviours. This exploration helped enrich the current understanding obtained through the earlier exploration of various perspectives of the CAMH stakeholders (Faulkner et al., 2009).

### 3.2.3 Research Setting

This study took place at the CAMH Queen Street facility and in the surrounding neighbourhood. The Queen Street facility and the neighbourhoods of Parkdale and Queen Street West were chosen for several reasons. First, this facility has a large inpatient and outpatient population that has a high rate of obesity (Cohn et al., 2004). In a cross-sectional study, Cohn and colleagues (2004) observed that 43% of women and 31% of men were considered obese. Furthermore, 48.5% of women and 42.6% of men have been diagnosed with metabolic syndrome, predisposing them to coronary heart disease and diabetes. Because rates of obesity and metabolic syndrome are nearly double the general population, interventions to reduce the amount of obesity and various comorbidities in this group of individuals are needed desperately.
Second, the Queen Street facility houses the Mental Health and Metabolism Clinic, a clinic devoted to helping clients and survivors acquire and maintain healthy dietary and physical activity behaviours in order to decrease obesity and prevent metabolic syndrome. The clinic offers various dietary and recreational programs to clients and survivors and is committed to furthering research in the area of obesity and weight management. Because of the clinic’s dedication to client and survivor-centred research, various behavioural and environmental strategies may be encouraged and delivered through the unit to further the care and betterment of clients.

Third, the various surrounding neighbourhoods contain several boarding homes where clients and survivors live (Habitat Services, 2009). By examining the hospital’s surrounding neighbourhoods, the experiences and perceptions of clients and survivors will not only help construct novel and acceptable ecological interventions that will benefit the clients and survivors of the Queen Street facility, but those who live with serious mental illness in the surrounding areas.

Lastly, the CAMH Queen Street Facility and the surrounding community are undergoing major redevelopments. Not only are the hospital and surrounding grounds going to be restructured, but the surrounding neighbourhoods of Parkdale and Queen Street West are experiencing gentrification. Because large and rapid changes will be occurring in the coming months, this study offers a chance to capture the experiences and perceptions of clients and survivors before their current hospital environment is modified. This provides an opportunity for future research to examine whether perceptions change over time in light of the restructuring and quite drastic environmental modifications.

3.2.4 Participants

This study was interested in exploring the experiences and perspectives of individuals with schizophrenia who are overweight or obese and live at or near the Queen Street facility. To ensure participants met the inclusion criteria, they were recruited from the Mental Health and Metabolism Clinic and various schizophrenia units at the hospital. In order to participate, participants must have met the following criteria:
1) Diagnosis of schizophrenia (any subtype) according to the criteria listed in the Diagnostic and Statistical Manual for Mental Disorders IV (DSM-IV, 1994), confirmed by chart review by staff from the Mental Health and Metabolism Clinic;

2) 18 years of age or older;

3) A body mass index greater than or equal to 25 (overweight);

4) Capable of giving informed consent.

In total, 25 individuals participated in this study. Twenty-two participants were male. Participants were between the ages of 24 and 63 years with an average age of 40.4 years (SD = 11.5 years). Most of the participants lived in in-patient settings (80%). See Table 1 for list of participants.
<table>
<thead>
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<th>Residence</th>
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</tr>
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<tr>
<td>Wayne</td>
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</tr>
</tbody>
</table>

Table 1. List of participants and demographic information.

### 3.2.5 Sampling

For this study, a purposeful sample with a maximum variation sampling strategy was used in order to capture a wide variety of perspectives about the obesogenic state of the Queen Street facility and surrounding neighbourhood from clients and survivors diagnosed with schizophrenia (Patton, 2002). Both men and women were sampled in this study; however, very few women expressed any interest in participating. In total, 25 interviews were conducted.
3.2.6 Recruitment

For this study, there were several methods of recruitment. Primarily, recruitment for this study occurred through the Mental Health and Metabolism Clinic. A recreation therapist and dietician at the Clinic identified potential participants through a case review of the clinic’s clients. Additionally, other recreation therapists and unit nurses at the hospital assisted with study recruitment. Although advertisements were posted throughout the CAMH (APPENDIX A) and several enquiries were made about the study, no individuals were recruited through this method. Throughout the recruitment process, I delivered all essential information about the study to clients and obtained informed consent (APPENDIX B).

3.2.7 Data Collection

This study utilized two main methods to collect data. First, clients were asked to take photographs of environmental elements they perceived to be obesogenic within the CAMH environment and surrounding neighbourhood (APPENDIX C). Second, clients sat down with me for a semi-structured interview where I asked about their perspective on the CAMH environment (APPENDIX D) using their photos as prompts.

3.2.8 Photovoice

Photovoice is a process that enables people to ‘identify, represent, and enhance their community’ through photography (Wang & Burris, 1997, p. 369). Members of a community use cameras to capture their lived experience and then use their photographs along with critical dialogue to share their knowledge with others. Community, in this instance, refers to a group of individuals who share a sense of belonging or relatedness, matter to one another and the group, have their needs satisfied through group membership, and share an emotional connection with other individuals (McMillan & Chavis, 1986).

Photovoice has three main objectives. First, photovoice allows people to record and appraise the strengths and limitations of their community. In this study, participants were
given digital cameras to capture different environmental aspects of the hospital and surrounding neighbourhood that promote unhealthful eating and decreased physical activity. Through photographs, participants were able to record important environmental issues that cause them to gain weight. Second, photovoice is used to start a discussion about critical issues in the community and share knowledge with other members to promote change. In this study, clients discussed their lived experience and knowledge of obesogenic elements with me. The use of photography enabled me to gain a sense of the world as seen through the viewpoint of clients. Because photovoice values the expertise and knowledge of community members, I gained an understanding of what the community thinks is vital and what is truly needed. Third, through the use of photovoice, it is hoped that critical issues and the perceived needs of the community reach policy makers who may change the community. This can be accomplished through teaching seminars at CAMH and targeted end-of-study knowledge translation strategies to hospital administration.

### 3.2.9 Semi-structured Interviews

Once clients had taken photographs of the CAMH environment, a semi-structured interview schedule was used to interview the participants. Current obesogenic literature and the ANGELO framework primarily informed the set of questions used in the interviews (Swinburn et al., 1999). A semi-structured interview framework was chosen for this study for a variety of reasons. First, the framework of a semi-structured interview is very flexible and this allowed new questions to be asked as a result of what respondents had said. This enabled me to probe certain responses further and explore related points in greater detail. Such flexibility was essential especially when I was examining the various photographs taken by the participants. Secondly, semi-structured interviews provide a method to obtain knowledge that may be cumbersome or impossible to obtain through questionnaires. Interviews produce results that are not only credible, but also steeped in face validity (Guba & Lincoln, 1989). During the course of this study, interviews were conducted in the Mental Health and Metabolic Clinic, in interview rooms located on unit floors, and the Empowerment Council Office.
3.2.10 Data Analysis

During the course of this study, each interview was audio-recorded using a digital recorder and then transcribed. Additionally, I kept a journal that detailed my experience as a researcher and any thoughts I had about potential themes and issues or concerns with the study that required further attention. The journal was often referred to during the transcription process. Although many researchers view transcription as a ‘chore’ (Agar, 1996, p. 153), I chose to take a different perspective and viewed the experience as an opportunity to become better acquainted with the data. Audio-recordings were transcribed using a denaturalized style, where speech was captured verbatim without particular attention being paid to utterances and pauses (Cameron, 2001). This style of transcription is commonly used by qualitative researchers because it is primarily concerned with the meanings and perceptions that are created throughout a conversation (Oliver, Serovich, & Mason, 2005). Following transcription, thematic analysis, as outlined by Braun and Clarke (2006), was used to generate initial codes, search for and review emergent themes and sub-themes, and then define and name the final themes.

After reading the transcriptions a number of times, I took a deductive analytical approach and first identified initial codes that fit into the established categories of the ANGELO framework. This meant that I identified text that pertained to various environment types. Next, I searched the identified codes in order to collate them to create potential themes and sub-themes based on their similarities. Throughout this coding process, I checked if the themes worked in relation to the initial codes, the whole data set, and also addressed the research questions. The coding process was flexible which allowed themes to be modified and refined so that a coherent reconstruction of the data emerged. After reviewing how the newly created themes fit with one another and the entire data set, I then created a final thematic map that illustrated all established themes and their interrelatedness. As a final step, I generated names and definitions for my established themes in order to clearly explain my research findings and how they answered my various research questions.
An example will help clarify the data analysis process. While reading through the transcripts, I highlighted segments of text that fit with different categories of the ANGELO framework. I first searched the transcripts for codes that pertained to physical activity and then diet. For example, the following quotations were highlighted, cut, and pasted into a separate Word document under the ANGELO category “Physical Activity – Physical Environment”:

- Adam: Something that is available to more people...at more times because they have a gym right now ah, only like four people can use it at a time for a big facility like this that has so much hundreds of people and they don’t want have a good gym with exercise machines and everything that can help people...

- Adam: Tell them in the building that they’re building over the place, they need to put a gym in the plan. Not a just a basketball court or a little room with a few equipment. A full gym.

- Adam: So there’s no stairs accessible for us that at least going up and down the stairs you can burn off a few calories.

After reading Adam’s transcript, two potential sub-themes began to emerge under a broader theme of “Hospital Environment”. In addition to his concerns regarding inadequate exercise facilities or gym space, Adam mentioned a lack of access to stairs that would help facilitate more incidental forms of physical activity. After the potential sub-themes “Exercise Facilities” and “Stairs” were created, I continued reading other transcripts. While I read the transcripts, I not only searched for other new codes that were related to different ANGELO framework categories, but also kept these two potential themes in mind. Other text segments soon began to emerge that were related to my two potential sub-themes:

- Colin: Ah, well gym. I used to work out three times a week, before I came here. There’s no weight room in here, but now I’ve got the gym. But it’s open 9 o’clock in the morning...it’s kind of early.
• Colin: …if you have a stair case, you know, you can walk up and down and…that’d be OK if you’re allowed to…It requires exercise to walking up and down stairs.

These new text segments helped identify that there were common concerns shared by the participants regarding the broader physical hospital environment, and specifically, the exercise facilities and access to stairs. These segments were then highlighted, cut, and pasted under the ANGELO category, “Physical Activity – Physical Environment”, and listed under my potential sub-themes, “Exercise Facilities” and “Stairs”. I continued reading and searching for new text segments. More quotations began to emerge that helped define concerns with the exercise facilities and general access to stairs:

• Ian: Then they also have the little weight room down there, which is quite pathetic, but anyway.

• Ian: It doesn’t have much in there though, and the space is so small anyway, so…I can’t really blame them. But, um, they have the weight room and that’s…only accessible by referral.

• Eric: It’s a small room, yeah. They don’t have room to, to have six or seven people same time. If they come in five person, you have to wait until they finish and then come back again to exercise your stuff.

• Eric: And then, we need a large, we need a big, um, big room. A lot of, a lot of, a lot of equipment like the gym and the lifting weights. They only have lifting weights, just, just these two.

• Patrick: They should have the gym open. They do have the gym open…Till 4. But I think they should have it open till 9.

• Bobby: …there’s a process that you have to go through. I think you have to talk to the centre wide, the recreational therapists, and ah, he will have to approve ah, your, you know, requests in order to use the place.
• Bobby: …the stairways are always like; it’s never open. Only ah, opportunity, you know, to move about from one floor to the other, is the elevator.

• Victor: Yeah. We need more gyms, and way more sports.

• Wayne: Well there is a gym here…there is no shower when you finish working out.

• Judy: Everything is closed up, so I don’t know. Only the doctor open the…here, here, here. He using the stairs.

These new text segments were added to the others listed under the two potential sub-themes, and it was apparent there were multiple issues that were related to the exercise facilities and stair access at the CAMH Queen Street site. Each time a different transcript was read, an iterative coding process took place where new text segments were compared to previous ones. Once all transcripts were read, all text segments under themes and sub-themes were examined to ensure they were related to one another and helped illustrate a particular issue. These themes and sub-themes were then defined and named. In this example, concerns with exercise facilities were expanded to include issues regarding accessibility, poor equipment, and limited physical space. This sub-theme was named “Limited Exercise Facilities”. With respect to access to stairs, people mostly mentioned they were not able to access them throughout the hospital, leading me to name the sub-theme “Limited Stair Access”.

The coding process described above did not involve the use of Computer Assisted Qualitative Software (CAQS) packages. Although researchers have noted that CAQS can allow researchers to deal with large data sets and can improve the rigor of qualitative data analysis, a CAQS package was not used for a number of reasons. First, a number of researchers have raised concerns that using CAQS can lead to prioritizing the quantity of data rather than the quality of the data (St John & Johnson, 2000). This may ultimately lead researchers to collect large amounts of codes that may not be analyzed in a meaningful manner and provide a deep, thick, and conceptual understanding of the data. Researchers have noted that CAQS can lead to over coding, where it can become difficult
for researchers to recall, collate, and properly analyze different codes (St John & Johnson, 2000). Additionally, in certain cases, codes can be created almost entirely stripped of the context in which they were captured. Researchers have mentioned that these effects can distance the researcher from the data (Seidel, 1991). Second, each CAQS package is unique and has a variety of functions and capabilities. Each package requires a considerable amount of time spent on proper training to ensure data is entered and retrieved correctly (St John & Johnson, 2000). Researchers have noted that at times CAQS can become more of a distraction than a helpful tool, where individuals become more concerned with proper data entry, retrieval, and whether codes can be manipulated and changed than data analysis. Lastly, most CAQS packages carry multiple costs, such as initial start up, license renewal, training, and troubleshooting and support. These costs were outside the budget of this doctoral thesis.

3.2.11 Data Trustworthiness

Multiple criteria, as suggested by Lincoln and Guba (1985), have been used to ensure the trustworthiness, or quality, of this research project. Because this study was operating within the social constructivist perspective, different criteria have been used to establish quality than what has traditionally been used to evaluate experimental and objective research. This study should be judged on credibility, confirmability, dependability, and transferability.

Credibility refers to whether or not the research findings represent the participant’s experiences and perceptions (Lincoln & Guba, 1985). To establish credibility, several strategies were employed throughout the course of this study. First, member checking was used throughout each interview to ensure that I understood each participant’s responses correctly. During the course of each interview, participants were read back all elicited obesogenic factors to ensure correct responses were captured. Second, the use of a reflexive journal allowed me to work through my biases and view the collected data from multiple perspectives.
Confirmability is a measure of how well the findings are determined by the data (Lincoln & Guba, 1985). After data collection, a peer debriefing session took place with my supervisor to discuss and ensure that relevant themes and categories were identified (Sparkes, 1998).

Dependability addresses the consistency of the research process and to account for the ever-changing context of the research environment (Lincoln & Guba, 1985). A research protocol was written, reviewed by my supervisor, and followed throughout the entire study to ensure that interviews were conducted and analyzed in a consistent manner.

Lastly, transferability refers to how the findings of a qualitative study can be applied to other contexts or settings (Lincoln & Guba, 1985). For this study, descriptions of participants and their experiences have been provided to facilitate potential transferability by the reader to their own mental health institutions and research studies.

3.2.12 Reflexivity

Reflexivity is an ongoing examination of self-understanding (Patton, 2002). To be reflexive, researchers must be constantly thoughtful of their own cultural, political, social, and ideological perspectives, in addition to the perspectives of participants and their audience. In essence, a reflexive triangulation must occur, where multiple perspectives are taken into consideration and data are viewed and re-viewed through different lenses. Because this study utilized a social constructivist perspective, when interacting with participants and examining the data I was mindful of my own position in life, socio-economic status, educational background, physical and mental health, and physical activity and dietary behaviours. Because it is not possible to ‘bracket’ my thoughts or my biases, I needed to interpret and reinterpret how I perceived the participants of this study and their unique experiences and perceptions (Koch, 1996). Such reflexivity was crucial to enhancing credibility and to developing a rich understanding of how the environment influences dietary and physical activity behaviours from the participants’ perspectives.
3.2.13 Ethical Concerns

The Tri-Council Policy Statement mandates respect for vulnerable persons, ‘those with diminished competence and/or decision-making capacity…’ (Canadian Institutes of Health Research, 2003, p. i. 5). Due to the identified vulnerability of individuals with serious mental illness, special ethical precautions were taken throughout my research programme to ensure that human dignity was respected, free and informed consent was obtained, privacy and confidentiality were protected, participants were treated in an equitable manner, and harms and benefits were explained and balanced appropriately. Recommendations to enhance informed consent in person with schizophrenia were also followed (Beebe & Smith, 2008). Ethical approval was sought and obtained from the CAMH Research Ethics Board (APPENDIX E) and the University of Toronto Health Sciences Research Ethics Board (APPENDIX F).

3.3 Results

The current study had two objectives: 1) to identify and examine environmental factors in and around the CAMH (Queen Street Facility) that may influence diet and physical activity; and 2) to identify priorities for interventions and further research. Environmental factors identified by participants and recommendations for future research were grouped according to environment type as outlined in the ANGELO framework. Factors and recommendations related to diet were more prominent and are presented first, followed by factors related to physical activity. Quotations are used to illustrate various themes and sub-themes. At times, multiple quotations from multiple participants are used to reinforce a particular point, while at other times, only one quotation is used to express a point. Where relevant, photos taken by participants are included in the description of a theme or sub-theme. Diet factors are summarized in Figure 1 and physical activity factors are summarized in Figure 2.
Figure 1. Summary of obesogenic factors related to diet in the CAMH environment.

Note: individual factors affecting diet were also brought up by participants, but are not noted above.
Figure 2. Summary of obesogenic factors related to physical activity in the CAMH environment. Note: individual factors affecting physical activity were also brought up by participants, but are not noted above.
3.3.1 Diet

3.3.1.1 Physical Environment

Hospital Facilities

Dietary temptations in the hospital

Participants stated that the hospital environment and surrounding neighbourhood were full of unhealthful dietary temptations. From vending machines to cafeterias to a roaming vending cart that visited every unit in the hospital, participants said they were constantly exposed to unhealthful food. Several participants mentioned that unhealthful food was unavoidable in the hospital and that merely seeing it was enough to trigger food cravings.

Perhaps most problematic of all of these temptations were the vending machines. Placed in every unit and strategically throughout the hospital, these food and beverage dispensers were identified as major contributors to the weight gain experienced by clients. Several participants mentioned that vending machines stood in sharp contrast to the health-promoting mission of the hospital. Vending machines were blamed for perpetuating a weight gain problem amongst clients who struggled to keep a healthful diet. Participants were puzzled why a hospital would allow the sale of unhealthful food products like potato chips, cookies, candies and soda knowing that such products can cause excessive weight gain and obesity-related morbidities like diabetes. Given its negative impact on weight, participants recommended that all vending machines be removed from the hospital grounds or completely overhauled to only sell healthful food products.
Jonathan: So what are they trying to teach us that...you know, that they’re to help us or they’re there to hurt us, right, with these vending machines. Are they trying to help us or are they trying to hurt us?...Do they want us to continue to be sick or they want us to get better?

Participants also pointed to unhealthful food products that caused weight gain available for sale at the hospital cafeteria. Food products included pizzas, burgers, fries, sausages, patties, chips, muffins, and other high fat and starch based items. Participants recommended that the hospital change the food products available for sale at the cafeteria to promote more healthful diets.
Eric: …*the food is nice, but, I’m talking about what that they [hospital cafeteria] have, chips and the, and the fries also…We need to change those kinds of stuff…*

In addition to unhealthful food products available for sale in vending machines and at the hospital cafeteria, clients also had to resist the temptations of two client run services: the ‘coffee cart’, a vending cart that visited every unit twice a day, and ‘Out of this world café’.

Essentially a convenience store on wheels, the coffee cart carried an assortment of food and beverage products such as potato chips, chocolates, pastries, sodas, and coffees. Occasionally, the coffee cart would carry a few fruit options like oranges and apples, but participants said that these were not popular items. Much like the coffee cart, the client run café also carried a wide selection of food and beverage products, but also sold hot sandwiches and soups. Participants mainly pointed to unhealthful food options like soda, potato chips, pastries, and chocolate bars when they described the café.

Although the coffee cart and café were identified as sources of unhealthful food products, only two participants recommended the food products be changed to items deemed more healthful. This resistance to change the contents of the cart and café may have been due...
to the fact that these were client and survivor run services and they represented opportunities for some individuals to gain employment.

*Jonathan: For people, especially coming down in the coffee cart and all that kind of thing….Food coming in here, they should provide some better food. That’s what I think.*

Hospital Food

Participants had many different perspectives on the quality of hospital food served either through tray or buffet service. Many participants said the food was hard to digest, bland, and lacked variety.

*Sean: People make jokes about hospital food, but this is not a joke. This is more of a nightmare….Yeah, I guarantee, two weeks if you ate the food here, two weeks here you wouldn’t believe it. And the same thing is repetitive, week after week….It’s just so, it’s ultra bland. From being steamed on the trays….And it’s not very good, really. A lot of it isn’t that good, but they cook all the nutrition out of it anyway….The taste and the nutrition is just not there.*

Additionally, some participants felt that the quality of food had decreased over the last few years and, as a result, was driving clients to find more palatable food elsewhere. Participants explained they chose to visit restaurants near the hospital to find satisfying meals that had taste rather than eat meals available to them as part of their care on the unit. Usually, satisfying and flavorful meals often consisted of foods high in fat and carbohydrates.
Wayne: …the food over here, that they eat here, has no taste…And they go outside…For outside meal…Hamburger, hotdogs, and sausage…There is no healthy food around here.

Given the strong reactions to the quality of food served on units, participants recommended that units serve a larger variety of food options and improve cooking methods in order to preserve texture and taste.

Ian: Yeah more flavour. Um, that would...that would kind of, I think that would bring back some of the clients that, that really, that are really disappointed in the meals here.

Dietary temptations outside the hospital

Across the street from the hospital, participants identified several convenience stores and diners that clients frequented. Participants identified these establishments as places where unhealthful food products could be purchased for a low cost. Easily accessible convenience stores across the street coupled with no storage space for perishable food in the hospital meant that clients often bought large quantities of unhealthful non-perishable food products such as soda and chips often at a discount. Although participants recognized that these establishments sold unhealthful food products, they realized these stores and restaurants operated outside the jurisdiction of the hospital and, therefore, did not have to change their business practices to accommodate clients. Instead, participants
mentioned that clients needed to exercise more self-control when it came to purchasing food.

*Bobby: Because of past experience ah, I don’t like going to the convenience store across from the hospital because, because um, I think he sells a lot of junk food in there. And ah, you end up buying big bags of chips and two litre pops and stuff like that, you know.*

**Programming**

Although participants indicated that more education about healthful diets would be helpful, individuals were also interested in opportunities to receive encouragement to eat a more healthful diet. Participants welcomed receiving help from staff on diet in the form of directive care, but also wanted to be able to share their frustrations with trying to eat healthfully. Essentially participants were seeking greater communication with staff in order to establish an empathic connection and to receive necessary skills training to make healthful choices and motivation to persevere through cravings.

*Adam: I think that could really work [educational programming] because you know most of the time, you know, people tend to…go towards something the more they learn about it, right? They hear about it on a day to day basis and on a weekly basis. You know, you kind of stick in their mind and sometimes subconsciously they practice some of the things that they’re learning and they don’t realize it….So I think that could work…*

### 3.3.1.2 Political Environment

**Limited Privileges**

A number of participants mentioned that time constraints imposed by limited privileges restricted where clients could purchase food off the unit. Often clients were limited to stores or restaurants that were within walking distance of the hospital where they could purchase a meal or a food product and then quickly return to the unit. Clients often had privileges that allowed them to be off the unit for 30 minutes or less. Given this time restriction, the many diners and convenience stores that offered low cost food products for sale across the street from the hospital were particularly popular with clients. Participants also described that over time this behaviour of buying food quickly in order
to return to the unit as soon as possible became a habit for many clients and it still occurred when clients’ privileges improved.

Figure 6. “Local restaurants.” Photo taken by Adrian.

*Adrian: They have no choice. They got to buy what they have in front and they have the money and they have no, not much time to be out in their privilege. They got to go back so they got to spend it right away. And they, and they get accustomed to it a lot.*

Participants said that if higher quality and more tasteful meals were served on unit floors, they would not have to leave the hospital for outside food. Not only would this allow clients to save money and improve their overall diets, it would afford them the opportunity to use their limited amount of time to pursue other activities.

### 3.3.1.3 Economic Environment

**Low Income**

Participants mentioned that they had low incomes that prevented them from purchasing higher quality and more healthful food products. The affordable options available at convenience stores and diners across the street from the hospital provided clients an opportunity to purchase food at a price they could manage. Due to their low incomes,
clients were not able to afford the higher quality and more healthful food available at some of the more expensive restaurants near the hospital.

Figure 7. “Local convenience store.” Photo taken by Jonathan.

*Jonathan:* …*you have nowhere to go here, around this area. You have a healthy restaurant, but they can’t even afford it…So, you’re kind of limited, you know?*

A few participants mentioned that clients lacked the necessary budgeting skills when it came to purchasing food products. One participant described a monthly routine where she would withdraw large sums of money from a bank machine at the hospital and then purchase food at the cafeteria.
Judy: *That’s where I took money to buy all this food…450 dollars, 400, 200… So I brought the money here and asked people to buy it [food from the CAMH cafeteria] for me.*

Another described his need to spend money on food whenever he had money in his pocket. A recommendation from one of the participants was to offer clients information on how to budget accordingly in order to purchase more healthful food products, instead of spending money on vending machines or other food outlets.
Adrian: *But if they get a meeting and information, maybe they stop [spending]?...They save their money and they go to buy, buy a better food in the restaurant.*

### 3.3.1.4 Socioculture Environment

**Boredom**

Participants who lived in the hospital indicated that they had very little to do during the day. Participants indicated that there was a lack of staff and limited hospital programming and access to certain facilities, and many clients simply ate out of boredom. They explained that they had a lot of time on their hands and very few opportunities to get involved at the hospital. Although participants knew they were purchasing unhealthful products, they mentioned they ate to keep themselves occupied.
Sean: Well that’s the ah, the vending machines. That’s a pit-stop for me, cause ah, as I was saying to you before, you got so much time on your hands. You just eat out of boredom...Strict boredom...you got nothing else to do.

Participants said that with more programming options, access to exercise facilities, and directive care, clients could be presented with more opportunities to be engaged in meaningful activities.

3.3.2 Physical Activity

3.3.2.1 Physical Environment

Hospital Facilities

Exercise Facilities

Participants identified many aspects of the physical hospital environment that limited their ability to be physically active. Primarily, participants mentioned that the hospital lacked adequate exercise facilities and equipment. Participants described exercise rooms as cramped and with too few fitness machines.
Adam: Something that is available to more people... at more times because they have a gym right now, only like four people can use it at a time for a big facility like this that has so much hundreds of people and they don’t want to have a good gym with exercise machines and everything that can help people...

