EXERCISE, NUTRITION AND
MENTAL HEALTH

by

Lucinda Evans

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

Master of Arts in Counselling

City University of Seattle

2015

APPROVED BY

Advisor and First Reader: Steve Conway, Ph.D.
Second Reader: Colin Sanders, Ph.D.
Division of Arts and Sciences
Abstract

This manuscript thesis aims to explore how integrating therapeutic lifestyle changes including exercise and nutrition, could have a positive effect on improving mental health and well being. Throughout this body of work, I aim to synthesize the research that correlates the effects of exercise and nutrition with mental health. I will then apply the research implications of integrating the lifestyle changes into counseling. I firstly explore how healthy lifestyle practices surrounding a nutritious diet and physical activity have been challenged over the past few decades, specifically in North America. I also draw upon the relationship between lifestyle, physical health and mental health. Once I have looked into the research pertaining this area of interest I will then explore how we can integrate a therapeutic lifestyle change of improved diet and increased physical activity into the counseling process. I will synthesize past research in this area and explore the limitations to a therapeutic lifestyle change approach to therapy.
Acknowledgements

I would firstly like to acknowledge my educators at City University of Seattle. I have valued their compassion and kindness towards their students. I am in deep admiration of the work each colleague does within the counselling field and their dedication to educating future counsellors alike. I would like to thank my faculty reader and thesis supervisor Steve Conway, whom offered nothing but reassurance and support throughout the process. I would also like to acknowledge my editor from the Writeroom, Gerda Weaver, who was an incredible support to me from the beginning.

I would like to acknowledge my supervisors within my practicum along with all of my clients I have worked with so far in my counselling career. I am in deep admiration of each individual I have worked with and feel truly privileged to be able to pursue a counselling profession.

I would also like to acknowledge the support, patience and encouragement from my family. I was incredibly overwhelmed many times throughout writing my thesis and found strength in my family being there every step of the way. My special thanks is to my wonderful parents, my partner Joshua, my brother Oliver and my dear friend Ania, all of whom never failed to be there for me at any hour. I am also able to share my passion that lays within my thesis subject with each of these individuals, learning from them and feeling more motivated to bring this knowledge into my counselling career.
Dedication

This thesis is dedicated to Gillian & Raymond.
# Table of Content

Abstract ................................................................................................................................. ii
Acknowledgements ............................................................................................................... iii
Dedication ............................................................................................................................ iv
Table of Content ................................................................................................................... iv
List of Tables ........................................................................................................................ vi
Introduction ......................................................................................................................... 7
  Lifestyle and the Western World ....................................................................................... 10
Chapter 1 Exercise and Mental Health .............................................................................. 15
  The Therapeutic Effects of Exercise: What happens when we move? ......................... 17
  What type of exercise and how much? ........................................................................... 20
  Summary .......................................................................................................................... 23
Chapter 2 Nutrition, Diet & Mental Health ....................................................................... 25
  Specific Nutrients .......................................................................................................... 26
  Dietary Patterns & Mental Health .................................................................................. 30
  Summary ........................................................................................................................ 34
Chapter 3 Counselling Implications of Lifestyle & Mental Health ................................. 35
  Integrating Exercise Therapy ......................................................................................... 36
  Incorporating A Therapeutic Lifestyle Change Into A Therapeutic Conversation ....... 41
  Integrating Nutrition into Psychotherapy .................................................................... 43
  Socio-economic barriers to the therapeutic lifestyle change ....................................... 48
  Summary ........................................................................................................................ 49
Discussion ............................................................................................................................ 51
  Physical Activity and Mental Health Implications ....................................................... 51
  Exercise as a Treatment Modality ................................................................................ 52
  Nutrition and Mental Health Implications ................................................................... 56
  Nutrition as a Treatment Modality .............................................................................. 58
Conclusion ............................................................................................................................ 59
References ............................................................................................................................ 61
Appendix ............................................................................................................................... 81
List of Tables

Table 1 – Trend of taking antidepressant medications ...........................................81
Table 2 – Trends in occupational activity from 1950 - 2000 .................................82
Table 3 – Daily television viewing from 1950 – 2000 .............................................82
Table 4 – Mental health factors that may affect nutritional intake..........................83
**Table 5** – Assessing possible factors in undernutrition .......................................84
Table 6 – Ingredients of the healthy mind platter .....................................................85
Introduction