Figure 11. “Gym.” Photo taken by Eric.

Eric: It’s a small room, yeah. They don’t have room to, to have six or seven people same time. If they come in five person, you have to wait until they finish and then come back again to exercise your stuff.

A common experience shared by participants was how difficult it was to access the exercise facilities. Some individuals mentioned the lengthy administrative process to gain access to the fitness facilities, while others mentioned the difficulty of physically locating the facilities in the hospital.

Bobby: ...there’s a process that you have to go through. I think you have to talk to the centre wide, the recreational therapists, and, he will have to approve, your, you know, requests in order to use the place.

Clients also discussed the hours the fitness facilities were open and identified them as being inconvenient. Some noted that the gym and pool were accessible only a few times per week.
Adam: …now they're making it available for us one or two or three times a week in the mornings from a certain time to a certain time. And only a certain amount of people can go in there.

One individual argued that the hospital was more accommodating to community members who rented the facilities during the evenings and weekends than to its own clients. He believed that the fitness facilities should be more accessible to clients and that the hospital should focus on client needs rather than rent out the facility to community groups.

Patrick: There’s these other people coming in this, this place. They’re not from the hospital. They say they got a permit. … but these groups that play basketball, soccer, they have, they’re not a priority, here. The patients here are priority. And then, it bothers me that they come here and they say they have a permit and they can use our gym when it’s for us…for the patient, client, CAMH patients.

Although participants acknowledged the facilities needed to be expanded and made more accessible, they felt that only certain, small modifications could be made, like increasing the amount of time the facilities were open during the day.

Stair Access

Many participants expressed their frustration about the lack of access to stairs in the hospital. Although participants mentioned they believed staircases were closed for safety reasons, many individuals indicated they would like the option of taking the stairs instead of the elevator. Participants recognized that taking the stairs would be beneficial to their health, as this simple form of incidental physical activity could help them burn off a few calories each day. Some participants believed that stair use should be promoted where possible.

Jamie: I wouldn’t mind using the stairs three days of the week to get my legs back into shape. Um, and the rest of the time, maybe elevator. I want to start off slow and maybe, and gradually, improve.
Colin: …if you have a stair case, you know, you can walk up and down and…that’d be OK if you’re allowed to…It requires exercise to walking up and down stairs.

Adam: For patients…We can’t use stairs here. Really except in the main buildings, like the administration building. That’s the only place you can get to use the stairs. And the units, all we use is the elevators and that’s where we go and come to most of the time. We can’t use the stairs you need a key to use the stairs…So there’s no stairs accessible for us that at least going up and down the stairs you can burn off a few calories…

Programming

Participants believed that a lack of physical activity and sports-related programming limited their ability to be active. Some participants explained that organized sporting events would provide opportunities for clients to socialize with other individuals while being active at the same time.

Jonathan: …go places and maybe go to a ball park and play baseball together. Like I used to know places they used to do that in Toronto. People still do it, I’m sure…Where people get together and go and play baseball and have a day, have a day out. You know?

Although participants indicated a need for more physical activity and sports-related programming, one participant noted that there was specifically a lack of options for women at the hospital to become active. She mentioned that men had opportunities to participate in some of the organized sports and activities, while women were often offered sedentary options, like reading.

Judy: Here, only men have [physical activity scheduling] apart from swimming…They, volley and the baseball…is for the men…Women doesn’t have any activities…only library.

In addition to physical activity and sports-related programming, participants also indicated that a lack of employment restricted their ability to be active. Several individuals noted that not having a job to attend to during the day left them feeling unmotivated and unwilling to be active. By establishing vocational programs, participants suggested that clients would have the opportunity to be active while working.
Daniel: …you got to have something to do, you know? Like you know, I’m going to work today, this is my job, I do this and that. But if you’re just sitting around doing nothing, you know, like, I think it’s a waste of time.

Paul: How would job skills help you be more active?
Wayne: Well because you’re busy…You’re physically working…And mentally working. Like computers…Or in the garage, working on the car…You have to think what to do and sometimes you lift things.

Several participants said that more access to information about physical activity and the physical and mental health benefits associated with physical activity should be offered to clients. Particularly, one participant stated that information about fitness, diet, and weight loss available in the hospital library should be more accessible as it could help clients improve their health and quality of life.

Bobby: I think it [information about physical activity and diet] should be incorporated into the rehabilitation regimen. Like, if they can um, you know, let them know that keeping fit is really important ah, not only does it help you to ah, feel good about yourself, it makes you think better.

Along with more information about physical activity, a number of participants expressed that there should be more directive care offered to clients with respect to being more active. Participants said that staff should offer information about being active and locations clients can access physical activity and exercise related resources and facilities. Additionally, many participants indicated that they were deeply affected by their mental illness and that it prevented them from taking part in physical activities. Particularly, many individuals noted that they felt unmotivated to be active and that their medication regimens made them feel tired and disoriented. By providing information about the benefits of physical activity and resources accessible to clients through directive care, participants said that clients would receive the necessary encouragement and motivation as well as knowledge to be active on a continual basis.

Jeff: Well, they’re dealing with mentally ill people…if you leave it up to the person to decide what to do, he’s going to chose the easy way out because according to him, he’s locked in the hospital and he wants to get out and all that. But you got to explain to him that it’s a hospital, that it’s there for ah, for ah his own good. Insist that he, that he do,
ah what is necessary for his health, instead of just leaving him, up to him to ah, to try on his own because will power is not strong in that, in that when it comes to mental illness.

Ian: I just think...you need a lot of support from you know people that know about the whole process and recreation to help you out because sometime it’s not that you don’t want to do it but if you could get the encouragement or somebody’s always asking you...at least when they do that once in a week, you will get active. You know it then it can become a habit and you want to do it on a daily or every other day basis.

One participant identified that a directed and coordinated effort was needed amongst the staff to help clients become active. He said that nurses and physicians should recognize clients, boost their spirits and encourage them to live active lifestyles. He insisted that nurses and physicians could energize their clients by giving them hope and the confidence to be active, while recreation therapists could direct clients to take part in specific activities. In essence, this participant illustrated the need for a sustained and coordinated effort amongst multiple health care workers to encourage and also provide services to clients to help them become more active.

Kevin: ...clients need attention from the nurses and from the doctors. They need recognition. They need...somebody to boost them up... They need...a...welcoming approach from the doctors and the nurses and other staff with open arms. Right? That would boost the ego and the personality of the patient, clients...That would give them energy and then the rec therapist could use that energy.

Participants noted that both structured and unstructured physical activity programming could help clients become active and provide an alternative to sitting around the hospital; however, such programming was contingent on having enough staff. Recreation and nursing staff members were identified as being integral to helping clients become more active. Although participants agreed that staff did schedule, organize, and supervise formal and informal exercise sessions regularly, they believed this could be done more frequently. Participants believed that if a greater number of nursing or recreation staff members were available, more clients would have the opportunity to be physically active.

Sean: Ah, I think they should make...more of an effort..., like when you stuck on the ward....To say hey, we’re going to go for a two hour walk...Just have a staff they can free up and say hey...you can take these guys for a walk?
Some participants also expressed frustration with the lack of staff and noted how busy nurses were at the hospital. Although they understood that nurses were overloaded with work, participants were irritated with asking repeatedly to be let off the unit to go for a walk or to be active off the unit.

*Kevin:* Well, you keep have to asking. You have to keep asking and ah…they’re busy and we understand, but ah, they don’t fully realize that we need some change of air. Some change of environment.

### 3.3.2.2 Political Environment

#### Limited Privileges

Many participants made comments about their limited privileges at the hospital and how it restricted their ability to be active. Participants often noted how difficult it was to leave their units or go outside to be active. The issue of limited privileges was complex. Some participants noted that they were either not allowed to leave their units at all or be permitted to leave for short durations scheduled a few times daily because of conditions imposed on them by hospital staff or various legal proceedings.

*Jamie:* …what makes me less active is um, being ah, being ah, in Queen Street for so long. Um, like I was in medium and I didn’t have any privileges in over eight months. Like I was in ah, I was ah, I wasn’t allowed to go outside for eight months. At all. So, that’s how I gained most of the weight. I was in there 24/7. I had the option to go into the yard, um, once a day and you couldn’t…it’s usually 45 minutes to one hour yard time. And um, you can walk back and forth, but ah, after ten minutes or so, you just get bored and sit down.

Other individuals spoke of their confinement in a different manner. These participants expressed frustration over the laborious task of getting past their unit’s main door. Participants felt confined due to the complex process of asking busy staff to open the unit door. For these participants, the locked unit door symbolized their confinement that often left them demoralized and unmotivated to be active.
Greg: The locked door. Um we can’t get out or in all the time. When you want to, people have to wait. And the there’s times that the nurses don’t take you off the floor when you’re allowed to have 15 minutes a day. Like if you’re…a person with ah…privileges. This is what they do. But, every time, 15 minutes, when I want out, I can’t get out because they say you’re locked on the floor…And I phone the um…advocate downstairs about it. And they’re going to look into it…to see if there’s a volunteer that can take me out or…whatever. Cause staying on the floor 24 hours is…it’s monotonous.

Due to the complexity of client privileges, many participants felt this was a particularly difficult issue to change.

### 3.3.2.3 Economic Environment

Participants did not directly mention any economic factors related to their own physical activity.
3.3.2.4 Sociocultural Environment

Culture of Sitting

Some participants indicated that a culture of sitting around existed at the CAMH and that clients had nothing to do with their time. Participants indicated that sedentary activities were not healthy and that they should be discouraged. Several participants indicated that they sat in the common areas of the hospital or in their units and were sedentary throughout the day.

Figure 13. “Gym.” Photo taken by Greg.

Greg: It’s best to go to the gym to ah…work out, instead of just sitting around sleeping late,…laying around.

Adam: …they have the benches right downstairs…As you go outside, they’re right out there…You can just sit down, you know?…Doesn’t give you any incentives to walk, you know?…Cause it’s…you see benches you just want to sit and smoke, you know?
These individuals mentioned that they needed to be engaged by staff and have specific activities that aligned with their interests programmed for them in order to increase their levels of physical activity.

Brian: I just sit in the community centre, you know? I don’t get too much physical activity, no…Well, the only thing I can think of is like, instead of sitting around the television, like most of the patients, like, most of the patients should have like floor hockey games or basketball games in the gym or whatever.

Jamie: …most of the patients, they’re not…interested in their health…they’ll say, “ah, we don’t’ want to do it.” Most of the time it was just me and another patient or so doing a hike or another exercise with the rec staff. And most of the time, if they go for a sports program, they’d rather sit down and watch.

**Mental Illness and Stigma**

Some participants indicated that their mental illness limited their ability to socialize and take part in group-based physical activities. These individuals stated that they preferred to be alone and keep to themselves. Some participants said they wanted to have time to collect their thoughts while others mentioned they were fearful of groups because of potentially being stigmatized due to their mental illness.

Jeff: I walked alone most of the time. Um, um I’ve become bit of a loner since I was diagnosed with schizophrenia. So um, I tried to avoid um, a situation where the person um, where I’m going to get into an argument with the other person…

Alternatively, two participants indicated that in order to minimize the threat of being stigmatized while being physically active, they chose to socialize with other individuals who lived with a serious mental illness. These participants believed that groups of individuals with serious mental illness provided comfort and safety from threats or incidents of violence and harassment.

Daniel: …if you’re walking in a group, and you know…each other, for a period of time, you feel much safer. Like you know, like um, no one’s going to attack me and stuff.

Victor: …when I walk myself, other people watch me and call me stupid or something…I like the group.
Ultimately, participants indicated that clients should be provided with options to either participate in physical activities that they could perform individually or as part of a group in order to feel safe.

3.4 Discussion

The purpose of this qualitative study was to identify and examine environmental factors in and around the CAMH that may influence diet and physical activity and to identify priorities for interventions and further research based on identified modifiable environmental factors. This is the first study conducted in Canada that has examined the perceptions and experiences of consumers of a psychiatric facility in order to further understand the impact of the environment on the physical activity and dietary behaviours of individuals with schizophrenia. This study is the first key element in the creation of a complex ecological intervention to address obesity in this population (MRC, 2006). Through the use of an emergent design, this study makes a contribution to the research literature by identifying a set of priorities for feasible and acceptable consumer centred interventions and research studies that can be developed to deal with the obesogenic environment at the CAMH.

Throughout the interviews, participants identified obesogenic elements that involved every type of environment. With respect to physical activity, participants identified several obesogenic factors in the physical environment such as limited hospital exercise facilities, inaccessible staircases, and a lack of client centred programming. These factors were closely linked to other factors classified under political and sociocultural environment types, including limited privileges and issues of mental illness and stigma. Despite the environmental focus of this study, some participants also spoke of individual responsibility to become more active, sometimes neglecting to mention environmental influences altogether. The “life-style theory of disease” approach taken by some participants to explain low levels of physical activity described it as a result of personal failure, rather than one caused by the hospital and its surrounding environment (McLeroy et al., 1988). Their suggestions to increase physical activity amongst consumers often focused on individuals taking more responsibility and changing their own behaviours,
rather than suggesting that any changes be made to the environment. This perspective is not surprising given that all previous treatment approaches for obesity in schizophrenia have been behavioural or pharmacological in nature (Beebe, 2008; Faulkner & Cohn, 2006; Faulkner, Cohn, & Remmington, 2007; Loh et al., 2006). These treatment approaches have been firmly placed in the medical model of treatment, where health care providers dispense evidence-based information and treatment options and patients are seen as agents responsible for their own decisions and health outcomes (Adler & Stewart, 2009; Shah & Mountain, 2007). Behavioural and pharmacological interventions have aimed to address a main tenet of the medical model when dealing with obesity: provide useful information to help improve unhealthful lifestyle decisions. Although these interventions may have intended to empower individuals with free choice, unfortunately they have also placed a great deal of responsibility on individuals, almost entirely negating the environment in which people live and receive treatment. This approach may not be the most useful strategy for this population given the various cognitive deficits and negative symptoms people with schizophrenia often exhibit. In essence, people with schizophrenia may simply not be able to take full advantage of the evidence-based information and treatment options that are dispensed to them. What has emerged from the individualistic interventions that have been promoted to individuals with schizophrenia is a form of “victim blaming,” where obese individuals have been asked to take full responsibility for their own weight outcomes. Some participants in this study may have presented individualistic approaches to dealing with obesity rather than addressing obesogenic environmental elements in the hospital simply because they were never made aware of other factors that may influence their weight. Individuals may have perceived their weight gain as a result of their own personal failures with treatment. This individualistic response from some of the participants signals a need for health care providers to adopt a broader biopsychosocial perspective in order to deal with obesity in this population. A biopsychosocial approach would complement the medical model and not only address physical and biological aspects of obesity and the chronic conditions that may stem from it, but also psychological and social factors associated with obesity (Engel, 1977). In essence, through the use of this model individual responsibility for health would be strengthened with necessary resources and policies that would help
modify environments so that they can help individuals make healthier decisions. The biopsychosocial model is quite complementary to the ecological model that reinforces the need to not only provide intrapersonal strategies to foster behaviour change by addressing psychological and biological variables, but also environmental strategies in the form of community and organizational changes and policy reforms to help provide supportive behaviour settings to reinforce healthful behaviours (Owens et al., 2010; Sallis & Owen, 2002). From all the interviews in the current study, what emerged was a combination of strategies that provided opportunities to change individual behaviour, but also organizational policy and the culture itself.

A need for accessible exercise facilities was identified as a factor that could improve physical activity and exercise participation in psychiatric facilities (Cormac, Martin, & Ferriter, 2004). Cormac et al. explained that physical activity may increase if barriers to exercise and sports facilities, as well as equipment, were addressed. This could include improving hours of operation, providing convenient locations, having motivated and encouraging staff-run the facilities, and ensuring equipment is available and operable. Additionally, consistent with previous research, more physical activity related programming options need to be provided to clients to encourage them to be active (McDevitt, Snyder, Miller, & Wilbur, 2006; Richardson, Faulkner, McDevitt, Skrinar, Hutchinson, & Piette, 2005). This could involve both structured and non-structured programs, group and individual options, educational sessions, as well as age-and-gender-oriented activities. A diverse range of options could offer clients the ability to choose programs that suit their particular needs, accommodating for various physical and mental health complications, and issues related to stigma. Research has shown that incorporating physical activity programs into mental health services, with appropriate and accommodating support systems in place, can be popular amongst clients and lead to several significant health and social benefits (Hodgson, McCulloch, & Fox, 2010).

One factor that has not been mentioned in previous research is the ability of employment programs to help increase levels of physical activity in people with serious mental illness. Several participants mentioned that vocational programs that helped clients find work would not only offer clients a sense of purpose and but also provide them with
opportunities to gain valuable incidental physical activity through labour. Given that unemployment is extremely high amongst individuals with schizophrenia (Goeree et al., 2005), and that paid work activity has been shown to have a positive impact on mental health symptoms in this population (Bell, Lysaker, & Milstein, 1996; Burns et al., 2009), future research may wish to explore whether vocational programs can have an impact on levels of physical activity. Research has shown that people in the general population who are employed, even in sedentary jobs, are more active than individuals who are unemployed (Van Domelen et al., 2011).

One potentially limiting factor that could prevent the creation and maintenance of new programming in psychiatric hospitals is a lack of staff. With a poor economic climate and strapped budgets, psychiatric hospitals are required to provide more services for less. This may mean that staff-client ratios may grow in the coming years as many governments implement hiring freezes, further restricting programming options for clients and compromising care (Weiss, Malone, Merighi, & Benner, 2009). Such restrictions can have implications on the level of privileges clients experience in psychiatric hospitals. Research conducted by Haglund, van der Meiden, von Knorring, and von Essen (2007) in Sweden showed that psychiatric wards were occasionally closed due to staff shortages, resulting in limited client privileges. Their findings illustrate that with limited staff, locking the ward door and limiting client privileges became a necessity in order to account for clients on the ward and create a safe work environment. Not only do such actions decrease client care, they also lead to increased stress and burnout for staff.

With potential staff shortages, interventions such as increasing stair use would seem like ideal options to increase levels of incidental physical activity given the minimal level of supervision required. However, due to safety concerns for both staff and clients, staircases are often closed and restricted only to staff in psychiatric hospitals. Although safety is of utmost importance in any hospital, such restrictions limit the accumulation of incidental physical activity of clients. Given the health benefits of short bouts of stair climbing (Boreham et al. 2005), stair use should be promoted in a manner to accumulate daily physical activity; however, only on units where it is deemed safe and possible to do
so. Other strategies to increase incidental physical activity in and around the hospital could include the removal of barriers on unit floors to allow clients to enter and exit more easily and promotion of walking and biking as alternative forms of transport.

With respect to obesogenic factors related to diet, clients identified aspects of the physical environment as having the greatest impact on their dietary behaviours. Similar to recommendations to improve levels of physical activity, some participants pointed to taking personal responsibility as a way to improve dietary behaviours. Many individuals spoke of not being able to control themselves around dietary temptations in the hospital (e.g., vending machines, client-run food services, the hospital cafeteria) and outside the hospital (e.g., nearby restaurants and convenience stores). Although participants pointed out obesogenic aspects of the physical environment and recommended policy changes that would remove or limit the sale of high calorie food items in the hospital, they also identified consumers needing to take personal responsibility to be able to make healthful dietary decisions.

The results of this study are consistent with research that has shown the hospital food environment contributing to obesity and other chronic illnesses amongst the client population (Reed & Chenault, 2010). Reed and Chenault note that hospitals need to reconstruct their food environments by removing easily accessible, high caloric, and unhealthful food available for purchase on site. Some researchers have suggested that vending machines contribute heavily to overeating in the hospital environment. In a study that explored the food and beverage vending environment in health care facilities in the state of California (Lawrence, Boyle, Craypo, & Samuels, 2009), researchers found that 79% of hospitals had at least one vending machine, and that hospitals averaged 9.3 vending machines per facility. Additionally, most vending machines did not contain healthful products as 75% of food and 81% of beverages sold in vending machines did not adhere to California school nutrition standards, a set of policies designed to increase the nutritional standards of vending machine content. Other studies that have examined the placement and content of vending machines in hospitals found similar findings (McDonald, Karamlou, Wengle, Gibson, & McCrindle, 2006; Kibblewhite, Bowker, & Jenkins, 2010). A review of recent vending machine policy changes at the CAMH
showed that all 7 food and beverage vending machines at the Queen Street facility follow Health Canada’s Eating Well with Canada’s Food Guide, 2007 (Dekker, 2007; G. Sidle, Manager of Clinical Operations CAMH, personal communication, September 27, 2010). Although changes have been proposed and made to reduce the amount of sugar, sodium and fat content in all food items, some food items in the vending machines still contain between 20 and 55 g of carbohydrates. The food content available for purchase in vending machines should be reexamined to see if more healthful options can be proposed.

Another concern for participants was the sale of unhealthful food at hospital cafeterias. Participants mentioned that the hospital cafeteria sold many unhealthful food products that caused clients to gain weight. Individuals recommended that food sold in the cafeteria be changed to more healthful options to not tempt clients to purchase it. Although many hospital cafeterias across North America serve unhealthful food (Reed & Chenault, 2010), there is little consensus as to what kind of food should be served (Freedhoff & Stevenson, 2008). Freedhoff and Stevenson found that hospital administrators are not inclined to act as the ‘food police’ and monitor what kind of food clients eat, with some administrators arguing that food choices should be left solely to the client. Administrators also pointed to the need to make profit from hospital food to fund other hospital programs. If there is to be any change in food products available for purchase in hospital cafeterias, a shift in nutritional values as well as how hospital programs are financed will be necessary.

As for food available for purchase at restaurants and convenience stores near the hospital, participants recognized that little could be done to change the products they sell. A common suggestion that many individuals gave was to improve the quality of food served to clients in the hospital. Participants argued that by improving the quality of hospital food, clients would not be tempted to seek out and purchase food elsewhere. This recommendation has also been made by Reed and Chenault (2010), who argued that clients unsatisfied with hospital food may be more receptive to high calorie comfort food. They noted that healthful, high quality food that does not sacrifice taste may decrease unhealthful eating when combined with other interventions such as dietary education programs. Through dietary education programs, clients could receive additional support.
to make more healthful dietary decisions that would take into account their own physical and mental health needs as well as any other issues that affect their diet. Such changes may help reduce the need for clients to make unhealthful food choices at nearby restaurants and convenience stores, thereby saving them money and freeing them to pursue other activities while off the unit.

3.4.1 Comparing Clients and Stakeholder Perspectives

When comparing client and professional stakeholder perspectives, obtained in an earlier study (Faulkner et al., 2009), there were a number of similarities and differences between the two groups regarding how diet and physical activity could be improved to facilitate weight loss in the client population. First, both groups agreed that programming was necessary to promote healthful lifestyle decision making at the CAMH. Although clients and stakeholders agreed that more directive and consistent care across units was necessary, the two groups differed on what specific aspects of care needed to be direct and consistent. Clients wanted direct care to help plan physical activity options while stakeholders were more concerned with consistent dietary policies that could be implemented throughout the hospital, like no ordering of take-out food and making sure clients woke up each morning to eat breakfast. Although both groups were inclined to examine more proactive and directive approaches to care, both were concerned with preserving client autonomy.

Clients and stakeholders also identified a need to change food delivery operations on each unit. Although this item was a point of agreement between the groups, clients and stakeholders pointed to different aspects of food delivery. Clients were more concerned with changes to the way food was prepared so that taste, texture, and nutritional value were preserved. Clients suggested meals no longer be prepared using steam so that food products would not be bland and soggy. Many participants mentioned that improvements in food quality would result in more clients choosing to eat meals on the unit and not seek additional food products in vending machines, the cafeteria, and restaurants and convenience stores across the street from the hospital. Stakeholders were not concerned about the manner in which food was prepared, but rather wanted to change the way food
was served to clients. Many stakeholders argued that changing from a buffet style of food delivery to individual tray service would limit consumption of food by clients during meal times and lead to more healthful diets over time. This strategy was attempted successfully on a rehabilitation unit at the CAMH and researchers found that after six months 39 of 53 individuals had lost weight with 7 individuals losing more than 7% of their body weight (Cohn et al., 2010).

A further point of agreement that existed between clients and stakeholders was that client and survivor run food operations, such as the coffee cart and the café, served unhealthful food options. Although both groups recognized that the coffee cart and cafe could offer more healthful options, stakeholders were more likely to impose restrictions on their operations. Stakeholders believed that the coffee cart and café could serve food options that were more aligned with recent healthful changes to the vending machines, changes that required food products to be low in fat, sugar, and sodium. Clients and stakeholders alike acknowledged that the client and survivor run operations provided clients with important vocational training and employment opportunities and that the services should continue to operate regardless of whether healthful food products were sold.

Another point raised by both groups was changes to vending machines and cafeteria food products. Although both groups recognized that vending machines and the cafeteria sold unhealthful food products, only clients expressed a need to fully remove unhealthful food from vending machines and the cafeteria. Clients also expressed a desire to rid the hospital of vending machines should food products not be improved. Stakeholders were more reserved on the need to radically alter food products available for sale in vending machines and the cafeteria. Many stakeholders explained that the food content in vending machines was recently altered to offer more healthful options that were low in fat, sugar, and sodium. Stakeholders insisted that the food in vending machines be examined again to ensure high nutritional standards.

As for points raised by only one group, clients identified that improvements to exercise and gym facilities were necessary to help improve physical activity amongst the client population. Recommendations included expanding existing gyms and exercise rooms,
purchasing more equipment, and making gyms and exercise rooms more accessible. Stakeholders most likely did not raise this point because such infrastructure changes would be quite expensive and outside current budget restrictions.

Another issue recognized only by clients was a lack of staff at the hospital. Clients mentioned that due to a lack of staff, certain programs like walking groups, recreational programming, and dietary consultations were often scaled back or not available on a regular basis. Clients expressed a need for more staff to provide access to regular physical activity and dietary programming and also to improve living conditions on the unit. Given the current economic climate, stakeholders promoted other solutions that utilized available resources.

3.4.2 Comparing Clients and results from previous photovoice research investigating physical activity, diet, and obesity

A number of recent studies have used photovoice to investigate the general population’s perceptions of environmental facilitators and barriers of physical activity and healthful diets. These studies have involved diverse groups such as parents and youth in rural and urban areas (Burton & Medcalf, 2011; Findholt, Michael & Davis, 2010; Hennessy et al., 2010; Kramer et al., 2010; Walia & Leipert, 2012), seniors (Lockett, Willis & Edwards, 2005; Mahmood, Chaudhury, Micahel, Campo, Hay & Sarte, 2012; Stephenson, 2012), and members of racialized communities (Ambrose Gallagher, Gretebeck, Robinson, Torres, Murphy & Martyn, 2010; Fleury, Keller & Perez, 2009). The findings from the current study are in line with previous research. With respect to physical activity, predominant issues that limited activity included a lack of community resources, inaccessible facilities, poorly maintained equipment and facilities, poor transit options to exercise facilities, and perceptions of unsafe neighbourhoods. Regarding food environments, participants in previous studies found that vending machines, school cafeterias, fast food restaurants, and convenience stores heavily influenced unhealthful eating.
Results from the current study show that perceptions of environmental facilitators and barriers of physical activity and healthful diet shared by people with schizophrenia are not different than those from the general population. These findings illustrate that individuals with schizophrenia can identify unhealthy environments, just as those in the general population, which can ultimately compromise overall health. These results show the potential broad impact of ecological interventions, should they be introduced. By implementing healthful environmental modifications, people’s perceptions of healthful spaces may improve for all individuals in a particular environment and not just a select few. Potentially, the creation of healthful behaviour settings would lead to more healthful decision-making by all individuals (Sallis & Owen, 2002; Taylor & Repetti, 1997).

3.4.3 Recommendations to improve the obesogenic environment of psychiatric facilities

Based on the findings from this study, earlier research that examined stakeholder perspectives (Faulkner et al., 2009), and previous studies examining this population, a number of recommendations can be made to improve the obesogenic environment of the CAMH.

1) Improve access to existing facilities that can help clients become active.

Whether it’s exercise facilities or locations where clients can accumulate incidental physical activity, efforts should be made to remove barriers that prevent active lifestyles in the hospital. This may include increasing the number of hours a gym is open; ensuring equipment is available and functioning properly; reducing the administrative burden for clients to access recreational services; or providing resources to clients so they can become familiar with the exercise facility and its location (Cormac et al., 2004). Additionally, the accumulation of incidental physical activity throughout the day should be promoted as much as possible within the hospital. Information should be distributed to clients about staying active and the benefits of simple activities like walking or taking the stairs should be promoted. These non-structured activities can help clients not only stay active, but also reduce the need for formal supervision in certain cases.
2) Improve programming options for both men and women and include educational and motivational components to improve physical activity and dietary behaviours.

Participants explained that in order to help clients break free from a culture of sitting and unhealthful eating, staff needed to take a more directive approach that still preserved client autonomy. This type of care could be delivered through improved programming at the hospital that caters to different client needs and interests. For instance, sport and physical activity programs and culinary and dietary classes could be set up to provide options and positive spaces for both men and women. Participants also identified a need for psychosocial programs that provide motivational support and are empathetic to the needs of clients in order improve physical activity and dietary behaviours. Through the use of motivational interviewing, exercise counseling, nutritional counseling, and other psychoeducation programs clients could receive directive care, become motivated to improve their lifestyles and ultimately make autonomous decisions that are right for them. Research conducted by Beebe (2007a) has reinforced the importance of psychosocial treatments for individuals with schizophrenia as a way to provide psychiatric care and monitoring, assess physical and mental health conditions, prevent relapse, and promote recovery.

Although the current economic climate may prevent the hiring of more staff to run various programs in hospitals (Eggertson, 2010), the addition of more allied health care workers could improve the care clients receive and reduce the work stress current staff experience. Throughout the study, participants called for increased staff presence on units and in the hospital in general to help facilitate physical activity and dietary programs. Participants recognized the difficult and stressful working conditions staff had to endure, but also argued their care needed to be improved. The creation of new programming in hospitals has to take into consideration current budget restrictions, current staff complements, and make use of current resources. One potential solution could be the creation of new partnerships and co-op placement programs with local universities and colleges to offer hospitals access to student volunteer labour, under the supervision of recreation therapists and dietitians, in exchange for on-the-job vocational training and other learning opportunities.
3) Implement policy changes to address the unhealthful food environment.

Changes to the food environment should be two pronged: 1) change the food processing and delivery methods to improve taste and quality of food served on unit floors and 2) change food content available for purchase in vending machines, the cafeteria, and client run services.

A recommendation raised by participants that could potentially help reduce cravings and unhealthful snacking was to improve the taste and quality of the food served to clients. Such changes, participants argued, could potentially limit the amount of unhealthful food clients would purchase at nearby restaurants or convenience stores. Although researchers have been calling for an improvement in the overall food environment in hospitals (Reed & Chenault, 2010), changes to client meals will need to be fully rationalized given the current economic climate (Eggertson, 2010). With Ontario hospitals facing service, staff or program cuts because of government budget restrictions, any proposed changes, such as tray service delivery of meals instead of buffets (Cohn et al., 2010), would have to demonstrate financial savings in addition to healthful benefits.

Similar to researchers who have called for improvements to the food environments of hospitals (Knol, Pritchett, & Dunkin, 2010; Reed & Chenault, 2010), participants believed that changes to the types of food available for purchase in vending machines, cafeterias, and client run services were necessary. In line with recent research (Knol et al., 2010), changes to vending machine options would limit sales to only sugar and caffeine free beverages and snacks that contain fewer than 150 kcal, 5 g total fat, and 15 g carbohydrates. Similar steps could be taken to make changes to food products available for purchase in cafeterias and client run services. Although changes to food products for sale in vending machines have been made in the last few years at the CAMH, current food options need to be reexamined to ensure high nutritional standards are being met.

3.4.4 Strengths and Limitations

This study has several strengths that should be noted. First, from a theoretical perspective, to the best of my knowledge this is the first study to examine the perceptions
of consumers as to what environmental factors in psychiatric facilities may influence diet and physical activity behaviours. By using the ecological model as a theoretical template, this study challenges previous research in this field that has primarily concentrated on intralevel factors and interventions to improve diet and physical activity behaviour (Cohn et al., 2004; Faulkner & Cohn, 2006; Gorczynski & Faulkner, 2010). Second, from a methodological perspective, the qualitative study design, which involved taking photos and participating in semi-structured interviews, proved to be an effective manner of identifying unique obesogenic elements in the CAMH Queen Street environment. The findings from this qualitative study coupled with findings from earlier work that explored the perspectives of stakeholders (Faulkner et al., 2009), helped identify and establish a set of priorities for both intervention work and further research at the CAMH that address multiple levels of the ecological model. Third, from a methodological perspective, the involvement of consumers in the research process proved to be a rich and rewarding experience as their input identified major issues, concerns, and needs in the CAMH environment. Additionally, consumers were able to suggest possible solutions that acknowledged current community strengths and resources. Direct consumer involvement helped ensure that any future research or intervention efforts will be undertaken with the support of the consumer community.

Although a number of different obesogenic factors were raised throughout the course of this study, which helped identify avenues for future research and intervention work, a number of theoretical and methodological limitations need to be addressed. First, from a theoretical perspective, the ANGELO framework proved to be a convenient needs assessment tool for classifying obesogenic factors along physical activity and dietary behaviours in the four different environment types in the micro level. Occasionally, certain obesogenic factors needed to be placed in multiple sections of the framework, reinforcing the messy and interconnected nature of ecological research that investigates obesity. Where the divisions of environment type became blurred almost entirely is at the macro level. For instance, clients and stakeholders both identified a lack of funds being provided by government sources as a barrier to healthful eating. Such financial outcomes are based on multiple social and political forces, which have a direct impact on what food
individuals are able to purchase ultimately. Such multi environment type classifications can make certain obesogenic factors nearly impossible to change. Although an obesogenic factor, like a lack of governmental funds, may have valid and reliable data to support its existence, and may seem extremely relevant to the current context, it may be seen as impossible or very difficult to change given its complexity, therefore making it less of a priority for researchers and policy makers to address. In essence, the framework privileges simple and very changeable obesogenic factors at the micro level and ensures they get addressed either through further research or interventions. Future research is needed to create strategies to address relevant, complex obesogenic factors and how changes along multiple environment types in the macro environment can be made possible.

Second, from a methodological standpoint, the study captured the perspectives of more men than women, given that only three women participated in this study. Although more men volunteered to take part in the study and several women declined to participate, future research needs to address the unique physical activity and dietary needs of women with serious mental illness in order to decrease obesity. Researchers may wish to consider several strategies to create positive environments where women can be part of the research process.

3.5 Conclusion

To improve both physical activity and dietary behaviours amongst individuals with schizophrenia living at the CAMH, participants identified that they would like to see a combination of 1) intrapersonal interventions that would encourage and motivate them to be more healthful through an individualized care approach and 2) environmental changes that would remove physical activity barriers and dietary temptations through organizational policy changes. Based on findings from this study, three main recommendations were provided: 1) improve access to existing facilities that can help clients become active; 2) improve programming options for both men and women and include educational and motivational components to improve physical activity and dietary behaviours; and 3) implement policy changes to address the unhealthful food
environment.
APPENDIX A. Recruitment Poster.

Are you interested in providing information on how you think the CAMH environment may be affecting your physical activity and diet?

WHAT ARE WE DOING?

Regular physical activity and a healthy diet help people maintain a healthy weight. Research has shown that certain environments (e.g., hospitals) have an impact on a person’s level of physical activity and diet. The purpose of this research is to examine what aspects of the Queen Street site and surrounding neighbourhood may be reducing a client’s level of physical activity and increasing the amount of food a client eats.

PARTICIPATION

Interested individuals will need to qualify for the research study in order to participate.

In order to participate, you must be:

• 18 years of age or older
• Diagnosed with schizophrenia
• Diagnosed as being overweight (Body Mass Index > 25) or obese (Body Mass Index > 30)

STUDY

For this study you will be asked to do two tasks.

1) You will take photos of objects and places within the Queen Street site and surrounding neighbourhood that you believe are affecting your physical activity and diet.

2) You will take part in a short interview to discuss your photos and your thoughts about other objects and places not photographed that may be affecting your physical activity and diet.

FOR MORE INFORMATION PLEASE CONTACT PAUL GORCZYNSKI (416) 994 5008.

For more information about programs and services at CAMH please visit www.camh.net or call 416-535-8501
APPENDIX B. Study Information Sheet and Consent Form.

Information Sheet

Research Project Entitled: Dissecting the 'obesogenic' environment of CAMH service users: Clients' perspective

Principal Investigator: Dr. Tony Cohn (Centre for Addiction and Mental Health)

Co-Investigator: Dr. Guy Faulkner (Faculty of Physical Education and Health, University of Toronto)

Co-Investigator: Paul Gorczynski (PhD Candidate) (Faculty of Physical Education and Health, University of Toronto)

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Think carefully in deciding whether or not you wish to take part.

Thank you for reading this.

What is the purpose of this study?

Regular physical activity and a healthy diet help people maintain a healthy weight. Individuals with schizophrenia tend to be more overweight or obese than individuals in the general population because they are likely to be physically inactive and eat higher calorie meals. Research has shown that certain environments (e.g., hospitals) have an impact on a person’s level of physical activity and diet. The purpose of this research is to examine what aspects of the Queen Street Facility and surrounding neighbourhood may be reducing a client’s level of physical activity and increasing the amount of food a client eats. This research will help guide
future research projects and create programmes that will help clients manage and lose their weight.

Do I have to take part?

**Taking part is voluntary.** It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive.

What will you be asked to do in the study?

For this study you will be asked to do two tasks.

1) For the first task, you will take photos of objects and places within the Queen Street Facility and surrounding neighbourhood that you believe are affecting your physical activity and diet. To complete this task, we will lend you a digital camera that will allow you to take 12 photos. In order to complete this task, you will have two hours of time. If you feel you can finish this task in less time, please let the research assistant know and he will meet you at an earlier time.

2) For this task, you will take part in a short interview to discuss your photos and your thoughts about other objects and places not photographed that may be affecting your physical activity and diet. You will also be asked to comment on potential programmes that may be created to help you increase your physical activity level and improve your diet. This interview will be voice recorded and take approximately 30 minutes.

The total time commitment for this study will be 2 to 3 hours.

Please note that if you do not wish to take photos, you may still take part in the interview part of this study.

Can I take part in the study?

In order to participate, you must be:

- 18 years of age or older
- diagnosed with schizophrenia
- diagnosed as being overweight (Body Mass Index ≥ 25) or obese (Body Mass Index ≥ 30)
Are there any risks to me in this study?

You will be asked to describe objects and places in and surrounding the Queen Street Facility that may be affecting your physical activity and diet. You may recall unpleasant and unsettling incidents that may make you feel uncomfortable. You should only discuss matters you feel comfortable with.

What are the benefits of my involvement?

This study will give you an opportunity to become more aware of the Queen Street Facility and the surrounding neighbourhood. Also, it will give you a chance to think about what objects or places may be affecting your physical activity and diet. These learning opportunities may help you make healthier decisions about your physical activity and diet in the future. From this study, we hope to get results that will allow clients and researchers to work together to create health promotion programmes to help clients increase their physical activity and improve their diet. These results will be published so that other health professionals can create similar programmes in other hospitals.

Will information obtained in the study be confidential?

The information you provide to the researcher will be kept confidential to the full extent provided by law. You will not be identified in any documents relating to the research. No information obtained during the study will be discussed with anyone outside of the research team. You will not be identified in any report or publication. As part of continuing review of the research, your study records may be assessed on behalf of the Research Ethics Board and, if applicable, by the Health Canada Therapeutic Products Programme. A person from the research ethics team may contact you (if your contact information is available) to ask you questions about the research study and your consent to participate. The person who is assessing your file or contacting you must maintain your confidentiality to the extent permitted by law.

What happens if I do not wish to take part in this study or wish to withdraw from the study?

If you do not wish to take part in this study, or if you wish to withdraw from the study once started, you may do so without giving a reason, with no repercussions and with no disadvantage to yourself.
Who is funding the research?

This research project is funded by the Centre for Urban Health Initiatives.

Questions?
If you have any questions about the study you can contact Dr. Tony Cohn (416-535-8501 ext. 2573). You can also contact Dr. Padraig Darby, Chair, Research Ethics Board, Centre for Addiction and Mental Health (416-535 8501 ext. 6876), to discuss your rights as a research participant.

Thank you for considering taking part in our study.
PARTICIPANT CONSENT FORM

Research Project Entitled: Dissecting the 'obesogenic' environment of CAMH service users: Clients' perspective

Principal Investigator: Dr. Tony Cohn (Centre for Addiction and Mental Health)

Co-Investigator: Dr. Guy Faulkner (Faculty of Physical Education and Health, University of Toronto)

Co-Investigator: Paul Gorczynski (PhD Candidate) (Faculty of Physical Education and Health, University of Toronto)

This form should be read in conjunction with the Participant Information Sheet

I agree to take part in the study as described in the Information Sheet.

For this study I will be asked to do two tasks,

1) For the first task, I will be asked to take photos of objects and places within the Queen Street Facility and surrounding neighbourhood that I believe are affecting my physical activity and diet. To complete this task, a digital camera will be lent to me that will allow me to take 12 photos. In order to complete this task, I will have 2 hours of time. If I feel you can finish this task in less time, I will let the research assistant know and he will meet me at an earlier time. I understand that I will return the digital camera to the research assistant.

2) For this task, I will take part in a short interview to discuss my photos and my thoughts about other objects and places not photographed that may be affecting your physical activity and diet. I will also be asked to comment on potential programmes that may be created to help me increase my physical activity level and improve my diet. I understand that this interview will be voice recorded and take approximately 30 minutes.

I understand that the total time commitment for this study will be 2 to 3 hours.
I am also aware that if you do not wish to take photos, I may still take part in the interview part of this study.

I understand that I may withdraw from the study at any time without justifying my decision and without affecting my normal care and medical management.

As part of continuing review of the research, I also understand that my study records may be assessed on behalf of the Research Ethics Board and, if applicable, by the Health Canada Therapeutic Products Programme. A person from the research ethics team may contact me (if my contact information is available) to ask questions about the research study and my consent to participate. The person assessing my file or contacting me, must maintain my confidentiality to the extent permitted by law.

I have read the Participant information leaflet on the above study and have had the opportunity to discuss the details with .......................................................... and ask any questions. The nature and the purpose of the study to be undertaken has been explained to me and I understand what will be required if I take part in the study.

I have been given a copy of this form to keep.

Signature of Participant ..............................................................................

Date...............................................................................................................

Printed name in BLOCK LETTERS................................................................

I confirm I have explained the nature of the study, as given in the Participant Information Sheet, in terms which in my judgement are suited to the understanding of the participant.

Signature of person obtaining consent..........................................................

Date..............................................................................................................

Printed name in BLOCK LETTERS................................................................
APPENDIX C. Photography Instructions.

Dissecting the 'obesogenic' environment of CAMH service users: Clients' perspective

Photography Instructions

Please take photos of:

a. Places where you like to be physically active
b. Places where you like to eat
c. Streets you like to walk on
d. Places/objects that make you less physically active
e. Places/objects that make you eat more
f. Places you feel safe

Please do not take photos of people or the hospital.

When you are finished taking the photos, please meet the research coordinator at:_______________________________(time/location)
APPENDIX D. Interview Guide.

Introductory Questions

1) Do you have any questions about the information that we just discussed?

Obesogenic Elements, Environments, Community Safety

2) Let’s take a look at what kinds of photos you took. Can you describe why you took this photo? What was it about this object/place that made you want to photograph it?

3) What areas in or around the Queen Street site do you like to visit where you can be physically active? (e.g., parks, recreation centres).

4) How much walking do you do around the Queen Street site in a week?

5) When walking recreationally, do you like to walk alone or with a group of people?

6) What streets or routes do you like to walk?

7) What areas in or around the Queen Street site do you like to visit where you can eat? (e.g., restaurants, diners)

8) What areas in or around the Queen Street site you avoid going to?

9) Is there anything in or around the Queen Street site that makes you feel unsafe?

10) Is there anything in or around the Queen Street site that makes you less or more physically active?

11) Is there anything in or around the Queen Street site that makes you eat more or influences what you eat?

Prompts:

Intrapersonal:
- Attitudes toward physical activity or diet
- Awareness of physical activity or diet
- Confidence to be physically active or eat healthier

Interpersonal:
- What are others doing
- Any social support (friends, family, staff)

Physical Environment:
- Confined living areas
- Facilities
- Open access to snack food
- Coffee carts

Policy:
- Financial constraints

12) For each listed factor the participant raised:
   i) How big of a problem is it?
   ii) Can we change it?
   iii) How can we change it?

13) What do you think is the most important factor CAMH needs to address to help clients and survivors be more physically active?

14) What do you think is the most important factor CAMH needs to address to help clients and survivors to eat healthier food?

15) What do you think about educational programs that would give you information and motivate you to be more physically active or help you eat healthier?

*If a person shows interest in the programs—Would you like to receive this information and motivation in a one on one counseling manner or in a group setting?

16) What are your thoughts on some of the following ideas? 1) Would you like to get help with waking up in the morning so that you would be able to eat breakfast? 2) If you were to order take-out food, would you like a unit nurse to be notified so that you would not then eat dinner provided on the unit? 3) Would you like to be able to use stairs more often? 4) What are some things you might want to change with your living situation that could make you be more active or eat more healthfully.

Closing remarks

- Is there anything you would like to add which we have not discussed?

- Are there any questions you would like to ask me?

Thank you for your valuable time and if you have any questions with regards to this study please do not hesitate to contact me.
APPENDIX E. Letter of Ethics Approval, Research Ethics Office, Centre for Addiction and Mental Health.

PROTOCOL REFERENCE #246/2008

December 15, 2008

Tony Cohn, MB, ChB, MSc, FRCP(C)
Mental Health and Metaboisim Clinic,
Schizophrenia Program
Centre for Addiction and Mental Health
1001 Queen Street West
Toronto, ON M6J 1H4

Dear Dr. Cohn:

Re: Research protocol 246/2008 entitled, "Dissecting the "Obesogenic" Environment of CAMH Service Users: Clients Perspective" by Cohn T, Faulkner G, Gorczynski P.

We are writing to advise you that the Centre for Addiction and Mental Health Research Ethics Board (CAMH REB) has granted approval to the above-named research study for a period of one year from the date of this letter. If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval by submitting the CAMH REB "Annual Renewal of Ethics Approval" form on or before November 01, 2009. Should the study be completed prior to the annual renewal date, please submit a final report. The level of continuing review for this study is Level 2.

The Information Sheet and Consent Form revised November 17, 2008 has been approved and is attached. The "Interview Guide form and as received November 28, 2008, have been approved and are attached. Subjects should receive a copy of their consent forms.

During the course of the research, any significant deviations from the approved protocol (that is, any deviation which would lead to an increase in risk or a decrease in benefit to human subjects) and/or any unanticipated developments within the research should be brought to the attention of the Research Ethics Office. Best wishes for the successful completion of your project.

Yours sincerely,

Susan Plon, MHSc
Manager, Research Ethics Office, CAMH

SP/md
Encl.

Cc: L.K.

1 CAMH investigators are reminded that should they leave CAMH, they are required to inform the Research Ethics Board of the status of any on-going research. If a study is to be closed or transferred to another facility, the REB must be informed and any advertisements must be discontinued.

2 Level 2: Review of routine annual reports, changes and amendments to the approved protocol, adverse events, filing of a final report and audit of study files/documentation.

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APPENDIX F. Letter of Ethics Approval, Office of Research Ethics, University of Toronto.

University of Toronto
Office of the Vice-President, Research
Office of Research Ethics

PROTOCOL REFERENCE #23797

February 5, 2009

Dr. Guy Faulkner
Department of Exercise Science
55 Harbord St.
Toronto, ON M5S 2W6

Mr. Paul Gorczynski
Department of Exercise Science
55 Harbord St.
Toronto, ON M5S 2W6

Dear Dr. Faulkner and Mr. Gorczynski:

Re: Your research protocol entitled "Dissecting the 'obesogenic' environment of CAMH service users: Clients' perspective"

ETHICS APPROVAL

Original Approval Date: February 5, 2009
Expiry Date: February 4, 2010
Continuing Review Level: 1

We are writing to advise you that a member of the Health Sciences Research Ethics Board has granted approval to the above-named research study, for a period of one year, under the REB's expected review process. Ongoing projects must be renewed prior to the expiry date.

The following consent documents (received January 26, 2009) have been approved for use in this study:
Information letter and Consent form
Advertisement

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report at least 30 days prior to the expiry date of your study.

Best wishes for the successful completion of your project.

Yours sincerely,

[Signature]

Daniel Gyewu
Research Ethics Coordinator

McMurrich Building, 12 Queen's Park Cres. W, 3rd Floor Toronto, ON M5S 1B8
TEL: 416-946-3273 FAX: 416-946-5765 EMAIL: ethics.review@utoronto.ca
Chapter 4

Study 2: Examining the efficacy and feasibility of exercise counseling in individuals with schizophrenia

4 Introduction

Researchers have shown that physical activity can help some individuals with schizophrenia improve their aerobic fitness, physical health, and control their weight (Archie, Wilson, Osborne, Hobbs, & McNiven, 2003; Beebe, Tian, Morris, Goodwin, Allen, & Kulda, 2005; Poulin et al., 2007). In addition to physical health and fitness improvements, physical activity has been shown to provide individuals with schizophrenia with various mental health benefits (Gorczynski & Faulkner, 2010; Holley, Crone, Tyson, & Lovell, 2011). In our recent review of randomized controlled trials involving individuals with schizophrenia, we found that individuals who participated in physical activity and exercise interventions had significantly improved positive and negative symptoms, decreased levels of depression and anxiety, and improved quality of life (Gorczynski & Faulkner, 2010). Despite these benefits, individuals with schizophrenia are less active than the general population (Brown et al., 1999; Daumit et al., 2005; Lindamer et al., 2008).

Low levels of physical activity are particularly concerning given the majority of individuals with schizophrenia are either overweight or obese and have high rates of the metabolic syndrome, cardiovascular diseases, and diabetes (Cohn et al., 2004; Cohn & Sernyak, 2006; Hennekens et al., 2005; McEvoy et al., 2005). Perhaps even more troubling is the fact that people with this serious mental illness live 15 to 25 years less than individuals in the general population because of serious complications that stem from obesity related morbidities (Hennekens et al., 2005). Given that physical inactivity is an independent risk factor for premature mortality (Paffenbarger, Hyde, Wing, & Hsieh, 1986), more attention and research should be devoted to helping individuals with schizophrenia initiate and maintain physical activity.
4.1.1 Limitations of Exercise and Physical Activity Research Involving Individuals with Schizophrenia

The most significant limitation of the exercise and physical activity literature involving this population is that most interventions are atheoretical in design (Gorczynski & Faulkner, 2010). Previous research has shown that interventions are more effective when they are structured theoretically (Kahn et al., 2002). Additionally, by not utilizing theory, researchers and clinicians do not know what effect various interventions have on variables that may mediate exercise and physical activity behaviour. A lack of this type of knowledge prevents researchers from fully understanding how interventions alter exercise and physical activity behaviour and how such interventions may be enhanced in the future.

Another aspect of poor methodological quality is that most studies examining exercise and physical activity in individuals with schizophrenia have relied on subjective measures to assess levels of physical activity (Beebe & Harris, 2012; Gorczynski & Faulkner, 2010). Given the various negative symptoms and cognitive deficits individuals with schizophrenia often experience, subjective forms of measurement should be viewed with caution and reinforced with objective measures such as accelerometry. In addition to varying difficulties experienced in study recruitment and study design, researchers often neglect to provide several key pieces of important information about their particular exercise or physical activity intervention (Ellis, Crone, Davey, & Grogan, 2007; Faulkner, 2005). Researchers rarely provide the intensity, duration, and frequency of their program under study. By not operationalizing an exercise or physical activity intervention, proper study replication becomes difficult, if not impossible. Additionally, it is uncertain if participants are encouraged to attain 60 to 90 minutes of daily moderate to vigorous physical activity, the amount recommended to experience weight loss (Haskell et al., 2007). To date, studies that have included exercise or physical activity components for individuals with serious mental illness and the information necessary to gauge their intensity, duration, and frequency have recommended amounts of physical activity that are not sufficient to experience weight loss. Such recommendations may partially explain why only modest impacts on weight loss in this population have been seen so far.
Future researchers need to consider the various limitations currently found in the exercise and physical activity literature and design interventions that are not only theoretically informed, but that address the heterogeneous nature of schizophrenia, and are sensitive to aspects of gender and age. Furthermore, studies need to be structured in such a manner where participants are provided with information about and opportunities to attain the necessary amount of moderate to vigorous physical activity necessary to experience weight loss. One behavioural intervention that is theoretically informed is exercise counseling.

4.1.2  Exercise Counseling

Exercise counseling is a tailored behavioural intervention that is designed to increase levels of activity by addressing an individual’s needs, motivation, and barriers to activity (Smitherman, Kendzor, Grothe, & Dubbert, 2007). Through a collaborative relationship, counselors provide information and support to individuals in order to help them change their exercise and physical activity behaviours. Exercise counseling is an intervention that draws from numerous theories and frameworks of behaviour change. Social cognitive theory (Bandura, 1986) and the transtheoretical model (Prochaska & DiClimente, 1983; 1986) serve as foundational frameworks for determining what mediating variables counseling sessions need to address. Social cognitive theory states that behaviour is influenced and influences both environmental and personal factors. Environmental factors include group or team structures, equipment, or various facilities. Personal factors include cognitions such as self-efficacy, mood, and attitudes. Personal factors may also influence and be influenced by environmental factors. Together, these three determinants influence one another and form what is known as triadic reciprocal causation. The transtheoretical model allows researchers and clinicians to assess whether clients are ready to change a particular behaviour (Prochaska, & DiClimente, 1983; 1986). Depending on their readiness to change, clients are placed into one of six stages: precontemplation (not considering changing behaviour); contemplation (intending to change behaviour in the next 6 months); preparation (intending to change behaviour in next 30 days); action (actively engaged in behaviour change for six months); maintenance (actively engaged in behaviour change for more than six months); and termination (actively engaged in behaviour change for more than five years, where relapse will most likely not occur). In addition to identifying
whether clients are ready for change, the transtheoretical model provides stage specific processes of change that strengthen a client’s self-efficacy and aim to highlight the positive, rather than the negative, attributes of physical activity. A systematic review that has examined the use of the transtheoretical model to structure physical activity interventions has shown that when interventions incorporate aspects that address the stages of change, processes of change, the decisional balance, and self-efficacy, interventions have mostly shown positive and statistically significant, short-term findings (Hutchison, Breckon, & Johnston, 2009). Out of the seven studies that were included in their review, Hutchison et al. (2009) showed that six studies showed significant shot-term improvements and the results of one study showed both significant short- and long-term changes. Researchers who have examined the transtheoretical model in individuals with serious mental illness have shown that the model has construct validity and can be used in this population to explain physical activity behaviours and potential mediating variables of physical activity (Gorczynski, Faulkner, Greening, & Cohn, 2010). Specifically, researchers showed that individuals who are physically active have high degrees of confidence to be active and perceive more positive benefits of physical activity and fewer negative disadvantages to being active.

In addition to social cognitive theory and the transtheoretical model, other theories have been incorporated into exercise counseling. In a study that evaluated the effects of exercise counseling on the levels of physical activity and fitness of individuals with chronic obstructive pulmonary disease (Hospes et al., 2009), researchers included sessions based on self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000), goal-setting theory (Locke & Latham, 1990), and the relapse prevention model (Marlatt & Gordon, 1985). Through the use of self-determination theory, counselors were able to target an individual’s three basic psychological needs (autonomy, relatedness, competence) in order to promote intrinsic forms of motivation to be active. By incorporating goal-setting theory, clients were provided with structured sessions that guided them to set SMART goals (specific, measurable, acceptable, realistic, timed) that helped them achieve healthful behaviour change and overcome various barriers to exercise. Lastly, the relapse prevention model helped clients to learn to anticipate, avoid, and cope with situations that may lead to physical inactivity. At the end of the 12-week pedometer study, participants in the exercise
counseling group significantly increased their mean number of steps per day from 7087 to 7872, while those in the control group decreased their daily number of steps from 7539 to 6172. In addition to enhanced daily physical activity, exercise counseling participants also indicated increased physical fitness, health related quality of life, and intrinsic motivation.

Two recent systematic reviews have also confirmed that exercise counseling can have a positive impact on adoption of physical activity, stages of change, and changes in physical activity level (Petrella & Lattanzio, 2002; Smitherman et al., 2007). In their review, Petrella & Lattanzio (2002) identified 13 studies that involved primary care providers delivering exercise counseling. Although the results of their review showed that studies tended to have positive results between counseling and physical activity level, no long-term effects were established. Additionally, interventions tended to include other educational materials and concentrate on a variety of health behaviours. In another review, Smitherman and colleagues (2007) identified 10 studies that evaluated the impact of face-to-face counseling interventions on physical activity. Their review found that eight of the studies indicated that exercise counseling, combined with educational material, was superior to non-counseling interventions.

One study has examined the use of exercise counseling in individuals with serious mental illness. Vickers and colleagues (2009) provided women with depression weekly individual exercise counseling sessions designed to increase physical activity. The goal of the exercise counseling intervention was to have participants increase their physical activity to 30 minutes per day on five or more days per week, an amount recommended by the Center for Disease Control and Prevention and the American College of Sports Medicine. The counseling sessions consisted of discussions about the benefits of exercise, collaborative goal setting, reinforcement strategies, overcoming barriers to being active, and relapse prevention. After ten weeks, a significantly greater number of women who received exercise counseling versus those who received health education were physically active. Additionally, more women in the exercise counseling group had moved into the action stage of the transtheoretical model versus those who received health education. Although Vickers and colleagues (2009) did show that exercise counseling based on the transtheoretical model is feasible in individuals with serious mental illness, this study
neglected to measure any mediating variables of physical activity, further reinforcing the need for more rigorous research that examines psychological aspects of behaviour change.

4.1.3 Research Purpose and Questions

Given the limitations of exercise and physical activity research conducted thus far in this population, the purpose of this study was to examine the feasibility and efficacy of a theoretically informed and structured exercise counseling intervention. To help facilitate the design and evaluation process of this pilot intervention, the Medical Research Council Framework for Complex Interventions was followed (MRC, 2006). The framework provides four, non-linear stages of intervention design: 1) development; 2) feasibility and piloting; 3) evaluation; and 4) implementation. The Framework provides a way to systematically design an intervention, accumulate evidence, and integrate it into practice. A major strength of the revised MRC Framework is its inclusiveness of small sample size and non-randomized studies. Consistently, the MRC Framework supports the use of single-case experimental design studies in the feasibility and piloting and evaluation stages. As such, this intervention was evaluated using a single-case experimental design. This study was guided by the findings of the first study of this thesis and the counseling intervention was designed to offer clients motivational support and encouragement to be physically active as well as information about scheduling and program offerings at the hospital as part of a larger ecological intervention. Specifically, this single-case experimental design study explored the following questions:

1) Would individuals with schizophrenia adhere to the exercise counseling protocol and would they find it acceptable?

2) What effect does exercise counseling have on increasing moderate and vigorous levels of physical activity?

3) What effect does exercise counseling have on mediating psychological variables underpinning changes in physical activity?
4.2 Methods

4.2.1 Study Design: Single Case Experimental Design

Ideographic studies based on the single case experimental design vary with respect to research aims from nomothetic studies (Lincoln & Guba, 1985). Primarily, nomothetic research is concerned with establishing wide generalizations, whereas ideographic studies aim to observe individual variations or within-subject outcomes (Kazdin, 1982). Although ideographic research is concerned with individual outcomes, generalizations can be accomplished through individual replication (Kazdin, 1982). Additionally, idiographic studies are often used for piloting research where intervention efficacy needs to be established before larger studies are undertaken (Kazdin, 1982; MRC, 2006).

There are various practical and ethical reasons why single case experimental designs should be used in populations that have a great deal of variability, such as individuals with schizophrenia. First, single case experimental designs require only a few individuals to examine the efficacy of an intervention (Kazdin, 1982). Given that individuals with schizophrenia vary greatly with sex, age, symptomology, medication regimens, and other factors associated with living conditions, a homogeneous population may be difficult to recruit for large group comparison studies. Single case experimental designs offer a unique manner to evaluate interventions and ensure that individuals with schizophrenia are not excluded from research and its gains. Second, single case experimental designs can show individual efficacy and pinpoint unique characteristics that are associated with particular outcomes (Kazdin, 1982; Ottenbacher, 1990). With large group comparison studies, such as randomized controlled studies, results are pooled to form group means and individual attributes associated with performance outcomes are not observed. For groups of individuals who may possess various heterogeneous qualities and require individualized care, a generalized outcome may not present a meaningful solution. Such generalized results provide neither clients nor clinicians with viable options. In addition to ethical reasons, there are practical grounds why single case experimental designs should be used in research involving individuals with schizophrenia. When constructing complex interventions, it is necessary to first examine whether individual components of an overall
intervention are efficacious (MRC, 2006). By utilizing a small sample size, single case experimental designs allow researchers to examine the efficacy and feasibility of a particular intervention component in a rigorous and resource efficient manner before the intervention is examined in a larger randomized controlled design (MRC, 2006).

Although single case experimental designs allow clinicians to provide individualized care and measure necessary study outcomes (Behi & Nolan, 1996; Behi & Nolan, 1997; Kazdin, 1982), there are instances where either reversible (withdrawal) or non-reversible (non-withdrawal) approaches are more suited to the particular needs of the client. Generally, reversible study designs allow for the measurement of outcomes when treatment is introduced and then withdrawn (A-B-A) or when treatment is withdrawn and then reinstated (B-A-B) (Kazdin, 1982). For instance, an A-B-A study design examining the effects of an exercise regimen on weight would examine the dependent variable (weight) before, during, and after the exercise regimen. Alternatively, a B-A-B study design would examine an individual’s weight before exercise is withdrawn, while its withdrawn, and once it is reintroduced. Researchers using reversible study designs may also choose to reintroduce the treatment to confirm its effect on the dependent variable (A-B-A-B) or introduce alternate treatments (A-B1-A-B2-A-Bn) to compare their effects on the dependent variable. Regardless of the reversible single-case experimental study design, researchers using this idiographic methodology can address the unique circumstances of the client and alter treatment as necessary.

Non-reversible designs are employed when interventions or treatments should not be discontinued (Kazdin, 1982). There are three main types of reversible designs: multiple baseline design across participants; multiple baseline design across behaviours; and multiple baseline design across settings. When utilizing a multiple baseline design across behaviours, the independent variable is applied to two or more dependent behaviours at different points over a prolonged period of time. For instance, after 3 days of obtaining baseline measurements for fruit and vegetable intake and levels of exercise per day, a lifestyle education program (independent variable) is introduced. Initially, the program only targets the individual’s diet. While consistent measurements continue to be made for both behaviours, the second component of the education program is introduced, but this
time targeting the individual’s level of exercise. The objective of this form of study design is to illustrate that the different components of a multi-component intervention address the behaviours they are intended to target. Multiple baseline designs across participants evaluate a single dependent variable in 2 or more subjects after a treatment is introduced at different lengths of baseline periods. Multiple baseline design across settings evaluate a single dependent variable in one person in two or more settings.

For this study, a reversible A-B-A design was used. This form of study design allowed the examination of exercise counseling on physical activity and its mediating variables, including stages of change, self-efficacy and perceived benefits and barriers to exercise.

### 4.2.2 Research Setting

This study took place at the Mental Health and Metabolism Clinic located at the CAMH Queen Street facility and College Street site. This clinic was chosen for a number of reasons. First, as already mentioned in Study 1, this facility has a large inpatient and outpatient population that has a high rate of obesity (Cohn et al., 2004). Because rates of obesity and metabolic syndrome at this facility are nearly double the general population, interventions to reduce the amount of obesity and various comorbidities in this group of individuals are needed desperately.

Second, the Mental Health and Metabolism Clinic is devoted to helping clients and survivors acquire and maintain healthy dietary and physical activity behaviours in order to decrease obesity and prevent metabolic syndrome. The clinic houses several health professionals who operate various dietary and recreational programs that aim to improve the quality of life of consumers and survivors. If shown to be efficacious, the developed intervention package may be integrated into the services provided by the clinic staff.

### 4.2.3 Participants

Traditional single case experimental design studies have used between three to five participants (Kazdin, 1982). In order to participate, participants must have met the following criteria:
1) Diagnosis of schizophrenia (any subtype) according to the criteria listed in the Diagnostic and Statistical Manual for Mental Disorders IV (DSM-IV, 1994), confirmed by chart review by staff from the Mental Health and Metabolism Clinic;

2) 18 years of age or older;

3) A body mass index greater than or equal to 25 (overweight);

4) Be in the contemplation or preparation stage of the transtheoretical model for physical activity;

5) Capable of giving informed consent;

6) Indicate no complications on the Physical Activity Readiness Questionnaire.

In total, four participants were included in the study. Pseudonyms were created for the participants to protect their identities. A brief profile of each participant is provided below.

Participant 1: James

James was a 29-year old single male who has lived with schizophrenia for 10 years. He worked various retail jobs and lived in the hospital where his meals were provided. James was taking Clozapine during the study and had a BMI of 45.16. His goal was to start boxing and weight lifting in an effort to lose weight.

Participant 2: Kevin

Kevin was a 28-year old single male who has lived with schizophrenia for 10 years. He did not work during the course of this study and lived in a group home where breakfast and dinner were provided. Kevin was taking Loxapine and had a BMI of 45.4. He enjoyed football, basketball, and occasionally going to the gym. Kevin’s goal was to regularly play sports and attend the gym.
Participant 3: Kristen

Kristen was a 25-year old single female who has lived with schizophrenia for 13 years. She did not work and lived at the hospital where meals were provided. Kristen was taking Clozapine, Benztropine, and a weight reduction medication and had a BMI of 31.9. Her goals included walking more often and riding her bicycle.

Participant 4: Judy

Judy was a 36-year old single female who has lived with schizophrenia for 14 years. She worked at a clothing store and lived on her own. Judy was taking Clozapine and Lipitor and had a BMI of 32.4. Her goal was to attend the gym at least 2 to 3 times per week where she could use the elliptical machine.

4.2.4 Sampling and Recruitment

To ensure participants met the inclusion criteria, they were recruited from the Mental Health and Metabolism Clinic with the assistance of clinic staff. Throughout the recruitment process, I delivered all essential information about the study to clients and obtained informed consent (APPENDIX A). For this study, a non-probability purposive sampling strategy was employed to recruit participants, mainly clients who frequent the Mental Health and Metabolism clinic at the Queen Street facility.

4.2.5 Procedure

4.2.5.1 Exercise Counseling Intervention and Measurement Schedule

The exercise counseling intervention was carried out over the course of two months and included 4-weekly individual sessions. Each session did not exceed 60 minutes in length. The structure of the exercise counseling intervention was based on findings from various systematic reviews mentioned above. Additionally, research conducted by Carey and colleagues (2007) and Miller and Rollnick (2002) provided specific exercises and
approaches (e.g., confidence and exercise scales, decisional balance, action planning) to use with this population while the delivery and order of the sessions was influenced by exercise counseling research conducted by Griffin (2006) and Hospes and colleagues (2009) (See APPENDIX B for Exercise Counseling Intervention Manual).

Baseline Measures:

During the first week of the study, participants arrived at the Mental Health and Metabolism Clinic and filled out study measures that assessed their: ability to participate in exercise (Physical Activity Readiness Questionnaire (Thomas, Reading, & Shephard, 1992)); socio-demographic information; current level of physical activity; stages of change, self-efficacy, and perceived benefits and barriers of physical activity. After completing the measures, participants had their weight and height measured using standardized instruments and then fitted with an accelerometer. Participants were asked to wear the accelerometer for the next five days to capture their levels of physical activity. Additionally, participants were asked to write down on a data collection sheet when the accelerometer was worn and what types of activities were performed. To increase the likelihood participants would wear their accelerometers, participants were: shown how the accelerometer should be worn; telephoned and reminded to wear their accelerometers; and provided with a magnet with a picture of the accelerometer which they could place in their place of residence that could act as a reminder.

Session 1: Build Rapport and Gather Knowledge

The four exercise counseling sessions are summarized in Table 1. A week after their baseline measures, participants were asked to come to the clinic for their first session. The first session allowed participants to become comfortable with the counseling style and gauge whether they were ready to commit to behaviour change. Throughout the first session, various techniques were used to assess readiness to change. First, past, present, and future interests and physical activity were explored. Additionally, confidence and importance scales were used to assess how confident each participant was about becoming more physically active and how important physical activity was to him or her (Carey et al., 2007; Griffin, 2006; Miller & Rollnick, 2002). The use of the scales reinforced the client-
centred approach of the sessions and stimulated ‘change talk’ by the participant. The first session provided a better understanding of why physical activity may or may not be important to the participant and what potential barriers existed. A thorough understanding of the participant’s importance and confidence ratings determined how participants should be supported throughout the remaining exercise counseling sessions. In addition to the confidence and importance scales, the participants completed a decisional balance exercise. This exercise helped participants explore and overcome their ambivalence to behaviour change by attempting to establish a discrepancy between the advantages and disadvantages of changing their behaviour.

Session 2: Goal Setting

During the third week of the study, participants attended their second exercise counseling session. The second session helped participants develop an action plan to become more physically active by setting specific goals and strategies. Consistent with goal-setting theory (Locke & Latham, 1990), participants had to be sufficiently interested and free from goal conflict in order to follow through with their goals. This meant that participants had to recognize the particular advantages of physical activity and not feel burdened by the various costs associated with becoming or being physically active. The option existed at this point to offer participants the opportunity to repeat the decisional balance exercise before moving on to developing an action plan. Because all participants were sufficiently interested in becoming more active, this step was not necessary.

Within the second session, participants were guided by two sets of questions. First, participants had to establish a particular physical activity goal, identify its importance, create a series of steps to help them follow through with their goal, and be provided with a list of available support structures both in- and outside the hospital. Second, participants were asked to identify how to handle potential barriers and seek out individuals that may render assistance.

Throughout this session, participants were asked about their goals, their goals’ perceived importance, and also how to overcome potential barriers. These questions were intended to increase the level, strength, and specificity of not only exercise self-efficacy, but also
barriers self-efficacy through verbal persuasion (Bandura, 1986). Additionally, these questions were designed to promote a client-centred approach, one that continually aimed to strengthen a person’s autonomy, competence in physical activity, and relatedness to other individuals. Essentially, the action plan was designed to satisfy a client’s three basic psychological needs and increase intrinsic motivation as identified in SDT (Deci & Ryan, 1985; Ryan & Deci, 2000). Additionally, the session allowed participants to identify, avoid, and cope with potential barriers that may cause relapse (Marlatt & Gordon, 1985).

Sessions 3 and 4: Evaluate, Revise, Inform

During sessions three and four, the action plan was reviewed and adjusted, if necessary. Participants were encouraged to discuss their set goals and any anticipated and unanticipated barriers they may have encountered during the previous week (Griffin, 2006; Hospes et al., 2009). Throughout these sessions, participants were reminded about their individual personal strengths and support systems, asked to brainstorm ideas of how to overcome difficult barriers, and provided with additional information about various resources to help them achieve their physical activity goals.

Follow-Up

Four weeks after their last exercise counseling session, participants were asked to return to the clinic for follow-up measures. Participants filled out measures that assessed physical activity, stages of change, self-efficacy, and perceived benefits and barriers of physical activity. Additionally, participants were asked to wear an accelerometer for 5 days in order to obtain an objective measure of physical activity. Accelerometers were collected from the participants the following week.
### Table 1. Exercise Counseling Sessions.

<table>
<thead>
<tr>
<th>Session</th>
<th>Session Objectives</th>
<th>Tools Used</th>
<th>PA Mediators</th>
</tr>
</thead>
</table>
2. Assess past, present, and future PA behaviour.  
3. Assess readiness to change PA behaviour. | 1. Confidence and Importance Scales  
2. Decisional Balance | 1. Self-efficacy  
2. Perceived Benefits and Barriers |
| 2. Goal Setting | 1. Establish physical activity goal.  
2. Identify importance of PA goal.  
3. Create steps to achieve PA goal.  
4. Identify facilitators to PA behaviour.  
5. Identify barriers to PA behaviour. | 1. Action Plan | 1. Self-efficacy  
2. Perceived Benefits and Barriers |
| 3. Evaluate, Revise, Inform | 1. Evaluate goal.  
2. Identify facilitators to PA behaviour.  
3. Identify barriers to PA behaviour. | 1. Action Plan | 1. Self-efficacy  
2. Perceived Benefits and Barriers |
| 4. Evaluate, Revise, Inform | 1. Evaluate goal.  
2. Identify facilitators to PA behaviour.  
3. Identify barriers to PA behaviour. | 1. Action Plan | 1. Self-efficacy  
2. Perceived Benefits and Barriers |

#### 4.2.6 Instruments and Data Collection

Throughout the course of this study, socio-demographic, physical activity, self-efficacy, perceived benefits and barriers, and stages of change was collected and assessed for each participant. Socio-demographic data was collected only once at the beginning of the study, but physical activity (Short-form International Physical Activity Questionnaire, Craig et al., 2003), self-efficacy, perceived benefits and barriers, and stages of change largely based on the transtheoretical model were measured one week before the intervention, each week throughout the study, and four, and five weeks after the intervention ended. Participants were asked to wear accelerometers one week before the start of the study to obtain baseline measures, one week following the intervention to assess intervention effects, and 4 weeks
after the study had ended to measure intervention maintenance results. Weekly measurements were taken at the same time for each participant. Lastly, each session was audio recorded and assessed for fidelity by an independent reviewer. Table 2 outlines the data collection schedule for this study.

<table>
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<th>Baseline</th>
<th>Intervention</th>
<th>Follow-Up</th>
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<tbody>
<tr>
<td><strong>Week</strong></td>
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<tr>
<td><strong>Accelerometer</strong></td>
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<td>x</td>
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<tr>
<td><strong>Stages of Change</strong></td>
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<td>x x</td>
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<td><strong>Self-efficacy</strong></td>
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<tr>
<td><strong>Benefits &amp; Barriers</strong></td>
<td>x x x x x x</td>
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</table>

Table 2. Sessions and Measurement Schedule.

### 4.2.6.1 Socio-demographic Data

Socio-demographic data that was collected included: age; sex; employment; marital status; and living arrangements (APPENDIX C).

### 4.2.6.2 Physical Activity: The Short-Form International Physical Activity Questionnaire (IPAQ)

Physical activity was assessed using the Short-Form International Physical Activity Questionnaire (IPAQ) (Craig et al., 2003) (APPENDIX D). The Short-Form IPAQ assesses the amount of time an individual spends being sedentary and moderately and vigorously physical activity over the past seven days. Each question asks participants to elaborate on the number of days over the last week they performed the activity and the total time spent performing the activity. Activities and their intensities were examined for their respective metabolic equivalents (MET) (1 kcal x kg$^{-1}$ x hr$^{-1}$) using values from the 2000 compendium of physical activities (Ainsworth et al., 2000). Additionally, the amount of time spent being
moderately and vigorously active was tabulated. The Short-Form IPAQ has demonstrated to be a reliable and valid assessment of physical activity in individuals with schizophrenia (Faulkner et al., 2006). In their validation study, Faulkner and colleagues (2006) reported a correlation coefficient of .68 when participants were re-tested one week later and a criterion validity of .37 when estimated energy expenditure was compared to a RT3 accelerometer.

### 4.2.6.3 Physical Activity: Accelerometry

In addition to using a subjective measure, physical activity was assessed objectively using a GT1M uni-axial accelerometer (ActiGraph). The GT3X is worn on the waist and continuously tracks movement in one dimension by providing output data on the anteroposterior (y) axis in 1-minute intervals. To establish a reliable estimate of habitual physical activity over both weekdays and weekend days, participants were asked to wear the accelerometer for five consecutive days during each of the measurement periods and provide information on when the unit was worn and what types of activity were performed. Participants were given instructions on how to wear the accelerometer and also to record the times the device was not worn (APPENDIX E). Data were collected using 60-second epochs. Days were considered complete and used in the analysis only if participants wore the accelerometers for 10 complete hours or more (Troiano, Berrigan, Dodd, Masse, Tilert, & McDowell, 2008). A period of 60 minutes of consecutive zeros was used to indicate accelerometer removal as recommended (Evenson & Terry, 2009). To constitute a complete week, 3 complete weekdays and 1 complete weekend day were required (Troiano et al., 2008). Counts between 100 and 3208 were classified as light activity, while counts over 3208 were classified as moderate and vigorous activity (Freedson, Melanson, & Sirard, 1998).

### 4.2.6.4 Stages of Change

Stage of change was assessed using a modified version of the stage of change question from the Patient-Centered Assessment and Counseling for Exercise (PACE) questionnaire (Long et al., 1996) (APPENDIX F). For this study, physical activity was defined as
moderate activity, an intensity that makes you breathe somewhat harder than normal, for 30 minutes on most days of the week. Participants choose one of five options: ‘I’m not physically active and I don’t intend to start’ (precontemplation); ‘I’m not physically active but I’m thinking about starting’ (contemplation); ‘I’m active occasionally’ (preparation); ‘I’m active regularly and started in the last 6 months’ (action); and ‘I’m active regularly and have been for longer than 6 months’ (maintenance).

4.2.6.5 Self-efficacy

Physical activity self-efficacy was measured using six questions from the PACE questionnaire (APPENDIX G). All questions were rated on a 5-point Likert scale where 1 = ‘I’m sure I can’t’ and 5 = ‘I’m sure I can’. A single global score was calculated from the responses and yielded an overall physical activity self-efficacy score. Recent research has shown that the measure is found to be reliable with a Cronbach’s alpha of .84 (Gorczynski et al., 2010). During the current study, this measure was found to be reliable with a Cronbach’s alpha of .77.

4.2.6.6 Perceived Benefits and Barriers of Physical Activity

The importance of the perceived benefits and barriers of physical activity was measured using twelve 5-point Likert scale questions, where 1 = ‘Not at all important’ and 5 = ‘Extremely important’ (APPENDIX H). All questions were derived from the PACE questionnaire (Long et al., 1996) and measures used by Faulkner, Taylor, Munro, Selby and Gee (2007) in a study that examined physical activity and smoking behaviours of individuals with schizophrenia. Two single global scores were calculated for both constructs. Research conducted by Gorczynski and colleagues (2010) confirms that both perceived benefits and barriers measures are reliable with Cronbach’s alpha of .75 and .74, respectively. However, it should be noted that during the current study, the perceived benefits measure was found to be reliable with a Cronbach’s alpha of .82, while the perceived barriers measure was found to be questionable with a Cronbach’s alpha of .63.
4.2.6.7 Treatment Fidelity

Each exercise counseling session was audio-recorded and analyzed for fidelity by an independent reviewer, a graduate student in the faculty of Public Health Sciences at the University of Toronto. The independent reviewer held a Masters of Social Work, and had previous counseling experience. A treatment fidelity checklist was created to assess whether the components of the exercise counseling intervention were conducted during each session (see Table 1) (APPENDIX I). The checklist provided a dichotomous scoring option for each component – components were either present or not. The audio recording of each session was listened to and examined by the independent reviewer. The primary focus of the treatment fidelity analysis was the delivery of the session components, not the interaction between the participant and counselor as is traditionally monitored in MI interventions.

4.2.6.8 Post Study Exit Interviews

At the end of the study, each participant was asked for his and her thoughts on exercise counseling and if any aspects of the intervention should be changed (See APPENDIX J for the interview schedule).

4.2.7 Data Analysis

Accelerometry data and mediating psychological variables of physical activity were grouped by study phase (baseline, intervention, and follow-up) and paired t-tests were used to compare mean scores. An alpha level of .05 was used for all statistical tests.

IPAQ data was analyzed through visual inspection (Kazdin, 1982). Visual inspection is a method that helps determine the reliability and consistency of the treatment effects by visually examining the graphed data (Kazdin, 1982). In order to determine whether a treatment effect occurs, visual inspection also takes into consideration changes in means, levels, slopes, and latency of change between two or more study phases (Kazdin, 1982). Changes in means refer to whether the calculated mean scores for each dependent variable for each phase differs. Changes in level refer to whether differences for the dependent
variable are detected between the last assessment in one phase and the first assessment in the next phase. Changes in slope refer to whether increases or decreases occur in the dependent variable from one phase to another. To determine whether a change in slope occurs, a trend or celeration line is drawn according to the split middle technique outlined by Kazdin. Lastly, changes in the latency of change refer to the length of time needed to observe an effect in a dependent variable after the intervention is introduced.

4.2.8 Ethical Concerns

The provisions outlined in the first study of this thesis were used to ensure that the guiding principles of the Tri-Council Policy Statement (2003, 2008) were adhered to in this study. Recommendations to enhance informed consent in person with schizophrenia were also followed (Beebe & Smith, 2008). Ethical approval was sought and obtained from the CAMH Research Ethics Board (APPENDIX K) and the University of Toronto Health Sciences Research Ethics Board (APPENDIX L).

4.3 Results

4.3.1 Exercise Counseling Attendance and Compliance with Protocol

Each participant attended all four counseling sessions and fulfilled each session’s objectives. Three participants attended their sessions on time, while participant 2 needed to reschedule one session due to a scheduling conflict.

4.3.2 Post Study Exit Interviews

All participants stated they enjoyed the exercise counseling sessions and found the intervention helpful and useful. Participants mentioned they learned to set physical activity goals and how to work toward them. All individuals said that throughout the study they made significant strides toward achieving their goals.
James, participant 1, had set a goal to start boxing and weight lifting in an effort to lose weight. Throughout the counseling sessions James was able to articulate the importance of regular exercise and physical health. When James faced exercise facility scheduling difficulties at the hospital that prevented him from using the gym on a regular basis, he was able to increase his level of walking and participate in other recreational activities.

Kevin, participant 2, had set a goal of regularly playing sports and attending the gym. Kevin also faced several scheduling challenges with the community gym when his day programming at a local outreach clinic changed its hours. Through the help of the action plan, Kevin was able to reschedule his weekly visits to the gym and maintain his attendance at the outreach clinic.

Kristen, participant 3, set a goal of walking more often and riding her bicycle. Kristen understood the health benefits of active transport. During the first few weeks of the study, Kristen rode her bicycle to weekly acupuncture classes and walked while window-shopping in the neighbourhood. Toward the end of the study, Kristen lost her bike-lock key and experienced frequent flat tires. When biking was not an option, she compensated by taking more walking trips.

Judy, participant 4, set a goal of attending the gym 2 to 3 times per week. Judy was very active during the study and made a sincere effort to attend the gym to use the elliptical machine. Unfortunately, Judy experienced several health complications during the study including a cold, a urinary tract infection, and sore joints that forced her to reduce her level of activity. Despite her health complications, she still remained active.

Overall, three of the four participants self-reported that they had increased their physical activity over the intervention.

4.3.3 Treatment Fidelity

An independent reviewer followed the treatment fidelity checklist, examined audio-recordings of all exercise counseling sessions and determined each session, for each
participant followed the exercise counseling framework and that all necessary components were addressed throughout the study.

4.3.4 Accelerometer data

4.3.4.1 Accelerometer Wear Time

Figure 1 provides amounts of daily wear time during each measurement period. All participants wore their accelerometers the necessary amount of time to provide complete weeks during the three different measurement periods throughout the study. Paired t-tests used to compare different phases revealed that only participant 1 had significantly different amounts of daily wear time between baseline and follow-up phases (t = 7.291, p < .05).

![Wear Time Diagram](image)

Figure 1. Wear time (hours/week). (* p < .05)

4.3.4.2 Moderate and Vigorous Physical activity

Figure 2 provides the total minutes per day of moderate and vigorous physical activity during each measurement period. Paired t-tests used to compare different phases showed
that for participant 3 there was a significant decrease between the baseline phase and the follow-up phase (t = 3.26, p < .05). The three other participants exhibited no significant changes in levels of MVPA. Total minutes of light physical activity were also examined and paired t-tests found no significant differences between the three phases for any of the participants.

![Accelerometer MVPA Graph](image)

**Figure 2.** Accelerometer Daily MVPA Across Study Phases. (* p < .05)

### 4.3.5 IPAQ

#### 4.3.5.1 Moderate and Vigorous Physical activity

Visual inspection indicated an increase in MVPA for participant 1 in the follow-up phase of the study. Participant 1’s mean MVPA score decreased slightly from 15.0 minutes/week in the baseline phase to 10.0 minutes/week in the intervention phase, but increased substantially to 70.0 minutes/week in the follow-up phase. There was no change in level between baseline and intervention phases, and a difference of 40.0 minutes/week between the intervention phase and follow-up phase. The baseline slope of -30 minutes/week decreased to +10.0 minutes/week in the intervention phase and increased to -20
minutes/week in the follow-up phase. Collectively, these results indicate a latency effect, where an increase in MVPA occurred for participant 1 in the follow-up phase of the study.

Visual inspection indicated an increase in MVPA for participant 2 in the intervention and follow-up phases of the study. Participant 2’s mean MVPA score increased from 100.0 minutes/week in the baseline phase to 140.0 minutes/week in the intervention phase to 180.0 minutes/week in the follow-up phase. The level between the baseline and intervention phases increased by 80 minutes/week and did not change between the intervention and follow-up phases. The baseline slope of -80 minutes/week decreased to -50 minutes/week in the intervention phase and increased to +240 minutes/week in the follow-up phase. Collectively, these results indicate a latency effect, where an increase in MVPA occurred for participant 2 in the follow-up phase of the study.

Visual inspection indicated an increase in MVPA for participant 3 throughout the intervention phase and then a drop to below baseline scores. Participant 3’s mean MVPA score increased from 57.5 minutes/week in the baseline phase to 111.3 minutes/week in the intervention phase and then decreased to 20.0 minutes/week during the follow-up phase. The level between the baseline and intervention phases increased by 70 minutes/week and decreased by 40 minutes/week between the intervention and follow-up phases. The baseline slope of -35 minutes/week decreased to -26.3 minutes/week in the intervention phase and decreased to +20 minutes/week in the follow-up phase. Collectively, these results indicate an increase in MVPA during the intervention phase and a sudden withdrawal reaction in the follow-up phase.

Visual inspection indicated a latency effect in MVPA for participant 4 in the follow-up phase of the study. Participant 4’s mean MVPA score decreased from 60.0 minutes/week in the baseline phase to 33.8 minutes/week in the intervention phase, and then increased to 115.0 minutes/week in the follow-up phase. The level between the baseline and intervention phases did not change and increased by 10 minutes/week between the intervention and follow-up phases. The baseline slope of -40 minutes/week decreased to +13.8 minutes/week in the intervention phase and increased to +150 minutes/week in the
follow-up phase. Collectively, these results indicate a latency effect, where an increase in MVPA occurred for participant 4 in the follow-up phase of the study.

To summarize, three of the four participants self-reported increased levels of MVPA by the follow-up phase. Levels of MVPA increased in the intervention phase for participant 3, however, these levels were not sustained. Results can be seen in Figure 3.
Participant 1

Participant 2

Participant 3

Participant 4

Figure 3. IPAQ MVPA.
4.3.6 Stages of Change

Results showed that three participants improved their readiness toward physical activity participation. Participants 2 and 4 moved from the preparation stage to the action stage of the transtheoretical model while participant 3 moved from contemplation to the preparation stage. Participant 1 stayed in the preparation stage throughout the study.

4.3.7 Mediating Psychological Variables of Physical Activity

Mean scores indicate that all participants increased their levels of self-efficacy as the study progressed. Paired t-tests used to compare overall mean scores for all participants between baseline and follow-up revealed results consistent with theory, but they were not significant. The mean scores for self-efficacy increased from 3.4 baseline to 3.8 follow-up, but failed to reach significance ($t = -.92, p = .40$).

The mean scores indicate that perceived benefits of physical activity increased for participants 1 and 2 and remained unchanged for participants 3 and 4. Paired t-tests used to compare overall mean scores for all participants between baseline and follow-up revealed results consistent with theory, but they were not significant. The mean scores for perceived benefits of physical activity increased from 4.1 baseline to 4.3 follow-up, but failed to reach significance ($t = -.47, p = .66$).

Mean scores indicate that participants 3 and 4 perceived fewer barriers as the study progressed, while participants 1 and 2 had increased perceptions of barriers by the follow-up phase. Paired t-tests used to compare overall mean scores for all participants between baseline and follow-up revealed results consistent with theory, but they were not significant. The mean scores for perceived barriers of physical activity decreased from 2.0 baseline to 1.9 follow-up, but failed to reach significance ($t = .22, p = .83$). Mean scores and standard deviations for each mediating psychological variable during each study phase can be found in Table 3.
### Table 3. Self-Efficacy, Perceived Benefits of Physical Activity, Perceived Barriers of Physical Activity.

<table>
<thead>
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<th>Baseline</th>
<th>Intervention</th>
<th>Follow-up</th>
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</thead>
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<td>3.9 (.10)</td>
<td>4.3 (.24)</td>
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<tr>
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<td>2.9 (.44)</td>
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<tr>
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<td>3.4 (.21)</td>
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<th>Follow-up</th>
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<td>3.8 (0.0)</td>
<td>3.8 (.12)</td>
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<table>
<thead>
<tr>
<th>Perceived barriers of physical activity</th>
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<th>Baseline</th>
<th>Intervention</th>
<th>Follow-up</th>
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<td>2.4 (.28)</td>
<td>2.1 (.12)</td>
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</table>

#### 4.4 Discussion

The purposes of this study included examining the feasibility and acceptability of exercise counseling and its effect on MVPA and the mediating psychological variables underpinning changes in physical activity. All four participants attended and complied with each of the exercise counseling sessions and found them enjoyable and useful. Participants were able to identify and discuss the importance of regular physical activity and exercise. Throughout the exercise counseling sessions and exit interviews, participants also mentioned they learned to set physical activity goals, execute action plans, rely on their social support networks, and set strategies to overcome various barriers to regular activity. Participants also said the counseling sessions provided them with an opportunity to reflect on other problems, such as housing, outpatient programming, neighbourhood safety, and health issues that impacted their physical and mental health. Providing a positive space to discuss major issues allowed participants to think holistically about their lives and to focus on strategies to overcome various barriers to not only become more active, but be more healthy in general. Although there were conflicting results between objective and subjective measures of physical activity, an examination of the mediating psychological...
variables of physical activity revealed that as individuals progressed through the intervention, changes in mediating psychological variables moved in the directions predicted by the transtheoretical model. Three participants also increased their readiness to become or stay active as indicated by the stages of change. Overall findings supported the feasibility of using exercise counseling to engage individuals with schizophrenia in an effort to increase their levels of physical activity and associated psychological mediators of physical activity; however, further research is necessary to examine the effect of the intervention on levels of MVPA.

The overall results of this study are in line with previous research that has examined exercise counseling in the general population. In their systematic review, Petrella and Lattanzio (2002) examined the effectiveness of exercise and physical activity counseling interventions. Their findings showed that although there was a lack of research supporting an increase in overall levels of physical activity and exercise over the long-term, participants in seven of eight studies who supplied information on physical activity and exercise initiation showed an improvement in the short-term. A review conducted by Smitherman et al. (2007) also showed no long-term improvements in overall levels of physical activity and exercise, but did note other benefits of counseling which included the ability to address medication compliance issues and the opportunity to discuss other physical and mental health concerns. In the current study, although no significant changes in levels of physical activity were seen for three participants when accelerometer data was examined, participants did increase their readiness to become or stay active as measured through the Stage of Change questionnaire. No significant changes in accelerometer readings may have been due to the fact that some of the participants were already sufficiently active at the beginning of the study, accumulating at least 150 minutes a week of MVPA. Findings concerning physical activity and exercise readiness and the mediating psychological variables of physical activity may show that exercise counseling may be an effective way of helping people become active by addressing the determinants of physical activity. Given a great number of people with schizophrenia are physically inactive, a small but important shift from doing no activity to doing some activity may prove to be extremely important for this population. Strategies to improve levels of MVPA will need to be addressed in future research.
One of the main results of this study showed conflicting findings regarding physical activity behaviour measurement and reinforced the need to question findings of both subjective and objective measures of physical activity within this population. When levels of MVPA were examined, IPAQ results showed increased levels of MPVA in the follow-up phase for participants 1, 2, and 4, while accelerometer data showed that only participant 1 increased his levels of MVPA between the baseline and intervention phases. Accelerometer results indicated no significant changes in levels of objectively measured MVPA for three participants in the follow-up phase when compared to the baseline phase. Overall, results showed that participants in this study self-reported lower levels of MVPA than what was captured through accelerometers. This finding is similar to results captured in a systematic review of direct and self-report measures for assessing physical activity in adults in the general population (Prince, Adamo, Hamel, Hardt, Gober & Tremblay, 2008). Their review found that percent differences between self-report and direct measures of physical activity increased as categories of physical activity exertion increased. Prince et al. suggested that individuals may not fully understand the differences between light, moderate, and vigorous levels of physical activity or be able to recall their physical activity intensities accurately. Their findings further suggest that direct and self-report measures be used to capture different types and intensities of physical activity, where accelerometers may be more preferable when incidental physical activity or episodic and higher intensities of physical activity are of research interest. Self-report assessments may be more useful and necessary when investigating different types of activity, leisure or low intensity activities, or certain types of activities that cannot be captured by an accelerometer (e.g., swimming, cycling, weight lifting). This is an important finding for researchers as it shows that problems with capturing levels of physical activity using self-report measures may not necessarily stem from conditions pertaining to schizophrenia, but rather recall issues also found in the general population.

Previous research that has examined the physical activity behaviours of individuals with schizophrenia has predominantly relied on subjective measurement, often in the form of recall questionnaires. To the best of my knowledge, only four studies have used accelerometers to assess physical activity behaviour in individuals who live with schizophrenia (Faulkner et al., 2006; Lindamer et al., 2008; Poyurovsky et al., 2000;
Sharpe, Stedman, Byrne, & Hills, 2006). The traditional use of subjective measurement has meant that researchers have been relying on recall tools to assess physical activity levels, something that can be easily hampered by cognitive deficits which are often experienced by individuals who live with schizophrenia (Brekke et al., 1997; Palmer et al., 1997; Weinberger & Gallhofer, 1997). Although two previous studies have found the IPAQ (Faulkner et al., 2006) and the Yale Physical Activity Scale (YPAS) (Lindamer et al., 2008) to be valid and reliable recall instruments used to measure physical activity in individuals with schizophrenia, the use of objective measures, like accelerometers, may provide a more accurate and precise method of collecting physical activity data. However, researchers have noted that accelerometers have their limitations when used by individuals with schizophrenia. In a pilot study that assessed accelerometers against doubly labeled water in a group of men with schizophrenia, Sharpe, Stedman, Byrne, and Hills (2006) noted that accelerometers generally overestimated energy expended on physical activity by an average of 148 kcal/day (SD = 413 kcal/day), with both underestimation of 614 kcal/day and overestimation of 582 kcal/day noted. The results of this study further reinforce that more research is necessary to identify more accurate and precise methods of measuring physical activity behaviour in this population and that relying solely on either subjective or objective methods is not advisable.

Another major finding of this study was that changes in self-efficacy and perceived benefits of and barriers to physical activity improved as the intervention continued. Psychological mediators changed according to theory as subjectively measured levels of physical activity increased for participants 1, 2, and 4. Changes in psychological mediators did not correspond to objective measures of physical activity. Although previous cross-sectional research has shown that increased levels of self-efficacy and perceived benefits of physical activity and decreased levels of perceived barriers to physical activity are associated with higher levels of activity (Gorczynski et al., 2010), no experimental research to date has examined the psychological processes of physical activity in individuals with serious mental illness.

There could be several reasons why changes in objectively measured physical activity were not detected. First, changes in mediators of physical activity behaviour change do not
necessarily translate into changes in physical activity behaviour. In a review conducted by Rhodes and Pfaffli (2010), interventions involving adults from non-clinical populations were examined for their effects on physical activity behaviour and mediator change. Of the 22 included studies that employed mediators of change analyses, half of the studies did not show that the intervention was effective in changing physical activity behaviour. Out of the remaining 11 studies that showed some change in physical activity behaviour, only five studies reported that changes in behaviour were a result of changes in at least one mediator caused by the intervention. This review also examined the effectiveness of the transtheoretical model. In total, eight studies conducted mediators of change analyses that used the transtheoretical model to structure physical activity interventions. Of these eight studies, four were able to show a change in behaviour with only three studies directly linking changes in physical activity behaviour to changes in mediators. Rhodes and Pfaffli (2010) make several recommendations for future behavioural research regarding physical activity. First, they recommend that researchers use small-scale studies to show evidence of treatment efficacy and mediator capacity before embarking on resource intense large-scale studies. Second, they recommend that direct, objective measures of physical activity be used in place of indirect, self-report measures which may lack the sensitivity to detect change in behaviour. Third, they recommend that intervention fidelity be conducted in future research to ensure interventions are being delivered as intended. Fourth, they recommend that researchers move beyond individual level physical activity interventions and explore interventions that aim to change social and environmental constructs to facilitate physical activity behaviour. It is worthwhile noting, that this study and this thesis follow each of these recommendations.

Second, it is uncertain if the number of sessions offered to participants was sufficient to produce changes in physical activity behaviour. Issues of dosage have been a problem for behavioural researchers studying exercise and physical activity and their effects in the general population. In a review of the effectiveness of behavioural interventions to modify physical activity behaviours in the general population, Holtzman and colleagues (2004) found that the number of contacts with participants varied from one to over 200 and spanned a study length from one encounter to over seven years. Out of the 72 interventions examined, researchers found that the median number of sessions offered to participants was
four and that the majority of interventions lasted between two weeks and six months. Overall, interventions that improved levels of physical activity participation existed at all levels of contact intensity and that there was no clear trend that showed an association between increased physical activity participation and the number of participant contacts. To date, no research has examined whether there is any association between the number of participant contact sessions and physical activity or exercise participation in schizophrenia. Future research should examine this link given that a major recommendation from study 1 of this thesis was that more work be done to improve programming options for both men and women in the hospital that includes educational and motivational components to improve physical activity behaviour. Additionally, participants in the current study mentioned in their interviews and indicated in subjective measures of physical activity that they learned new skills and strategies to become more active and perceived themselves to be more active by the end of the study. This may suggest that more sessions would have been preferred by the participants and could have provided more opportunities to explore more skills and strategies to become and remain active.

Third, it is possible the transtheoretical model, which provided the foundation of my exercise counseling intervention, may not provide sufficient strategies to challenge individuals to increase their levels of MVPA once they enter the action stage. In essence, people may have intentions of challenging themselves to exercise at a greater intensity once they become active at a light level, but may lack the ability of turning those intentions into actions. This “intention-behaviour gap” may require additional behavioural strategies to be overcome (Sheeran, 2002). Individuals may not have increased their levels of MVPA because they were already active at a high level and in the action stage. At the beginning of this study, three individuals were accumulating the recommended amount of at least 150 minutes a week of MVPA as measured through accelerometry (Colley, Garriguet, Janssen, Craig, Clarke, & Tremblay, 2011). The findings from the current study may also suggest that future exercise counseling interventions may wish to structure the intervention in a way that supports, maintains, and pushes individuals to increase their levels of MVPA. By altering the exercise counseling intervention to incorporate the Health Action Process Approach (Schwarzer, 2008), intentions would be supported through action planning,
coping planning, and both maintenance and recovery self-efficacy. This would mean that greater attention would be devoted to not only planning and setting goals and strategies to overcome various barriers to activity, but also looking at ways to strengthen ways people believe they can maintain a difficult behaviour or overcome adversity. Currently, no research has yet examined the use of the Health Action Process Approach in individuals with schizophrenia.

Although it is not possible to explain why objectively measured physical activity levels did not change significantly in this study, future research should continue to employ sound behavioural theory and measurement when constructing physical activity interventions (Ellis et al., 2007; Faulkner, 2005; Gorczynski & Faulkner, 2010). Given that theory-based interventions are more effective than atheoretical interventions at boosting activity levels in the general population (Kahn et al., 2002), there is no reason why researchers should abandon behavioural treatments to increase levels of physical activity or exercise, only perhaps to expand it to incorporate other levels of the ecological model. Research conducted by Beebe and colleagues (2011) has shown that behavioural intervention research based on self-efficacy theory can have a positive impact on levels of physical activity in individuals with schizophrenia. In a study that examined a theoretically informed group-based walking program, individuals who were randomly assigned to the experimental condition were more likely to attend the walking sessions and walk for longer periods of time than those who were in the treatment as usual control condition. Although the differences between the two groups were not statistically significant, the results of this study reinforce the need to design interventions using sound behavioural theory as theory-based interventions are more effective than atheoretical interventions at increasing physical activity levels. In their rationale for the study and its design, Beebe and colleagues (2010) reinforced the need for researchers to empirically develop and evaluate theoretically informed exercise interventions as a way of increasing activity levels in this population in the future. More physical activity intervention research grounded in psychological theory is necessary for this population, including mediators of change analyses and interventions that address multiple levels of the ecological model.
4.4.1 Strengths and Limitations

The strengths of this pilot study lie in its methodological design and execution. First, the single case experimental design offered the ability to closely examine the effects of exercise counseling on four obese individuals with schizophrenia who were physically inactive. Pilot research involving a small and relatively homogenous population can help support future experimental research on a larger scale that can provide more generalizable results. Second, the results of this study indicated complete adherence to the program. Only one other study that has investigated an exercise program for individuals with schizophrenia has indicated this level of compliance (Marzaloni, Jensen, & Melville, 2009). High adherence levels in this study indicated that conducting motivational exercise programs in this population is clinically feasible and that individuals find it acceptable. Third, this study used accelerometers to measure levels of physical activity in addition to the IPAQ. The use of accelerometers showed the need for further research to use objective measures of physical activity as memory recall in this population may be poor. Additionally, all four participants wore their accelerometers the necessary amount of time to register valid data, indicating that accelerometer use to measure physical activity in individuals with schizophrenia in intervention studies is possible. Fourth, all exercise counseling sessions were audio-recorded and analyzed for treatment fidelity by an independent reviewer. This independent review indicated that all components of the program were followed as prescribed in the protocol.

This pilot study had several limitations that are worth mentioning. First, the inherent design of single-case experimental studies make them excellent methodological choices for piloting interventions given their multiple sampling and resource benefits. Unfortunately, with respect to external validity, these results are not generalizable, but rather lay the groundwork for further, larger scale, experimental inquiry. Second, regarding internal validity, aspects of selection may have had an impact on the results. The individuals selected for this study were recruited from the Mental Health and Metabolism Clinic with the assistance of clinic staff. The individuals who were selected to participate in the study may have been identified for their high levels of executive or cognitive functioning, motivation, or other qualities that would have facilitated participation in exercise
Paul Gorczynski PhD Thesis

counseling (Foussias, Mann, Zakzanis, van Reekum, Agid, & Remington, 2011; Foussias, Mann, Zakzanis, van Reekum, & Remington, 2009). Levels of executive and cognitive functioning could have been evaluated in this study using measures such as the Wisconsin Card Sorting Test (WCST) (Laws, 1999) and a brief cognitive assessment tool for schizophrenia (B-CATS) (Hurford, Marder, Keefe, Reise, & Bilder, 2011). Levels of motivation could have been evaluated using the Apathy Evaluation Scale (Marin, Biedrzyck, & Firinciogullari, 1991). Future research should evaluate the impact of exercise counseling using a larger sample while taking into account levels of executive and cognitive functioning and levels of motivation. Third, based on accelerometry findings, three participants were sufficiently active at the start of this study. These individuals were accumulating at least 150 minutes a week of moderate and vigorous physical activity (Colley et al., 2011). Future research may wish to screen individuals using objective measures before enrolling them in physical activity interventions. Fourth, the internal consistency reliability of the perceived barriers measure in this study was found to be questionable with a Cronbach’s alpha of .63. Although this measure has been found to be reliable in the past (Gorczynski et al., 2010), caution should be used when interpreting the perceived barriers results. Future research should evaluate the measure using a substantial sample before using it to evaluate the effectiveness of the transtheoretical model in this population.

4.4.2 Clinical and Research Implications

The results of this study convey several important clinical and research implications. First, it is necessary to question both subjective and objective forms of measurement when assessing levels of physical activity in this population. Issues with both recall instruments and accelerometers in this population make physical activity measurement difficult for both participants and clinicians. More research needs to explore accurate and precise measurement of physical activity in this population. Second, given that all participants struggled with unique personal barriers that arose during the course of this study, more time needs to be devoted to problem solving during the exercise counseling sessions. Individuals should be encouraged to reframe their goals, and devise alternative strategies to become active when faced with significant barriers. Potentially more sessions may be required to
help individuals address these challenges. Additionally, it may be necessary to address issues of amotivation, as this sub-domain of negative symptoms has a profound effect on overall cognitive functioning and may impact overall physical activity (Foussias et al., 2011; Foussias et al., 2009). Third, exercise counseling may be an excellent intervention to motivate individuals to increase their readiness to become or stay active. Participants in this study helped show exercise counseling may be an effective way of helping people become active by strengthening the determinants of physical activity such as improving one’s self-efficacy and perceptions of the benefits of and barriers to physical activity. Given the large number of individuals with schizophrenia who are inactive and that previous research on physical activity referral programs has shown poor compliance with physical activity behaviour (Crone, Johnston, Gidlow, Henley, & James, 2008), exercise counseling may prove to be an effective strategy to increase readiness and adherence to physical activity and exercise. Further research is still required as to how exercise counseling can help increase levels of MVPA. Lastly, it is necessary to structure and deliver physical activity interventions in individuals with schizophrenia using a theory-based approach. Several researchers have called for greater structure and consistency in research in order to examine the full potential of exercise interventions and incorporate this evidence-based knowledge into practice (Ellis et al., 2007; Faulkner, 2005). As seen in the general population, targeting the underpinning psychological mediators of behaviour change may result in physical activity interventions being more effective. Additionally, as Rhodes and Pfaeffli (2010) suggested, incorporating mediator analyses into future research will help confirm if any action theory links or conceptual theory links exist between theoretical frameworks and desired behavioural goals. Researchers may also wish to address other determinants of physical activity in addition to self-efficacy and perceived benefits and barriers of physical activity. Determinants could include demographic, psychosocial, behavioural, cognitive, and emotional factors. Research done by both Vancampfort and colleagues (2011) and Faulkner and colleagues (in press) illustrates that certain factors negatively affect physical activity participation. Factors that negatively influence physical activity in schizophrenia include: age, socio-economic status, employment status, duration of illness, weight gain, metabolic morbidity, anti-psychotic side-effects, negative symptoms, cigarette use, and social isolation. Although certain factors cannot be changed (e.g., age, duration of illness),
taking into consideration other changeable factors may increase participation. For instance, coupling smoking cessation interventions and exercise counseling or employment resources and exercise counseling may prove beneficial and ultimately produce win-win outcomes for clients. Future work may wish to address both negative symptoms and medication side-effects in an effort to raise activity levels.
Appendix A. Information Sheet and Consent Form.

Information Sheet

Research Project Entitled: Examining the feasibility of exercise counseling in individuals with schizophrenia

Principal Investigator: Dr. Tony Cohn (Centre for Addiction and Mental Health)

Co-Investigator: Dr. Guy Faulkner (Faculty of Physical Education and Health, University of Toronto)

Co-Investigator: Paul Gorczynski (PhD Candidate) (Faculty of Physical Education and Health, University of Toronto)

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Think carefully in deciding whether or not you wish to take part.

Thank you for reading this.

What is the purpose of this study?

Individuals with schizophrenia tend to be more overweight or obese than individuals in the general population because they are likely to be physically inactive. The purpose of this research is to examine if exercise counseling can help increase a person’s levels of moderate and vigorous daily physical activity. A moderate level of physical activity is achieved when a person is breathing quickly and sweating after being active. This research will help guide future research projects and create programmes that will help clients be active and manage their weight.
Do I have to take part?

**Taking part is voluntary.** It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive.

What will you be asked to do in the study?

For this study you will be asked to do several tasks. These tasks fall under three sections:

1. You will be asked to fill out questionnaires that examine your level of physical activity and psychological factors that influence your physical activity. Psychological factors include your level of confidence to be active, the barriers you face to being active, and what you think are the benefits of being active.

2. You will be asked to wear an accelerometer at three different times in this study. An accelerometer is a device that is worn on your hip that measures how active you are. The device is not heavy and weighs less than one pound. We ask that you wear this device one week before the first exercise counseling session, one week after the last exercise counseling session, and four weeks after your last exercise counseling session. In order to assess how active you are, you will need to wear the accelerometer for seven days straight. In order to get an accurate measure of your activity level, we will need to measure and record your weight and height.

3) You will be asked to attend four exercise counseling sessions. Exercising counseling is a behavioural method that provides you an opportunity to talk to an individual about setting goals to be active and discuss the benefits of physical activity. Additionally, it provides you with an opportunity to talk about what is preventing you from being active and explore ideas for getting over any barriers.

The total time commitment spent with an exercise counselor will be 6 to 7 hours over the course of 10 weeks. You will also wear an accelerometer for seven days at three different times throughout this study. The schedule for this study is presented below and shows the contact time with the exercise counselor. It shows what will be happening each week throughout the study. Please ask any questions you may have about this schedule.
<table>
<thead>
<tr>
<th>Week</th>
<th>Session</th>
<th>Questionnaires and Measurements</th>
<th>Time Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-exercise-counseling Measurements</td>
<td>1) Demographic information; 2) Physical Activity Questionnaire; 3) Assessment of readiness to change physical activity behaviour; 4) Confidence to be active; 5) Barriers to being active and Benefits of being active. 6) Obtain Accelerometer (weight, height measurements).</td>
<td>1 hour</td>
</tr>
<tr>
<td>2</td>
<td>Exercise Counseling Session 1: Build Rapport and Gather Knowledge</td>
<td>Return Accelerometer 1) Physical Activity Questionnaire; 2) Assessment of readiness to change physical activity behaviour; 3) Confidence to be active; 4) Barriers to being active and Benefits of being active.</td>
<td>1 hour</td>
</tr>
<tr>
<td>3</td>
<td>Exercise Counseling Session 2: Goal Setting</td>
<td>1) Physical Activity Questionnaire; 2) Assessment of readiness to change physical activity behaviour; 3) Confidence to be active; 4) Barriers to being active and Benefits of being active.</td>
<td>1 hour</td>
</tr>
<tr>
<td>4</td>
<td>Exercise Counseling Sessions 3: Evaluate, Revise, Inform</td>
<td>1) Physical Activity Questionnaire; 2) Assessment of readiness to change physical activity behaviour; 3) Confidence to be active; 4) Barriers to being active and Benefits of being active.</td>
<td>1 hour</td>
</tr>
<tr>
<td>5</td>
<td>Exercise Counseling Sessions 4: Evaluate, Revise, Inform</td>
<td>1) Physical Activity Questionnaire; 2) Assessment of readiness to change physical activity behaviour; 3) Confidence to be active; 4) Barriers to being active and Benefits of being active.</td>
<td>1 hour</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>1) Physical Activity Questionnaire; 2) Assessment of readiness to change physical activity behaviour; 3) Confidence to be active; 4) Barriers to being active and Benefits of being active. 5) Obtain Accelerometer (weight measurement).</td>
<td>30 minutes</td>
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<tr>
<td>7</td>
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<td>Return Accelerometer</td>
<td>5 minutes</td>
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<td>8</td>
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</tbody>
</table>
Follow-up Measurements

1) Physical Activity Questionnaire;
2) Assessment of readiness to change physical activity behaviour;
3) Confidence to be active;
4) Barriers to being active and Benefits of being active.
5) Obtain Accelerometer (weight measurement).

Return Accelerometer

Can I take part in the study?

In order to participate, you must:
1) have a diagnosis of schizophrenia (any subtype);
2) be between the ages of 18 and 30 years;
3) have a body mass index greater than or equal to 25 (overweight);
4) indicate you want to become physically active;
5) answer “No” to all questions on the Physical Activity Readiness Questionnaire;
6) be capable of giving informed consent.

Are there any risks to me in this study?

You will be asked to set goals to be active and talk about the benefits and barriers to being active. You may recall unpleasant and unsettling incidents that may make you feel uncomfortable. You should only discuss matters you feel comfortable with. Additionally, there are a number of physical risks that can happen when you start being physically active. These risks include: 1) injuries (e.g., sprains, broken bones); 2) feeling tired; 3) pain (e.g., sore muscles); 4) heart and lung problems (e.g., chest pain, breathing difficulties); and 5) sudden death due to cardiac complications. PLEASE NOTE: Sudden death due to cardiac complications while exercising is EXTREMELY RARE, but CAN occur. PLEASE NOTE: Due to these potential physical risks, you will be asked to fill out a Physical Activity Readiness Questionnaire that will ask you questions about your medical history and whether you are able to become active. This questionnaire is found on the last page of this document.

What are the benefits of my involvement?

This study will give you an opportunity to become more aware of opportunities to be physically active at the Queen Street Facility. This study may provide you with learning opportunities that may help you make healthier decisions about your physical activity in the future. From this study,
we hope to get results that will allow clients and researchers to work together to create health promotion programmes to help clients increase their physical activity. These results will be published so that other health professionals can create similar programmes in other hospitals.

**Will I be compensated for participating in this study?**

Yes, you will be compensated for participating in this study. You will receive a total of $50 for your participation in this study. This amount of money will be given to you in stages after you complete each of the four exercise counseling sessions and the final follow-up measurements. You will receive $10 after each exercise counseling session and $10 after you complete the follow-up measurements for a total of $50. Additionally, you will be given TTC tokens to come to and return from the clinic where the study will be held.

**Will information obtained in the study be confidential?**

The information you provide to the researcher will be kept confidential to the full extent provided by law. You will not be identified in any documents relating to the research. No information obtained during the study will be discussed with anyone outside of the research team. You will not be identified in any report or publication. As part of continuing review of the research, your study records may be assessed on behalf of the Research Ethics Board and, if applicable, by the Health Canada Therapeutic Products Programme. A person from the research ethics team may contact you (if your contact information is available) to ask you questions about the research study and your consent to participate. The person who is assessing your file or contacting you must maintain your confidentiality to the extent permitted by law.

**What happens if I do not wish to take part in this study or wish to withdraw from the study?**

If you do not wish to take part in this study, or if you wish to withdraw from the study once started, you may do so without giving a reason, with no repercussions and with no disadvantage to yourself.

**Who is funding the research?**

This research project is funded by the Centre for Urban Health Initiatives.
Questions?

If you have any questions about the study you can contact Dr. Tony Cohn (416-535-8501 ext. 2573). You can also contact Dr. Padraig Darby, Chair, Research Ethics Board, Centre for Addiction and Mental Health (416-535 8501 ext. 6876), to discuss your rights as a research participant.

Thank you for considering taking part in our study.
# Physical Activity Readiness Questionnaire

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Please choose</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?</td>
<td>YES</td>
</tr>
<tr>
<td>2</td>
<td>Do you ever feel pain in your chest when you do physical activity?</td>
<td>YES</td>
</tr>
<tr>
<td>3</td>
<td>Have you ever had chest pain when you are not doing physical activity?</td>
<td>YES</td>
</tr>
<tr>
<td>4</td>
<td>Do you ever feel faint or have spells of dizziness?</td>
<td>YES</td>
</tr>
<tr>
<td>5</td>
<td>Do you have a joint problem (back, knee, hip) that could be made worse with increased physical activity?</td>
<td>YES</td>
</tr>
<tr>
<td>6</td>
<td>Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?</td>
<td>YES</td>
</tr>
<tr>
<td>7</td>
<td>Is there any other reason why you should not participate in physical activity? If so, what?</td>
<td>YES</td>
</tr>
</tbody>
</table>

### IF YOU HAVE ANSWERED YES TO ONE OR MORE QUESTIONS

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.
- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

### IF YOU HAVE ANSWERED NO TO ALL QUESTIONS

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:
- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.

### PLEASE NOTE

If your health changes subsequently so that you answer YES to any of the above questions, inform your fitness/health professional immediately. If you are temporarily unwell (e.g. cold or flu), delay becoming more active until you are better.
PARTICIPANT CONSENT FORM

Research Project Entitled: Examining the feasibility of exercise counseling in individuals with schizophrenia

Principal Investigator: Dr. Tony Cohn (Centre for Addiction and Mental Health)

Co-Investigator: Dr. Guy Faulkner (Faculty of Physical Education and Health, University of Toronto)

Co-Investigator: Paul Gorczynski (PhD Candidate) (Faculty of Physical Education and Health, University of Toronto)

This form must be read in conjunction with the Information Sheet

I agree to take part in the study as described in the Information Sheet.

For this study I will be asked to do several tasks. These tasks fall under three sections:

1) I will be asked to fill out questionnaires that examine my level of physical activity and psychological factors that influence my physical activity. Psychological factors include my level of confidence to be active, the barriers I face to being active, and what I think are the benefits of being active.

2) I will be asked to wear an accelerometer at three different times in this study. I will wear this device one week before the first exercise counseling session, one week after the last exercise counseling session, and four weeks after my last exercise counseling session. In order to assess how active I am, I will need to wear the accelerometer for seven days straight. In order to get an accurate measure of my activity level, I understand I will have my weight and height measurements taken.

3) I will be asked to attend four exercise counseling sessions. Exercising counseling is a behavioural method that provides me an opportunity to talk to an individual about setting goals to be active and discuss the benefits of physical activity. Additionally, it will provide me an opportunity talk about what is preventing me from being active.
I understand the total time commitment for this study. I have gone through the schedule for this study with the research coordinator and have had an opportunity to ask questions.

I understand that I may withdraw from the study at any time without justifying my decision and without affecting my normal care and medical management.

As part of continuing review of the research, I also understand that my study records may be assessed on behalf of the Research Ethics Board and, if applicable, by the Health Canada Therapeutic Products Programme. A person from the research ethics team may contact me (if my contact information is available) to ask questions about the research study and my consent to participate. The person assessing my file or contacting me, must maintain my confidentiality to the extent permitted by law.

I have read the Information sheet on the above study and have had the opportunity to discuss the details with ..............................................................and ask questions. The nature and the purpose of the study to be undertaken has been explained to me and I understand what will be required if I take part in the study.

I have been given a copy of this form to keep.

Signature of Participant .............................................................................

Date.............................................................................................................

Printed name in BLOCK LETTERS................................................................

I confirm I have explained the nature of the study, as given in the Information Sheet, in terms which in my judgment are suited to the understanding of the participant.

Signature of person obtaining consent........................................................

Date.............................................................................................................

Printed name in BLOCK LETTERS................................................................

Past, Present, Future

Past exercise or physical activity:

Interests?

Present exercise or physical activity:

Type, intensity, type

Future exercise or physical activity

Focus on Lifestyle

One way of increasing activity is by altering daily routines to encourage more exercise. Ask your client questions that will indicate which of the following aspects of her/his lifestyle you can target to provide the best prescription. Use the following list to record appropriate notes and check off the ones you can target for modification.

___ current work routine.

___ current leisure routine.

___ most convenient times.

Confidence Scale

Importance Scale
### Decisional Balance

<table>
<thead>
<tr>
<th>Good things about changing</th>
<th>Not-so-good things about changing</th>
</tr>
</thead>
<tbody>
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</table>

<table>
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<tr>
<th>Good things about staying the same</th>
<th>Not-so-good things about staying the same</th>
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<tbody>
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</table>
Action Plan:

Some things you want to do to become more physical active in the next week: 

___________________________________________

___________________________________________

___________________________________________

___________________________________________

Goal: ____________________________________

___________________________________________

___________________________________________

___________________________________________

The reasons this goal is important to me? 

___________________________________________

___________________________________________

___________________________________________

___________________________________________

The Steps I plan to take are: ____________

___________________________________________

___________________________________________

___________________________________________
Some things that might prevent me from being physical active in the next week: ____
___________________________________________
___________________________________________
___________________________________________
___________________________________________
Some things that might interfere with my first goal: ________________________________
___________________________________________
___________________________________________
___________________________________________
___________________________________________
How I could handle these barriers: _________
___________________________________________
___________________________________________
___________________________________________
___________________________________________
The ways other people can help me are: ___
___________________________________________
___________________________________________
___________________________________________
Action Plan Follow-up:

Goal: ____________________________________________
___________________________________________
___________________________________________
The reasons this goal is important to me?____
___________________________________________
___________________________________________
___________________________________________
___________________________________________
The Steps I took to accomplish my goal are:
___________________________________________
___________________________________________
___________________________________________
___________________________________________

Some things that prevented me from being physical active in the past week: ___________
___________________________________________
___________________________________________
___________________________________________
___________________________________________
Some things that interfered with my goal:
___________________________________________
___________________________________________
___________________________________________
___________________________________________

I handled these barriers by:__________________
___________________________________________
___________________________________________
___________________________________________
___________________________________________

I will continue to handle these barriers in the future by:__________________________
___________________________________________
___________________________________________
___________________________________________
___________________________________________

The ways other people can help me are: __
___________________________________________
___________________________________________
___________________________________________
___________________________________________
Appendix C. Socio-Demographic Information.

Socio-Demographic Information

a) Age (in years): _________

b) Sex (please tick one box): Male  □  Female  □

c) Are you currently working outside the home (please circle)?  YES  NO

If yes, what is your job? ______________________

d) Marital Status (please tick one box): Single  □  Married  □  Divorced  □

e) Living Arrangements:  Independent  □  Group (meals provided)  □

(please tick one box)  With Family  □  Group (no meals provided)  □

g) Length of illness: ______________________ (years)

g) Medication regimen: ______________________
Appendix D. International Physical Activity Questionnaire (IPAQ).

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?

   _____ days per week
   
   [ ] No vigorous physical activities  ➔ Skip to question 3

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

   _____ hours per day
   _____ minutes per day

   [ ] Don’t know/Not sure

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.

   _____ days per week
   
   [ ]
4. How much time did you usually spend doing moderate physical activities on one of those days?

_____ hours per day  
_____ minutes per day

☐ Don’t know/Not sure

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 might do 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

1. 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.

2. 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
Appendix E. Instructions for the use of the Accelerometer.

INSTRUCTIONS FOR THE USE OF THE ACCELEROMETER

Accelerometer:
• Wear the accelerometer snugly on the right side of your waist.

• Make sure the arrow on the accelerometer is pointing up.

• Start wearing the accelerometer as soon as you get dressed each day.

• The accelerometer should be worn until you go to bed with exception of when you take a shower, swim or any other activity that can get the device wet. Please record each day in your logbook the time when you put on the accelerometer and when you take it off.

• Also include in your log book any times during the day when you take the accelerometer off (i.e. when showering, swimming or other activities that prevent you from wearing the device).

Do not use the accelerometer when:
• In the shower.

• While swimming or any other conditions, such as heavy rain, that may get the accelerometer wet.

• Or while sleeping.

If you have any questions, please contact:

Paul Gorczynski
Research Coordinator
Telephone: xxx xxx xxxx
Email: paul.gorczynski@utoronto.ca
Day 1

Name:

Date:

Time Accelerometer was placed on right hip:

<table>
<thead>
<tr>
<th>TIME</th>
<th>TIME WHEN ACCELEROMETER WAS TAKEN OFF</th>
<th>WHAT DID YOU DO WHEN THE ACCELEROMETER WAS OFF?</th>
<th>TIME WHEN ACCELEROMETER WAS PLACED BACK ON HIP</th>
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Time when accelerometer was taken off: ____________
# Day 2

Name: 

Date: 

Time Accelerometer was placed on right hip:

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<th>WHAT DID YOU DO WHEN THE ACCELEROMETER WAS OFF?</th>
<th>TIME WHEN ACCELEROMETER WAS PLACED BACK ON HIP</th>
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Time when accelerometer was taken off: ___________

156
**Day 3**

Name: 

Date: 

Time Accelerometer was placed on right hip:

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<th>TIME</th>
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<th>WHAT DID YOU DO WHEN THE ACCELEROMETER WAS OFF?</th>
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Day 4

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Date:

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Name:

Date:

Time Accelerometer was placed on right hip:

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<th>TIME WHEN ACCELEROMETER WAS PLACED BACK ON HIP</th>
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Day 6

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Date: 

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<th>WHAT DID YOU DO WHEN THE ACCELEROMETER WAS OFF?</th>
<th>TIME WHEN ACCELEROMETER WAS PLACED BACK ON HIP</th>
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Day 7

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Date:

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<th>WHAT DID YOU DO WHEN THE ACCELEROMETER WAS OFF?</th>
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Appendix F. Stages of Change.

**Readiness to Become More Physically Active**

Current recommendations suggest that being physically active requires taking part in 30 minutes of moderate physical activity most days of the week. Moderate activity is that which makes you breathe somewhat harder than normal.

1. Please circle the letter next to the statement which is closest to how you feel about physical activity?

   a. I’m not physically active and I don’t intend to start

   b. I’m not physically active but I’m thinking about starting

   c. I’m physically active once in-a-while but not regularly

   d. I’m physically active regularly but started only in the past 6 months

   e. I’m physically active regularly and have been so for longer than 6 months
Appendix G. Self-Efficacy.

Physical Activity Confidence

There are many things that can get in the way of physical activity. On a Scale of 1 to 5, how confident are you that you can:

<table>
<thead>
<tr>
<th>Activity</th>
<th>1 I’m sure I can’t</th>
<th>2 I probably can’t</th>
<th>3 Neutral</th>
<th>4 I probably can</th>
<th>5 I’m Sure I can</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do physical activity even when you feel sad or stressed?</td>
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<tr>
<td>Set aside time for physical activity on most days of the week?</td>
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<tr>
<td>Do physical activity even when your family or friends want you to do something else?</td>
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<tr>
<td>Get up early, even on weekends, to do physical activity?</td>
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<tr>
<td>Do physical activity even when you have a lot of other things to do</td>
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<tr>
<td>Do physical activity even when it is raining or really hot outside</td>
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</table>
### Appendix H. Perceived Benefits and Barriers of Physical Activity.

#### Pros and Cons of Physical Activity

On a Scale of 1 to 5, how important is each statement?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all Important</th>
<th>Not Really Important</th>
<th>Neutral</th>
<th>Important</th>
<th>Extremely Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would feel embarrassed if people saw me doing physical activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Physical activity would help me to stay fit</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>People important to me would be happy if I did physical activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>There is too much I would have to learn to do physical activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I would feel better about myself if I did physical activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I would need too much help from others to do physical activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I do not like the way physical activity and exercise makes me feel</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I would have fun doing physical activity or sport</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I would have to do it by myself</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I would have more energy if I did physical activity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Physical activity takes time away from doing other things</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
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<tr>
<td>It would improve my health or reduce my risk of disease</td>
<td>1</td>
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Appendix I. Treatment Fidelity.

Participant: __1____

Session 1:
Rapport building (past, present, future physical activity) (yes / no)
Administered confidence and importance scales and decisional balance (yes / no)

Session 2:
Administered action plan (yes / no)
Establish goal (yes / no)
Identify importance (yes / no)
Create series of steps to achieve goal (yes / no)
Provided list of physical activity opportunities (yes / no)
Barriers identification (yes / no)

Session 3:
Progress report (yes / no)
Evaluate goal (yes / no)
Address barriers (yes / no)

Session 4:
Progress report (yes / no)
Evaluate goal (yes / no)
Address barriers (yes / no)

Participant: __2____

Session 1:
Rapport building (past, present, future physical activity) (yes / no)
Administered confidence and importance scales and decisional balance (yes / no)

Session 2:
Administered action plan (yes / no)
Establish goal (yes / no)
Identify importance (yes / no)
Create series of steps to achieve goal (yes / no)
Provided list of physical activity opportunities (yes / no)
Barriers identification (yes / no)

Session 3:
Progress report (yes / no)
Evaluate goal (yes / no)
Address barriers (yes / no)

Session 4:
Progress report (yes / no)
Evaluate goal (yes / no)
Address barriers (yes / no)
Participant: __3____

Session 1:
   Rapport building (past, present, future physical activity) (yes / no)
   Administered confidence and importance scales and decisional balance (yes / no)
Session 2:
   Administered action plan (yes / no)
   Establish goal (yes / no)
   Identify importance (yes / no)
   Create series of steps to achieve goal (yes / no)
   Provided list of physical activity opportunities (yes / no)
   Barriers identification (yes / no)
Session 3:
   Progress report (yes / no)
   Evaluate goal (yes / no)
   Address barriers (yes / no)
Session 4:
   Progress report (yes / no)
   Evaluate goal (yes / no)
   Address barriers (yes / no)

Participant: __4____

Session 1:
   Rapport building (past, present, future physical activity) (yes / no)
   Administered confidence and importance scales and decisional balance (yes / no)
Session 2:
   Administered action plan (yes / no)
   Establish goal (yes / no)
   Identify importance (yes / no)
   Create series of steps to achieve goal (yes / no)
   Provided list of physical activity opportunities (yes / no)
   Barriers identification (yes / no)
Session 3:
   Progress report (yes / no)
   Evaluate goal (yes / no)
   Address barriers (yes / no)
Session 4:
   Progress report (yes / no)
   Evaluate goal (yes / no)
   Address barriers (yes / no)
Appendix J. Post Study Exit Interview Schedule.

1. What did you like about the study and the exercise counseling?

2. What did you not like about the study or exercise counseling?

3. What would you change about the study or exercise counseling?

4. What would you keep the same in the study or exercise counseling?

5. What have learned from this study?

6. Is there anything else you want to mention about your experience in this study?
Appendix K. Letter of Ethics Approval, Research Ethics Office, Centre for Addiction and Mental Health.
Appendix L. Letter of Ethics Approval, Office of Research Ethics, University of Toronto.

University of Toronto
Office of the Vice-President, Research
Office of Research Ethics

PROTOCOL REFERENCE # 25030

February 17, 2010

Dr. Guy Faulkner
Faculty of Physical Education and Health
56 Harbord Street
Toronto, ON M5S 2W6

Mr. Paul Gorczynski
Faculty of Physical Education and Health
55 Harbord Street
Toronto, ON M5S 2W6

Dear Dr. Faulkner and Mr. Gorczynski:

Re: Administrative Approval of your research protocol entitled, “Examining the feasibility of exercise counseling in individuals with schizophrenia”

We are writing to advise you that the Office of Research Ethics has granted administrative approval to the above-named research study. The level of approval is based on the following role(s) of the University, as you have identified with your submission:

- Graduate Student research – hospital-based only
- Storage or analysis of De-identified Personal Information (data)

This approval does not substitute for ethics approval, which has been obtained from your hospital Research Ethics Board. Please note that you do not need to submit Annual Renewals, Study Completion Reports or Amendments to the ORE unless the involvement of the University changes so that ethics review is required. Please contact the ORE to determine whether a particular change to the University’s involvement requires ethics review.

Best wishes for the successful completion of your project.

Yours sincerely,

S. Lanfrey
Research Ethics Coordinator

McMurrich Building, 52 Queen’s Park Cres, W, 2nd Floor Toronto, ON M5S 1S8
TEL: 416-946-3373 FAX: 416-946-5763 EMAIL: ethics.review@utoronto.ca
Chapter 5

Study 3: Examining the efficacy of point-of-choice prompts on stair usage in a psychiatric setting

5 Introduction

There are numerous physical and mental health benefits associated with sustained physical activity. Although the benefits of physical activity are well documented, only 15% of Canadian adults are physically active and accumulating the recommended level of 150 minutes a week of moderate and vigorous physical activity (Colley et al., 2011). Individuals with serious mental illness represent a large portion of adults who are not active enough to experience beneficial health gains (Brown et al., 1999; Daumit et al., 2005; Lindamer et al., 2008). Given high rates of physical inactivity, researchers recommend that marginally increasing the level of physical activity in sedentary individuals, like those with serious mental illness, may produce the greatest public health improvement (Blair, Kohl, Paffenbarger, Clark, Cooper, & Gibbons, 1989; Blair & Connell, 1996; Macfarlane, Taylor, & Cuddihy, 2006).

One strategy that has been recommended to increase overall physical activity in sedentary individuals is to modify the physical and sociocultural environments so that individuals acquire more incidental physical activity (i.e., any physical activity built up over the course of a day) (Kikbusch, 1989; Sallis & Owen, 2002; Ziviani, Scott, & Wadley, 2004). Physical environments are both natural and built whereas sociocultural environments are composed of the values, beliefs, and attitudes of a particular community (Sallis & Owen, 2002). Both of these environments provide a behaviour setting where behaviour occurs. Through their design, behaviour settings can either enhance or restrict particular behaviours such as physical activity (Sallis & Owen, 2002).

Several reviews have shown that environmental modifications can provide additional opportunities to acquire incidental physical activity through short bouts (Foster & Hillsdon, 2004; Kahn et al., 2002; Sallis et al., 1998; Task Force on Community
Preventive Services, 2001). A recent review has confirmed that accumulated physical activity produces similar health benefits as continuous physical activity (Murphy, Blair, & Murtagh, 2009). Research results indicated that short bouts of moderate intensity physical activity can improve physical fitness (Murphy & Hardman, 1998; Macfarlane et al., 2006; Park, Rink, & Wallace, 2008), body composition (Asikainen et al., 2002; Miyashita, 2008; Miyashita, Burns, & Stensel, 2006; Miyashita, Burns, & Stensel, 2008; Murphy & Hardman, 1998), and lower chances of all-cause mortality and coronary attack (Laukkanen, Kurl, Salonen, 2002; Morris, Clayton, Everitt, Semmence, & Burgess, 1990). Additionally, researchers have shown that individuals are more likely to continue to be physically active when they perform moderate intensity activity in short bouts (Jakicic, Wing, Butler, Robertson, 1995).

5.1.1 Stair Use: An Environmental Approach to Increase Incidental Physical Activity through Short Bouts

An environmental modification that has been studied for its impact on increasing physical activity and improving health is stair use. In recent years, researchers have investigated stair use for a number of reasons. First, stair use requires no equipment and is accessible to a large portion of the population (Eves, Webb, & Mutrie, 2006). Second, stair use is available at no cost and does not necessarily take time away from an individual’s schedule. Third, stair use requires significantly more energy than walking. According to the 2000 compendium of physical activities (Ainsworth et al., 2000), walking at a leisurely pace requires approximately 2.5 to 4.0 Metabolic Equivalents (METs), while stair use requires between 5.0 to 10.0 METs. Given the fact that stair use is considered a vigorous form of exercise, numerous health benefits can be attained from accumulated bouts of this form of activity (Boreham et al. 2005; Yu, Yarnell, Weetnam, & Murray, 2003). In a 10-year prospective study that examined the cardiac benefits of physical activity, researchers showed that attaining 54 kcal/day of moderate activity (the equivalent of 7 minutes of stair use) was enough to reduce the risk of death from coronary heart disease by approximately 62% (Yu et al., 2003). According to Yu and colleagues (2003), this short bout of moderate to vigorous intensity activity reduced
thrombotic factors and inflammatory markers associated with heart disease. In addition to improving cardiac health, stair use has several implications for weight management. Given its vigorous nature, stair use provides an opportunity for all individuals to attain incidental physical activity that can aid with weight loss or maintenance. Because energy expenditure is proportional to body weight (i.e., $1 \text{MET} = 1 \text{kcal} \times \text{kg}^{-1} \times \text{hr}^{-1}$) (Ainsworth et al., 2000), individuals who are overweight and obese require more energy to perform the same task as those who are not overweight. As such, incorporating short bouts of stair use can be specifically beneficial to those who are overweight or obese trying to manage their weight.

5.1.2 Stair Use Interventions: A Review

Traditionally, stair use interventions have involved point-of-choice signs, such as posters, to determine if they influence stair use behaviour over escalator or elevator use (Foster & Hillsdon, 2004). Several studies have investigated the use of point-of-choice prompts in various environments including shopping centres (Andersen, Franckowiak, Synder, Bartlett, & Fotaine, 1998; Blamey, Mutrie, & Aitchison, 1995; Brownell, Stunkard, & Albaum, 1980; Kerr, Eves, & Carroll, 2000; Kerr, Eves, & Carroll, 2001b, Kerr, Eves, & Carroll, 2001c; Kerr, Eves, & Carroll, 2001d; Kerr, Eves, & Carroll, 2001e), train stations (Brownell et al., 1980), airports (Russell & Hutchinson, 2000; Coleman & Gonzalez, 2001), bus terminals (Brownell et al., 1980), university buildings (Boutelle, Jeffery, Murray, & Schmitz, 2004; Russell, Dzewaltowski, & Ryan, 1999), and various worksites (Coleman & Gonzalez, 2001; Kerr, Eves, Carroll, 2001a; Titze, Martin, Seiler, & Marti, 2001). A review conducted by Foster and Hillsdon (2004) examined 16 studies where written media, such as posters and stair-riser banners (i.e., banners affixed to each step), were used to prompt stair use instead of escalator and elevator use. Although direct comparisons were not possible because each study presented different confounding variables like traffic volume, location, age, sex and ethnicity, in general, posters and banners increased stair use by as much as 1 to 10% at follow up over baseline values, with younger individuals, those carrying no bags, and women using stairs more often. Additionally, stair-riser banners were seen to be more effective than posters because they were noticed more readily by the public and contained more than one health promoting
message (Kerr, Eves, & Carroll, 2001b; Kerr, Eves, & Carroll, 2001d). Although both types of prompts did increase stair use, their effects were short term, often lasting approximately three months. Another review conducted by Kahn and colleagues (2002) showed similar findings and made recommendations to enhance future research in the area. Their primary recommendation was that point-of-choice prompts should be customized to be culturally relevant and sensitive to particular populations for greater appeal and effectiveness. Additionally, Kahn and colleagues (2002) mentioned that future researchers must take into consideration other confounding factors that may influence stair use. These factors included: stair case location; lighting; maintenance; safety and security; and whether staircases are accessible during non-fire related emergencies. A recent review of point-of-choice prompts confirmed the findings of the two previous reviews (Nocon, Muller-Riemenschneider, Nitzschke, & Willich, 2010). In their systematic review, Nocon et al. (2010) identified 25 studies that examined stair, elevator, and escalator use in various public settings. Overall, 42 evaluations of point-of-choice prompts were included in the review and showed that the majority of results showed a significant increase in stair climbing.

Since these three major reviews, several studies have taken into consideration some of the suggestions made by Kahn and colleagues (2002). For instance, Kerr and colleagues (2004) examined the impact of sequential environmental changes in addition to posters on stair use. In their study, the main stairwell of the Centers for Disease Control and Prevention’s Rhodes Building in Atlanta, Georgia was altered to make it more appealing to users. During the course of the study, the stairwell was fitted with new carpets, artwork, and a stereo system. Within the first three months of the environmental changes, stair use increased by 8.9%. In another study, Andersen and colleagues (2006) illustrated the importance of culturally sensitive signs in increasing stair use. In their study that examined the stair use behaviours of Black American commuters in a subway station in Baltimore, Maryland, researchers first consulted with members of the Black communities and then created a sign that featured a fit Black American woman using the stairs. The sign was posted in an area where individuals had to decide between taking the stairs or an escalator to exit the station. After the sign was introduced, researchers recorded a 5.8% increase in stair usage. When the sign was removed after two weeks, stair use remained
above baseline measures. Other recent studies have examined the use of point-of-choice prompts and shown increased stair use in a variety of populations and public environments (Eves et al., 2006; Nomura, Yoshimoto, Akezaki, & Sato, 2009).

5.1.3 Limitations of Stair Use Interventions

Although researchers continue to find that point-of-choice prompts and environmental modifications increase stair use, several study limitations still exist. First, most researchers rely solely on observational techniques to collect information on traffic volume and stair use. A lack of objective measures compromises the internal integrity of the study and quality of results. Second, researchers continue to classify individuals who use stairs according to criteria that are difficult, if not impossible, to use. Researchers arbitrarily classify individuals by their age, ethnicity, and BMI and base their decisions strictly on observation. Furthermore, given that most studies have been conducted in busy environments, like train stations and public office buildings, observers are often left to make quick decisions. Third, in addition to classification biases, researchers usually conduct observations for small portions of the day. This form of segmented observational research provides researchers with only limited information on stair use behaviour. Lastly, stair use research has concentrated on the general population, and has not provided specific information on communities that may be marginalized by mental or physical illness. Given that individuals who have no compromising health conditions are more likely to respond to physical activity interventions such as point-of-choice prompts (Dishman & Buckworth, 1996), research examining the effect of point-of-choice prompts in populations that exhibit mental or physical health conditions is desperately needed.

5.1.4 Stair Use Intervention: Purpose and Rationale

Given the high rate of inactivity and obesity at CAMH (Cohn et al., 2004), stair use may present an opportunity for sedentary individuals to acquire short bouts of daily physical activity, which may help contribute to overall health benefits including weight loss. This environmental strategy to increase physical activity has also been suggested by participants in the first study of this thesis and shown to be acceptable. Additionally,
environmental strategies may be more inclusive than traditional lifestyle modifications because they do not solely rely on high levels of cognition or motivation and may be more accessible to individuals who are mentally unwell to participate in counseling sessions. As such, this study will assess the efficacy of point-of-choice prompts to increase stair use between two floors of a five-floor building at the CAMH and address the major limitations of sole observational research by incorporating infrared motion sensors. The specific purpose of this ‘proof-of-principle’ study will be to illustrate that environmental modifications are possible in a psychiatric environment and that such modifications may increase levels of incidental physical activity. The questions this study will address include:

1) Will point-of-choice stair riser banners and posters prompt individuals who live, visit, and work at the hospital to use stairs more often between the fourth and fifth floors?

2) Will stair use vary according to day of the week?

Additionally, through observational research, two participant characteristics will be recorded for each individual who uses the stairs. Participant characteristics will include: sex and hospital status (identifying those who wear identification badges as employees or volunteers and those without identification badges as clients or visitors). Because these characteristics will be captured, a secondary focus will examine:

3) Will stair use between the fourth and fifth floors vary by sex and hospital status?

5.2 Methods

5.2.1 Research Setting and Participants

This study examined the rate of use of the staircase and elevators on the fourth and fifth floors of the Unit 1 building at the CAMH Queen Street facility. Individuals who live and work on the unit were participants in this study. Both the University of Toronto Health
Science Research Ethics Board (APPENDIX A) and the Centre for Addiction and Mental Health Research Ethics Board (APPENDIX B) granted approval for this study.

This particular location was chosen for several reasons. First, this is the only staircase that is accessible to clients in the building. Staircases are often inaccessible in psychiatric hospitals because they may present physical hazards to both staff and clients (Kelly, 2000). This staircase is accessible to clients because it is located in an area that is highly visible. Second, although individuals require a key to operate the elevators between the two floors, gaining access to use the elevators is not difficult and key holders often ride the elevators with non-key holders. All staff and some clients are key holders. This staircase presents an opportunity for many clients to increase their levels of incidental physical activity throughout the day. Third, this staircase is located between two floors that provide vital services to the clients. Some client residences can be found on the fifth floor and the cafeteria is located on the fourth floor. Additionally, clients receive their medication and participate in social and recreational activities on the fourth floor. Between meals and social activities, there appeared to be a lot of opportunities for stair use.

5.2.2 Procedure and Data Collection

This 6-week study used a quasi-experimental, interrupted time series research design to assess the effect of point-of-choice signs on stair use between the two floors. After a 2-week baseline phase, point-of-choice stair riser banners were placed on each individual stair face while posters were fixed beside the elevators on both floors. Stair riser banners measured 10cm x 53cm in size and alternated in colour between green and yellow as they were placed on the stair faces (Figure 1). Posters measured 28cm x 22cm in size and were green in colour (Figure 2). Stair riser banners and posters carried the same message: “Stay Fit, Take the Stairs”. After a 2-week intervention phase, stair and elevator use was observed for an additional 2-week follow-up phase where stair riser banners and posters were removed.
For this study, stair use was measured through an infrared motion sensor along with systemic behavioural observations. Elevator use was only measured through systemic behavioural observations. An infrared motion sensor was installed at the mid-point of the staircase to measure continuously the number of individuals who used the stairs throughout the study. The Trailmaster 1550 (Trailmaster, Infrared Trail Monitors, 2009) is a monitoring system that transmits an infrared beam between a transmitter and a receiver. When an object breaks the beam, such as an individual passing through it, the
date and time of the event is recorded. In order to record only one event per person, the monitoring system needs to be installed at a height where both leg movements are not captured. Research that has measured stair use successfully with the Trailmaster 1550 recommended the system be installed near the handrails (Nicoll & Zimring, 2009). The Trailmaster 1550 provided an objective continuous stream of data on stair use between Tuesdays and Sundays during each week of the study. On Mondays, the device was uninstalled, its data downloaded, and then reinstalled. Total stair use was averaged over each hour the device was capturing data throughout the study.

Objective data were supplemented with systematic behavioural observations that were conducted between 10:00am and 12:00pm on every Tuesday, Thursday and Saturday throughout the study. These particular times were chosen because they did not coincide with busy times of the day (e.g., meal times) where stair use was already high. Additionally, by observing individuals on two weekdays and one weekend day, data represented nearly the entire week. Several characteristics were recorded for each individual who took the stairs or the elevator during the course of this study. Participant characteristics included: sex and hospital status (identifying those who wore identification badges as staff or volunteers and those without identification badges as clients or visitors). Individuals were not counted and not included in the study if they used a wheelchair or other mobility devices, or were traveling with service carts when using the elevator (e.g., coffee carts, janitorial carts, medication carts). For two days during the baseline phase of the study, a second observer coded participants (n=171) to produce agreement ratings. Between the two observers, there was 100% agreement on sex and 99% agreement on hospital status. Additionally, there was 97.4% agreement between the Trailmaster 1550 and the systemic observational data throughout the study, where 1021 events were captured by the Trailmaster 1550 and 1047 systematic observations were recorded.

5.2.3 Data Analysis

For the objective data, a one-way analysis of variance (ANOVA) was conducted to determine whether the intervention had an effect on stair use by comparing mean scores
across the three different phases. Mean scores were computed by averaging the number of users per day over the course of each study phase. A one-way ANOVA was conducted to examine differences between weekdays and weekend days. Additionally, a multivariate ANOVA examined whether there was a difference in stair use between weekdays and weekends during different study phases. For observational data, a logistic regression analysis was conducted. Stair and elevator use served as the dichotomous dependent variable and sex and hospital status were entered as independent variables. A Chi Square test was used to compare different phases. An alpha level of .05 was used for all statistical tests.

5.3 Results

5.3.1 Infrared motion sensor

5.3.1.1 Unit Population

Hospital census counts indicated nearly a constant population of clients on both floors throughout the duration of this study. In total, there were two clients who left the unit during the baseline phase, leaving 46 clients who lived on the unit for the remainder of the study. The staff population varied throughout the day and throughout the week. Most staff worked between the hours of 8:00am and 6:00pm, Monday through Friday. During those hours the staff population reached a total of 21 individuals, which included: 9 nurses; 2 housekeepers; 3 occupational therapists; 2 recreation therapists; a social worker; a nurse manager; a nurse educator; a nurse practitioner; and a psychiatrist. During the weekend, the number of staff fell to 8 individuals, which included: 7 nurses and a recreation therapist.

5.3.1.2 Intervention

There were a total of 14,981 stair users captured by the Trailmaster 1550 during the study. There was no significant change in the number of stair users throughout all phases \[F(2, 856) = .853, p = .427\]. During the baseline phase, 5342 stair users were captured,
while only 4758 and 4881 stair users were captured during the intervention and follow-up phases, respectively.

### 5.3.1.3 Day of Week

There was a significant difference between weekday and weekend day stair use throughout the study, with more people using the stairs during the week than the weekend $[F(1, 857) = 10.536, p = .001]$. There was no phase by day of week interaction effect $[F(2, 853) = .091, p = .913]$.

### 5.3.2 Systematic behavioural observations:

#### 5.3.2.1 Sex

In total there were 1265 systemic behavioural observations made of both stair and elevator use during the course of the study. Logistic regression did not indicate a sex effect on stair or elevator use during any phase of the study $[OR = .968, 95\% CI .708-1.322]$. From baseline to follow-up, males increased their stair use, while females decreased their stair use. The increase in stair use for males was not significant ($X^2 (2, N=449) = .084, p = .959$), while the decrease in stair use for females was also not significant ($X^2 (2, N=598) = .906, p = .636$). Results for stair and elevator use by sex are summarized in Charts 1 and 2.

#### Table 1. Stair use by sex.

<table>
<thead>
<tr>
<th></th>
<th>Baseline (n=356)</th>
<th>Intervention (n=342)</th>
<th>Follow-up (n=349)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>147</td>
<td>152</td>
<td>150</td>
</tr>
<tr>
<td>Female</td>
<td>209</td>
<td>190</td>
<td>199</td>
</tr>
</tbody>
</table>

#### Table 2. Elevator use by sex.

<table>
<thead>
<tr>
<th></th>
<th>Baseline (n=79)</th>
<th>Intervention (n=68)</th>
<th>Follow-up (n=71)</th>
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<tr>
<td>Male</td>
<td>31</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>Female</td>
<td>48</td>
<td>46</td>
<td>43</td>
</tr>
</tbody>
</table>
5.3.2.2 Hospital Status

Throughout the study, employees/volunteers used the elevators more often than clients, while clients used the stairs more often than the employees/volunteers. There was a significant effect of hospital status on stair and elevator use, showing that employees/volunteers were less likely to take the stairs than clients [$OR = .389, 95\% CI .285-.531$]. As the study progressed from the baseline phase to the follow-up phase, employees/volunteers increased their stair use, but not significantly ($X^2 (2, N=444) = 5.12, p = .077$), while clients/visitors decreased their stair use, but not significantly ($X^2 (2, N=603) = 4.86, p = .090$). Results for stair and elevator use by hospital status are summarized in Charts 3 and 4.

<table>
<thead>
<tr>
<th>Stair Use</th>
<th>Baseline (n=356)</th>
<th>Intervention (n=342)</th>
<th>Follow-up (n=349)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees/Volunteers</td>
<td>133</td>
<td>141</td>
<td>170</td>
</tr>
<tr>
<td>Clients/Visitors</td>
<td>223</td>
<td>201</td>
<td>179</td>
</tr>
</tbody>
</table>

Table 3. Stair use by hospital status.

<table>
<thead>
<tr>
<th>Elevator Use</th>
<th>Baseline (n=79)</th>
<th>Intervention (n=68)</th>
<th>Follow-up (n=71)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees/Volunteers</td>
<td>53</td>
<td>41</td>
<td>49</td>
</tr>
<tr>
<td>Clients/Visitors</td>
<td>26</td>
<td>27</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 4. Elevator use by hospital status.

5.3.2.3 Sex and hospital status

When sex and hospital status were examined together, male employees/volunteers significantly increased their stair use throughout the study ($X^2 (2, N=133) = 13.4, p = .001$), while female employees/volunteers increased their stair use, but not significantly ($X^2(2, N=311) = .238, p = .888$). This trend was not seen with male clients as stair use decreased from the baseline phase to the follow-up phase ($X^2 (2, N=316) = 5.02, p = .081$). Female clients also decreased their stair use from the baseline phase to the follow-up phase ($X^2 (2, N=287) = 1.39, p = .499$). Results for stair use by sex and hospital status are summarized in Charts 5 and 6.
Table 5. Stair use by sex for employees/volunteers.

<table>
<thead>
<tr>
<th></th>
<th>Baseline (n=133)</th>
<th>Intervention (n=141)</th>
<th>Follow-up (n=170)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>29</td>
<td>41</td>
<td>63</td>
</tr>
<tr>
<td>Female</td>
<td>104</td>
<td>100</td>
<td>107</td>
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Table 6. Stair use by sex for clients.

<table>
<thead>
<tr>
<th></th>
<th>Baseline (n=223)</th>
<th>Intervention (n=201)</th>
<th>Follow-up (n=179)</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>118</td>
<td>111</td>
<td>87</td>
</tr>
<tr>
<td>Female</td>
<td>105</td>
<td>90</td>
<td>92</td>
</tr>
</tbody>
</table>

5.4 Discussion

The purpose of this ‘proof-of-principle’ study was to illustrate that environmental modifications are possible in a psychiatric environment and to assess the efficacy of point-of-choice prompts to increase stair use between two floors of a five-floor building at the CAMH. Examining the infrared motion sensor data, there was no significant change in stair use across the three study phases. With respect to systematic behavioural observations, there was no overall sex effect on stair use or elevator use, but clients and visitors did opt for the stairs significantly more often than employees and volunteers. When stair use was examined more closely and analyzed by sex and hospital status separately, stair use for employees and volunteers increased, with male employees and volunteers significantly increasing their use of stairs.

The population target of this intervention was patients. There are several possible reasons why the intervention was not successful in increasing stair use among this group. First, when comparing the results of this study to previous research that has examined point-of-choice prompts in elevator settings, it is important to note that the percentage of people using the stairs instead of the elevator in this study was high at the beginning. By examining the systematic behavioural observations data, in the baseline phase 81.8% of people used the stairs. This high rate of stair use is the result of administrative decisions to limit the number of individuals who can possess a key to operate the elevators. In comparison, other studies identified in a systematic review showed a range of stair
climbing baseline rates of 0.4% to 71.4% (Nocon et al., 2010). In the current study, there may have been a ceiling effect in that most patients and staff were already using the stairs when possible.

Second, although both staff and clients sought clarification that the Trailmaster 1550 did not contain a camera, staff asked more questions about the device and its use, whether any work related behaviours were being monitored and recorded, the health benefits of stair use in general, and the nature of the study. Future research should ensure that all individuals in a closed environment receive the same amount of information about the benefits of stair use. Potentially, researchers may wish to consider the use of an educational component directed at clients to improve comprehension of the numerous health benefits associated with stair use.

Despite the null finding regarding change in stair use by patients, these findings demonstrate the value of environmental interventions in that their impact may extend beyond the target population to other users of a particular setting. In this case, male staff significantly increased their stair use over the intervention period. This is a positive and encouraging finding. Why female staff did not increase stair use by a similar margin is not clear. Findings published by Foster and Hillsdon (2004) and Soler and colleagues (2010) in their reviews of stair use interventions suggest that there are many confounding variables that influence stair use. Without direct comparisons of various randomized groups, one variable such as gender should not be deemed more influential than other variables such as location, traffic flow, age, or ethnicity. Given that these other confounding variables were not examined in the present study, future research may explore these factors in addition to gender in determining stair use.

This study had a number of limitations that should be addressed. First, as mentioned, the rate of stair use was high in comparison to elevator use at the beginning of the study. Future research should consider the use of point-of-choice prompts in staircases that are used less frequently. Also, locations where clients can freely choose between elevators and stairs should also be examined. Second, point-of-choice messaging was taken from studies that used similar health related messages. Researchers may wish to seek input
from clients and staff before the construction of posters and banners to ensure messages resonate with the target population. Third, two clients left the unit during the baseline phase which decreased the total number of individuals who used the stairs and subsequently may have influenced the intervention and follow-up results.

Despite these limitations, a number of strengths should be mentioned. First, to the best of my knowledge, this is the first study to explore a stair use intervention or any environmental modification to increase physical activity within a psychiatric setting. Environmental interventions to increase levels of activity may be more inclusive than traditional lifestyle modification interventions because they do not rely solely on high levels of cognition or motivation and may be more accessible to clients who are mentally unwell in counseling sessions. Second, this study employed both infrared motion sensors and systematic behavioural observations to examine stair use. The use of both objective and subjective research allowed for the examination of near continuous stair use in the hospital. Most stair use research to date has relied solely on systematic behavioural observations during limited periods of time (Soler et al., 2010).

Overall, this study showed that a simple environmental intervention is feasible in a psychiatric setting and that they can affect certain demographics of the hospital. Given the many mental and physical health challenges faced by individuals living with schizophrenia, greater efforts must be made to create inclusive and accessible strategies to engage this population to become active. As this research has found, such efforts may have a secondary effect of increasing physical activity levels of staff as well. In addition to stair use, other environmental strategies should focus on increasing low intensity or incidental physical activity, as individuals with schizophrenia are largely inactive and any increase in levels of physical activity would be beneficial (Lindamer et al., 2008). Environmental strategies should not only focus on the physical environment of the hospital, but also consider political, economic, and socioculture structures as well (Swinburn et al., 1999). For instance, the hospital could address the barriers clients face entering and exiting their units, offer a free bike share program to allow clients to use alternative forms of active transport at no cost, and make the grounds more attractive, safe, and accessible to promote recreational and utilitarian walking and other forms of
physical activities. Although more research is necessary, environmental interventions can play a role in increasing levels of physical activity and help address the obesogenic environment that faces individuals living in psychiatric settings.
Appendix A. Letter of Ethics Approval, Office of Research Ethics, University of Toronto.

University of Toronto
Office of the Vice-President, Research
Office of Research Ethics

PROTOCOL REFERENCE #25028
March 1, 2010

Dr. Guy Faulkner
Department of Exercise Science
Faculty of Physical Education and Health
University of Toronto
66 Harbord Street
Toronto, ON M5S 2W6

Mr. Paul Gorczynski
Department of Exercise Science
Faculty of Physical Education and Health
University of Toronto
66 Harbord Street
Toronto, ON M5S 2W6

Dear Dr. Faulkner and Mr. Gorczynski:

Re: Administrative Approval of your research protocol entitled, “Examining the efficacy of stair / floor barriers on stair use in a psychiatric setting”

We are writing to advise you that the Office of Research Ethics has granted administrative approval to the above-named research study. The level of approval is based on the following note(s) of the University, as you have identified with your submission:

- Graduate Student research – hospital-based only
- Storage or analysis of De-identified Personal Information (data)

This approval does not substitute for ethics approval, which has been obtained from your hospital Research Ethics Board. Please note that you do not need to submit Annual Renewals. Study Completion Reports or Amendments to the CRE unless the involvement of the University changes so that ethics review is required. Please contact the CRE to determine whether a particular change to the University’s involvement requires ethics review.

Best wishes for the successful completion of your project.

Yours sincerely,

S. Lamblin
Research Ethics Coordinator

McMurrich Building, 12 Queen’s Park Cres. W, 2nd Floor Toronto, ON M5S 1S8
TEL: 416-946-3273 FAX: 416-946-5743 EMAIL: ethics.review@utoronto.ca
Appendix B. Letter of Ethics Approval, Research Ethics Office, Centre for Addiction and Mental Health.

PROTOCOL REFERENCE #003/2010

February 2, 2010

Dr. Tony Cohn
Mental Health and Metabolism Clinic
Centre for Addiction and Mental Health
1001 Queen Street West
TORONTO ON M6J 1H4

Dear Dr. Cohn:

Re: Research protocol #003/2010 entitled “Examining the efficacy of stair riser banisters on stair use in a psychiatric setting” by Cohn T, Faulkner G, Remington G, Gorczynski P

We are writing to advise you that the Centre for Addiction and Mental Health Research Ethics Board (CAMH REB) has granted approval to the above-named research study for a period of one year from the date of this letter. If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval by submitting the CAMH REB “Annual Renewal of Ethics Approval” Form on or before January 01, 2011. Should the study be completed prior to the annual renewal date, please submit a final report. The level of continuing review for this study is Level 2.

During the course of the research, any significant deviations from the approved protocol (that is, any deviation which would lead to an increase in risk or a decrease in benefit to human subjects) and/or any unanticipated developments within the research should be brought to the attention of the Research Ethics Office. Best wishes for the successful completion of your project.

Yours sincerely,

Susan Pilon, MHSc
Manager, Research Ethics Office, CAMH

cc Paul Gorczynski, Research Coordinator, Faculty of Physical Education and Health, UofT

1 CAMH Investigators are reminded that should they leave CAMH, they are required to inform the Research Ethics Board of the status of any on-going research. If a study is to be closed or transferred to another facility, the REB must be informed. Any adoptions must be discontinued.

2 Level 2: Review of routine annual reports, changes and amendments to the approved protocol, adverse events, filing of a final report and audit of study files/documentation.
Chapter 6

Thesis Contributions

6 Addressing Gaps in the Literature

Obesity is a serious health condition facing individuals living with schizophrenia. With rates of metabolic syndrome, cardiovascular disease, and diabetes well above the general population average (Carney et al., 2006; Cohn et al., 2004; McEvoy et al., 2005; Tirupati & Chua, 2007), many researchers have called for innovative strategies to address obesity and related comorbidities in this population. Most approaches to date have concentrated on behavioural and pharmacological options to control weight in individuals with schizophrenia (Faulkner & Cohn, 2006; Faulkner, Cohn, & Remmington, 2007; Loh et al., 2006; Verhaeghe, De Maeseneer, Van Heeringen, & Annemans, 2011), with most studies showing only a small to moderate effect. Behavioural programs have primarily concentrated on the individual and addressed aspects of unhealthful eating and physical inactivity. Although small to moderate effect sizes in behavioural studies have been noted, researchers have identified several limitations with the current behavioural literature. First, behavioural programs are limited in their reach because not everyone in the target population may be able to participate. Lower educational attainment, cognitive ability, language barriers, and accessibility issues related to chronic illness may prevent people from participating in a behavioural program fully (Gallblally, 1997). Second, behavioural programs aimed at changing unhealthful behaviours in people with schizophrenia have been structured using an atheoretical manner (Ellis et al., 2007; Faulkner, 2005; Gorczynski & Faulkner, 2010). With respect to physical activity, it is uncertain why only atheoretical approaches have been used in this population to date. Given that theory-based interventions have been more effective than atheoretical interventions at boosting activity levels in the general population (Kahn et al., 2002), the use of theory-based programming may prove to be successful. Third, behavioural programs have concentrated on the individual and have not taken into account the broader psychiatric facilities and services that provide care (Faulkner & Cohn, 2006;
Faulkner, Cohn, & Remmington, 2007). Lifestyle interventions focus on individual responsibility to change diet and physical activity. Currently, no research has addressed the “behaviour settings” that contribute to unhealthful living in schizophrenia (Faulkner & Cohn, 2006; Faulkner, Cohn, & Remmington, 2007). Research to date has not examined physical, economic, political, and social environmental influences on obesity in schizophrenia. Given these findings, researchers have suggested that in addition to addressing individual behaviours, environmental or ecological approaches are required to provide opportunities and access to healthy diets and physical activity in an effort to decrease weight (Faulkner et al., 2009). By using the ecological model as a theoretical template (Egger & Swinburn, 1997), this mixed-methods thesis addressed some of the limitations in the current schizophrenia literature. As such, the objectives of this thesis were two fold:

1) To identify modifiable environmental factors that may influence the dietary and physical activity behaviours of both in- and out-patient clients at the CAMH Queen Street facility; and

2) Examine the efficacy of intrapersonal and environmental components of a broad ecological intervention.

Given the complexity of ecological interventions, a series of steps are necessary to show that individual components of the overall intervention are feasible and efficacious (MRC, 2006). Guided by the MRC framework of creating complex interventions, an approach was taken in this thesis to first conduct a full examination of client and survivor perspectives of the obesogenic environment and identify interventions that were deemed needed, acceptable, and feasible. In study one, by involving clients, a collaborative partnership was created where clients provided input and identified issues, concerns, and needs in the CAMH environment, suggested possible solutions that acknowledge current community strengths and resources, and helped direct discussion and future research where deficiencies are perceived. After the participants identified appropriate interventions, the interventions were then pilot-tested and evaluated for their efficacy in studies two and three. Below is a summary of each of the three studies, and their purposes
and objectives, main conclusions, and scientific contributions. A summary table is also provided (See Table 1).

6.1 Study 1: Dissecting the 'obesogenic' environment of a psychiatric setting: Client Perspectives

The purpose of the first study was to examine clients’ perceptions of obesogenic environmental elements and the types of interventions clients would like to see implemented to address the state of overweight and obesity in the hospital. This qualitative study had two specific objectives:

1) To identify and examine environmental factors in and around the CAMH (Queen Street Facility) that may influence diet and physical activity; and

2) To identify priorities for interventions and further research based on identified modifiable environmental factors.

Using the ANGELO Framework as a guide (Swinburn et al., 1999), participants identified obesogenic elements that involved every type of environment. With respect to physical activity, participants identified several obesogenic factors in the physical, political, and sociocultural environments, such as limited hospital exercise facilities, inaccessible staircases, a lack of client centred programming, limited privileges, and issues of mental illness and stigma that impeded active living. Despite the environmental focus of this study, some participants also spoke of individual responsibility to become more active, sometimes neglecting to mention environmental influences altogether. With respect to diet, clients identified aspects of the physical environment as having the greatest impact on their dietary behaviours. Similar to recommendations to improve levels of physical activity, some participants pointed to taking personal responsibility as a way to improve dietary behaviours. This finding helped illustrate a need to incorporate a biopsychosocial approach to complement the current medical model used to deliver treatment for obesity at the hospital. By continuing to acknowledge intrapersonal strategies to foster behaviour change by addressing psychological and biological
variables, environmental strategies in the form of community and organizational changes and policy reforms can help provide necessary supportive behaviour settings to reinforce healthful behaviours (Sallis & Owen, 2002).

To improve physical activity and dietary behaviours, the results from this study show that participants would like to see a combination of 1) intrapersonal interventions that would encourage and motivate them to be more healthful through an individualized care approach and 2) environmental changes that would remove physical activity barriers and dietary temptations through organizational policy changes. The findings from this study are in line with previous research that examined the perceptions of barriers to physical activity and recommendations for physical activity programs for people with serious mental illness (McDevitt et al., 2006; Ussher, Stanbury, Cheeseman, & Faulkner, 2007). This qualitative study helped identify a set of priorities for both intervention work and further research at the CAMH that addressed multiple levels of the ecological model. First, barriers should be removed to help clients access existing exercise facilities and locations where incidental physical activity can be accumulated. This may include increasing the number of hours a gym is open; ensuring equipment is available and functioning properly; reducing the administrative burden for clients to access recreational services; or providing resources to clients so they can become familiar with the exercise facility and its location (Cormac et al., 2004). Second, more programming options are needed for both men and women to address a culture of sedentary behaviour and unhealthful eating. This type of care could be delivered through improved programming at the hospital that caters to different client needs and interests. For instance, sport and physical activity programs and culinary and dietary classes could be set up to provide options and positive spaces for both men and women. These recommendations have been raised in previous research (McDevitt et al., 2006; Owens et al., 2010). Third, policy changes should be made to the food environment at the hospital to reduce cravings and unhealthful snacking. Participants recommended changing the food content available for purchase in vending machines, cafeterias, and client run services to more healthful options. Additionally, participants recommended altering the manner food was processed and delivered to improve taste and quality. Improving taste to decrease cravings and
moving to tray service to improve food quality and reduce portion size are in line with previous recommendations at the CAMH and other hospitals (Cohn et al., 2010; Reed & Chenault, 2010).

Future research may also wish to explore the Obesity Policy Action (OPA) framework and policy grids to analyze potential policy initiatives at different government and organizational levels and sectors and settings to address obesity (Sacks, Swinburn, & Lawrence, 2009). The OPA framework examines health, economic, social, and environmental outcomes based on policies that target socio-ecological factors (‘upstream’ policies); physical activity and dietary behaviour settings (‘midstream’ policies); and health services and clinical interventions (‘downstream’ policies). Socio-ecological factors include the social determinants of health, which are the conditions in which people live that influence the physical, social, and personal resources that individuals and communities possess to achieve a higher health status. Policies at the upstream level would involve evaluating financial, educational, employment, housing, and other social sectors aimed at improving the living conditions of socially disadvantaged groups. Physical activity and dietary behaviour settings include locations where people live, receive treatment, work, and play. Midstream policies would directly aim to increase levels of activity and decrease consumption of food in each of these settings. These policies would address hospital settings, clinics, outpatient centres, community and recreational facilities, and housing developments such as group homes. Health services and clinical interventions would involve the actions taken by allied healthcare professionals. Downstream policies would target access and availability to health services offered in primary, secondary, tertiary care facilities as well as pharmaceuticals and therapeutic goods that could address obesity. These types of polices tend to be more reactive than proactive, with a greater focus on management rather than prevention. These types of policies also carry substantial financial costs. The OPA framework moves beyond the ANGELO framework by addressing broad socio-ecological factors that impact health and living conditions and further dissects various social and built environments and sectors that impact physical activity and dietary behaviours. The framework provides an opportunity to identify and then evaluate specific policy
initiatives designed to address different levels of governance in different sectors and settings.

This study has made important contributions to the schizophrenia literature. First, this is the first study to examine clients’ perspectives on the broader environment in a mental health setting in an effort to address obesity in schizophrenia. Previous research has primarily focused on behavioural and pharmacological options to control weight in this population and has relied on the perspectives of stakeholders (Faulkner & Cohn, 2006; Faulkner, Cohn, & Remmington, 2007; Faulkner et al., 2009; Loh et al., 2006). Second, by involving clients in the research process, an insider perspective was gained as to what obesogenic elements exist within psychiatric facilities and how they need to be addressed. Their input gave voice to marginalized individuals who have traditionally been excluded from the research process and helped encourage buy-in from clients to the interventions. Third, this study has shown that the ANGELO Framework is a methodology that can help hospital administrators to work with consumers in psychiatric settings to identify unique obesogenic elements and then structure feasible and acceptable strategies to address obesity. Previously no research tools existed that could systematically identify obesogenic elements in a mental health setting and how interventions should be constructed. Despite its contributions, one limitation of the following study was the low number of women who participated. Although more men volunteered to take part in the study and several women declined to participate, future research needs to address the unique physical activity and dietary needs of women with serious mental illness in order to decrease obesity.

Conducting this study provided me the opportunity to develop several qualitative research skills. Throughout this study, I learned how to structure an interview schedule, lead individuals through a photovoice process, conduct interviews, and analyze a large qualitative dataset. I also learned other soft skills like interacting with university and hospital research ethics boards, recruiting participants in a hospital environment, and working collaboratively with multiple healthcare professionals to achieve my research goals. Because of the direct experience gained through conducting this study I was able to obtain a position as a reviewer and board member on the Health Science Research
Ethics Board at the University of Toronto. Being a reviewer and board member on the Health Science Research Ethics Board has provided me with an opportunity to learn about the research process and various research methods and develop key partnerships with researchers across diverse disciplines. My qualitative research skills will help me conduct and analyze future research that will help further examine the perspectives of clients in other hospital or community settings. In particular, future qualitative research is necessary to identify obesogenic elements in boarding homes or rooming houses where many individuals with schizophrenia live. Photovoice is one particular method that could be used to mobilize the community, raise awareness, and gain the attention of key community and political stakeholders. Some preliminary research has already started at the Parkdale Community Health Centre where an initiative is being spearheaded by the Boarding Home Subgroup of the West End Diabetes Plan, with which I have been involved.

6.2 Study 2: Examining the efficacy and feasibility of exercise counseling in individuals with schizophrenia

Based on the findings from Study 1, the purpose of the second study was to examine the feasibility and efficacy of a theoretically informed and structured exercise counseling intervention. Using a single-case experimental design, the study followed four individuals before, during, and after they received the behavioural intervention. Specifically, this study explored the following questions:

1) Would individuals with schizophrenia adhere to the exercise counseling protocol and would they find it acceptable?

2) What effect does exercise counseling have on increasing moderate and vigorous levels of physical activity?

3) What effect does exercise counseling have on mediating psychological variables underpinning changes in physical activity?
All four participants complied with the exercise counseling sessions and found them enjoyable and helpful in terms of setting physical activity goals and strategies to overcome various barriers to regular activity. Participants mentioned they learned to set and execute action plans and rely on their social support networks when needed. Participants also said the counseling sessions provided them with an opportunity to reflect on other problems and health related issues. Providing a positive space to discuss major issues allowed participants to think holistically about their lives and to focus on strategies to overcome various barriers to not only become more active, but be more healthy in general. Despite conflicting results between objective and subjective measures of physical activity, an examination of the mediating psychological variables of physical activity revealed that as individuals progressed through the intervention, changes in mediating psychological variables moved in the directions predicted by the transtheoretical model. Three participants also increased their readiness to become or stay active as indicated by the stages of change. Overall findings supported the feasibility of using exercise counseling to engage individuals with schizophrenia in an effort to increase their levels of physical activity and associated psychological mediators of physical activity.

The results of this study have made a number of contributions to research examining intrapersonal interventions to increase levels of physical activity in people living with schizophrenia. First, this study has shown that the single-case experimental design method can be an effective manner to examine a physical activity intervention during the feasibility and pilot stages of intervention design as outlined by the MRC framework (2006). As outlined by Rhodes and Pfaeffli (2010), single-case experimental design studies are a resource efficient method to conduct early stage research to examine intervention feasibility. Future research examining physical activity should continue to use this unique methodology during the feasibility and pilot stages of intervention design given its ability to show an intervention effect using a small group of homogenous individuals and cost and resource effective nature. Larger scale studies using a randomized controlled method should be used in the later stages of intervention design.
Second, this study has shown that it is feasible to use a theory-based approach to engage individuals with schizophrenia to increase levels of physical activity and associated psychological mediators. In a recent review of exercise interventions in schizophrenia (Gorczynski & Faulkner, 2010), researchers identified a lack of behavioural theory to structure exercise interventions as a major limitation in the schizophrenia literature. Given that theory-based physical activity interventions are more successful than non-theory based interventions in the general population (Kahn et al., 2002), researchers examining individuals with schizophrenia should continue to explore the use of theory to design physical activity behavioural interventions in this population. Additionally, as Rhodes and Pfaeffli (2010) suggested, researchers should incorporate mediator analyses into future research to help confirm if any action theory links or conceptual theory links exist between theoretical frameworks and desired behavioural goals.

Third, although this study used objective measures of physical activity in individuals with schizophrenia, the results of this study show that limitations exist with objective methods of measuring physical activity. Participants in this study were only required to wear their accelerometers for a minimum of 10 hours per day. This did not provide a continuous measurement of physical activity. Although previous research has encouraged the use of objective measures of physical activity (Beebe & Harris, 2012; Gorczynski & Faulkner, 2010), the results of this study reinforce that objective measures have their weaknesses and future research needs to identify more accurate and precise methods of measuring physical activity behaviour in this population. Continuous objective measurement may help overcome this measurement limitation. Yang and Hsu (2010) have identified several motion sensors that can monitor physical activity continuously which may be more preferable to wear than waist accelerometers. Future research needs to examine which type of accelerometer is most preferable in this population.

Conducting this study provided me the opportunity to develop several research skills. First, I learned to structure and deliver a theory-based exercise counseling intervention to individuals with schizophrenia in a clinical setting. This opportunity allowed me to determine that exercise counseling can be easily integrated into a primary care environment and offered alongside other medical services. This recommendation has
been previously stated by researchers who suggested that activity interventions should be integrated into existing mental health services to improve overall access to clients (Richardson et al., 2005). Future researchers may also wish to conduct economic analyses to examine the costs associated with integrating behavioural interventions into a clinical setting. Economic analyses will determine if it is financially feasible to incorporate exercise counseling into clinical practice (Faulkner, Cohn, & Remmington, 2007; Verhaeghe et al., 2011). Second, I furthered my knowledge of single-case experimental designs. This methodology helps provide a resource efficient manner to examine the feasibility and efficacy of interventions during the pilot stages of development. This will prove to be a valuable skill set in future research with designing other behavioural interventions in other settings. Third, I learned to use, analyze, and interpret both subjective and objective physical activity data. Data from both the IPAQ and the accelerometer provided valuable information about the exercise counseling intervention. Knowledge of both methods will help me structure and execute future cross-sectional and experimental research. One potential area of study is the examination of sedentary behaviours and perceptions of sedentary behaviours in people with schizophrenia. In study 1, a number of participants identified a culture of sitting in the hospital. As previous research has shown, sitting is a risk factor for coronary heart disease (Dunstan, Thorp, & Healy, 2011). The results of study 2 have shown that there are differences between actual behaviours and perceptions of behaviours. Future research may wish to explore this link further using both subjective and objective methods and to develop and test interventions that reduce time spent being sedentary.

6.3 Study 3: Examining the efficacy of point-of-choice prompts on stair usage in a psychiatric setting

Also based on the findings of Study 1, the purpose of the third study was to examine whether environmental modifications are possible in a psychiatric environment and to assess the efficacy of point-of-choice prompts to increase stair use between two floors of a five-floor building at the CAMH. Specifically, this study answered the following questions:
1) Will point-of-choice stair riser banners and posters prompt individuals who live, visit, and work at the hospital to use stairs more often between the fourth and fifth floors?

2) Will stair use vary according to day of the week?

3) Will stair use between the fourth and fifth floors vary by sex and hospital status?

This study showed that an environmental intervention that has an impact on physical activity is feasible in a psychiatric setting. Using both an infrared monitor and behavioural observations, there were no significant changes in stair use between the study phases. Stairs were used more often on weekdays than weekends and clients and visitors did use the stairs significantly more than employees and volunteers. When stair use was examined by sex and hospital status separately, only male employees and volunteers significantly increased their stair use. The results of this study show that, where possible, stair use should be made available to clients as it does provide an opportunity to attain incidental physical activity throughout the day.

This study has made several contributions to the stair use literature and advanced research that examines environmental interventions to increase physical activity in people with schizophrenia. First, this study employed both infrared motion sensors and systematic behavioural observations to examine stair use. The use of both objective and subjective research allowed for the examination of nearly continuous stair use in the hospital. Most stair use research to date has relied solely on systematic behavioural observations during limited periods of time (Soler et al., 2010). Future research that examines stair use should continue to use both objective and subjective methods to facilitate the data collection process to account for different parts of the day. Second, this is the first study to examine stair use in a mental health setting observing a clinical population. Most stair use research to date has concentrated on the general population in environments such as shopping centres, bus terminals, train stations, universities, and various non-hospital worksites (Foster & Hillsdon, 2004; Soler et al., 2010). Future research may wish to explore stair use in other clinical populations who are highly inactive. Third, this is the first study to examine any environmental modification to
increase physical activity in individuals with schizophrenia. Previous research to date has concentrated on behavioural interventions and not explored environmental strategies to increase levels of activity (Faulkner & Cohn, 2006; Faulkner, Cohn, & Remmington, 2007; Gorczynski & Faulkner, 2010). Environmental interventions to increase levels of activity may be more inclusive than traditional lifestyle modification interventions because they do not rely solely on high levels of cognition or motivation and may be more accessible to clients who are mentally unwell and not able to participate in counseling sessions. Additionally, although the target population of this intervention was clients, the benefits extended beyond to staff and other users of this setting. This positive finding shows the multiple benefits of environmental interventions.

Conducting this study provided me the opportunity to develop several research skills. First, I learned to design and conduct high-quality behavioural observational research that built on previously published stair use literature. During this study I used both traditional behavioural techniques and specialized equipment to examine stair use. This study allowed me to become familiar with the Trailmaster 1550 infrared monitor, to collect objective data and analyze it accordingly using several statistical methods. Throughout this study I also had the opportunity to use computer software such as Indesign and Photoshop to design custom stair riser banners and posters. Lastly, I had the opportunity to work with various hospital staff to ensure the study was conducted effectively in a non-intrusive, safe, and respectful manner. This allowed me to learn to connect with strategic stakeholders in the hospital in order to conduct a study using limited time and resources in an efficient manner. These skills will allow me to conduct future environmental studies in the hospital or in the community. The use of infrared monitors can be particularly important if used to measure stair use in boarding homes or roaming houses. Some of this research has been proposed by the Boarding Home Subgroup of the West End Diabetes Plan. Future research should also consider seeking input from clients and staff at any boarding home or roaming house before the construction of posters and banners to ensure messages resonate with the target population.
6.4 Final Conclusions

Overall, the objectives of this thesis were met. Through the use of multiple research methodologies, modifiable factors that may influence the dietary and physical activity behaviours of both in- and out-patient clients at the CAMH Queen Street facility were identified and both intrapersonal and environmental components of a broad ecological intervention to increase physical activity were examined for their efficacy. Both qualitative and quantitative research components played important roles in this thesis. The mixed-methods approach was necessary in order to gain a full understanding of the hospital environment and to efficiently examine different interventions (Creswell & Plano Clark, 2011). Qualitative methods helped provide important information about the context of the current problem at the CAMH and valuable details that helped structure both physical activity interventions. Quantitative methods allowed the impact of both interventions to be measured and assessed for their efficacy.

Obesity is a serious problem facing many individuals living with schizophrenia today. Novel solutions are needed to move beyond lifestyle interventions and address multiple factors that cause weight gain. By addressing multiple levels of an ecological model, more inclusive strategies can be created that can have a broad impact and deliver real change. By targeting physical activity and aiming to create environments that are more conducive to active living, changes to weight gain amongst individuals with schizophrenia may be possible. Several recommendations were raised in the first study of this thesis to provide serious options to individuals living with schizophrenia to become more active. These recommendations aimed to address a broad range of personal and environmental barriers that limit physical activity and affect diet. Although this thesis presented a theory driven approach to intrapersonal and environmental intervention construction in an institutional setting, more work is needed. With research showing that psychiatric services are changing in Canada, more interventions are needed to address obesity in the community. Since the late 1980’s, reports have shown that provincial governments in Canada have decreased funding to psychiatric hospitals and psychiatric units in general hospitals and steadily increased funding to community psychiatric
services (Sealy & Whitehead, 2004). Recent findings from the Institute of Health Economics show that in 2007 the amount of money spent on community services continued to outpace spending on inpatient services in psychiatric and general hospitals (Jacobs et al., 2010). These reports illustrate that the deinstitutionalization of psychiatric services in Canada is resulting in more individuals with mental illness receiving care in community settings rather than psychiatric or general institutions. This thesis highlighted the need to think about the broader social and built environments in which people live and receive treatment. It took an ecological approach to addressing obesity in individuals with serious mental illness and moved away from solely relying on individual or pharmacological treatments. The ANGELO framework used as a needs assessment tool in study one was presented as a resource that can help healthcare administrators and policy makers identify sectors and settings where a variety of interventions can be put in place that can address obesity and improve the overall health of clients. The ANGELO framework is not limited to only large institutions, but can be used in community settings as well. Combined with the MRC framework to create complex interventions, as illustrated in studies two and three, unique approaches to obesity can be designed, piloted, and implemented in any setting.

Findings from this thesis also showed that people with schizophrenia are quite similar to those in the general population with respect to physical activity engagement and measurement. Throughout this thesis, participants recognized unhealthful behaviour settings and reacted similarly to physical activity interventions as people in the general population. Results also showed that people with schizophrenia are similar to people in the general population with respect to subjective physical activity measurement. This is an important finding for researchers as it shows that people with schizophrenia may be just as difficult to engage in physical activity and exercise as those in the general population. It also shows that people with schizophrenia are subject to poor recall and biases that are displayed by people within the general population. Poor engagement in or motivation toward physical activity and exercise may not necessarily stem from aspects related to mental illness, but rather a general lethargy that afflicts all individuals. More randomized controlled trials are necessary to examine differences between people with
schizophrenia and the general population with respect to promoting more healthful behaviours. Additionally, other behavioural and environmental factors not explored in this thesis may need to be studied and considered in the future. Determinants could include demographic, psychosocial, behavioural, cognitive, and emotional factors. Perhaps the greatest lessons and contributions that come from this thesis are that theory-driven research must continue in this field. Too often interventions to increase physical activity in this population are created without any theoretical rationale. In the general population, research has shown that theory-driven research is more successful at increasing levels of physical activity. The same approach needs to be taken with this vulnerable population if we are to see any meaningful changes in not only levels of physical activity, but also obesity.
<table>
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<th>Study</th>
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<tr>
<td>One</td>
<td>Clients diagnosed with schizophrenia who live or have lived at CAMH</td>
<td>Interviews, photovoice; thematic analysis</td>
<td>1) What environmental factors in and around the CAMH (Queen Street Facility) influence diet and physical activity? 2) What are the priorities for interventions and further research based on identified modifiable environmental factors?</td>
<td>1) Physical activity and diet, obesogenic elements involved every type of environment in ANGELO. 2) Participants recommended intrapersonal interventions to encourage and motivate people to be more healthful and environmental changes to remove physical activity barriers and dietary temptations.</td>
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<tr>
<td>Two</td>
<td>Clients diagnosed with schizophrenia who are overweight or obese</td>
<td>Questionnaires, accelerometer; Single-case experimental design, visual inspection, t-tests</td>
<td>1) What is the feasibility of exercise counseling amongst individuals with schizophrenia? 2) What effect does exercise counseling have on increasing moderate and vigorous levels of physical activity? 3) What effect does exercise counseling have on mediating variables underpinning changes in physical activity?</td>
<td>1) All four participants complied with protocol. Exercise counseling is feasible in a mental health setting. 2) IPAQ: three participants increased MVPA levels; Accelerometer: all four participants decreased MVPA levels. 3) Three participants increased their readiness to become or stay active. Mediating psychological variables improved.</td>
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<tr>
<td>Three</td>
<td>Clients, visitors, staff, volunteers</td>
<td>Observation, motion-sensors; ANOVA, Chi-Square</td>
<td>1) Will point-of-choice stair riser banners and posters prompt individuals who live, visit, and work at the hospital to use stairs more often between the fourth and fifth floors? 2) Will stair use vary according to day of the week? 3) Will stair use vary by sex or hospital status?</td>
<td>1) No significant changes in stair use between the study phases. 2) Stairs were used more often on weekdays than weekends. 3) Clients used the stairs significantly more than staff. Only male employees significantly increased their stair use.</td>
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Table 1. Thesis Overview with Main Conclusions.
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