Mental health (or well-being) is a concept that represents a balance of mental, emotional, physical, and spiritual health. It is achieved through engaging and caring relationships, a supportive community, and a stable home, work and leisure time balance (Mood Disorder’s Society of Canada, 2009). Conversely, mental illness can be described as a “serious disturbance in thoughts, feelings and perceptions that is severe enough to affect day-to-day functioning,” such as depression, schizophrenia, bi-polar, and anxiety disorders (Mood Disorder’s Society of Canada, 2009, p.3). A recent publication of a systematic review and meta-analysis of 174 surveys exploring the global prevalence of mental health disorders between 1980-2013 showed one in five respondents (17.6%) meeting the criteria for a common mental disorder within the 12 months preceding the assessment and approximately 30% of respondents experience a common mental disorder (most commonly involving mood, anxiety, and substance use disorders) at some point during their lifetime (Steel et al., 2014). Depression is one of the leading causes of disability and by the year 2020, depression is predicted to become the second leading cause of disability in the world, second to heart disease (Mood Disorder’s Society of Canada, 2009; Andersen, Thielen, Bech, Nygaard, & Diderichsen, 2011). Within North America, The Mood Disorders Society of Canada (2009) estimated in 2014 that there is a one in five (18%) chance of experiencing mental illness in a person’s lifetime in Canada, with 8% of Canadians diagnosed with major depression disorder (MDD) and 12% experiencing anxiety disorder in a lifetime. The prevalence of mental health is predicted to rise in Canada over the next 30 years (Mental Health Commission of Canada, 2012). Similarly, data from the National Survey and Drug Use and Health (NSDUH) in the United States proposed at least one in five adults aged 18 or older had a mental illness in the past year (2013).
Given that mental health is not limited to emotional and mental well-being, but a balance of physical well-being also (Mood Disorder’s Society of Canada, 2009), when addressing mental health conditions, it is also important to consider the correlation with physical health conditions. People with physical health conditions are more vulnerable to developing mental disorders, such as depression, because the quality of life, social network and employability to name a few, is affected (WHO, 2013; Scott et al, 2009). Similarly, mental health conditions have been increasingly shown to precede physical health problems and are important to recovery of physical health conditions (The UK’s Faculty of Public Health, 2010). For example, within a large population-based (n=20,627) cohort study in the UK, an 11% increased risk of stroke was associated with those who showed signs of increased psychological distress (Surtees, Wainwright, Luben, Wareham, Bingham & Khaw, 2008). Additionally, Kroenke and colleagues (2005) explored the relationship between depressive symptoms and prospective incidence of colorectal cancer in a large sample of US Female nurses (n=81,612) and found a positive correlation between the women with greater depressive symptomology having an elevated relative risk of colorectal cancer (Kroenke et al, 2005). The lifespan of people with severe mental illness is reported as considerably shorter than that of the general population (De Hert et al, 2011; The UK’s Faculty of Public Health, 2010) and although many factors contribute to poor physical health in those people with severe mental health problems, it is suggested that “the increased morbidity and mortality seen in this population are largely due to a higher prevalence of modifiable risk factors, many of which are related to individual lifestyle choices” (De Hert et al., 2011, p.52). One example of this might be obesity, which has a suggested relationship with mood disorders such as bipolar disorder and major depressive disorder (McEloy et al, 2004; Roberts, Deleger, Strawbridge & Kaplan, 2003). In a longitudinal study exploring the association between obesity and
depression, a systematic review and meta-analysis of fifteen studies found a reciprocal significant interaction between depression and obesity to which obese persons had a 55% risk of developing depression over time and depressed persons had a 58% increased risk of becoming obese (Luppino et al, 2010). Obesity is over four times more prevalent in developed and high income countries when compared to low income countries (WHO, 2015) and has received increasing attention over the past several decades given its serious health implications such as diabetes, coronary heart disease, stroke, cancer, and mental health conditions to name a few (Center for Disease Control and Prevention, 2011). The World Health Organization reported an increase in obesity from between 1995 to year of 2000 from 200 million to over 300 million worldwide, naming this escalating global obesity epidemic “globesity” and recognizing that immediate action is needed (WHO, 2008).

When I came to thinking about writing my thesis, I was eager to explore this intimate bidirectional relationship between mental health problems, specifically depression and anxiety, and physical health (Kolappa, Henderson & Kishore, 2013). Given how staggering the figures are of those suffering from mental illness, particularly in the Western societies where there is such largely developed and researched health programs, pharmaceuticals, mental health practices and resources. I wondered why is it that in the western world where there is a higher life expectancy, well-developed medical care, and elite technology designed to make life easier (WHO, 2014; Sarris, O’Neil, Coulson, Schweitzer, & Berk, 2014), that such an increase in mental illness, particularly depression and anxiety and physical illnesses such as diabetes and heart disease are so prevalent and even regarded as ‘conditions’ of western industrialized nations (Tucker and Buranapin, 2001; Trivedi, Sareen & Dhyani, 2008).
Although it is possible that the increase in the reported mental illness globally, specifically depression and anxiety, are in part a result of the improved diagnostic recognition of mental disorders (Sarris et al, 2014), I do not believe this to be the only factor. Thus, the relationship between physical and mental health made me also wonder how the westernized contemporary lifestyle may also offer part explanation as to why mental illness is on the rise (Lopresti, Hood & Drummond, 2013).

Accepting that there is a profoundly large scope of variables within the research of lifestyle factors and mental health, and that I was not going to offer any new ‘ground breaking’ research within my publication, I wondered if I could synthesize at least some of the most recent research that explores the relationship between lifestyle and mental health with a focus on nutrition and physical activity as two of the most impacted lifestyle elements on the western modernized lifestyle, on mental health (Simopoulos, 2004; Walsh, 2011; Illardi, 2010). With this, I questioned if there was an underestimated emphasis on the importance of these lifestyle elements for the treatment of mental health disorders as well as contributing factors to psychopathologies (Walsh, 2011). I questioned the need to integrate broader aspects of treatment programs for those with mental health problems such as diverse therapeutic teams that are more versed in these lifestyle elements. Thus, focusing on the westernized populations, I will explore in this thesis the existing research on the relationship between physical activity and mental health, nutrition and diet and mental health and lastly the treatment implications of integrating these lifestyle factors into treating mental health problems.

**Lifestyle and the Western World**

As physical activity and nutritional diet are the two lifestyle factors that will serve as the primary focus for this thesis, it is important that these factors be defined. Physical activity is
presented and defined as any “bodily movement produced by skeletal muscles that requires energy expenditure” (WHO, 2008, par. 1). Exercise is a subcategory of physical activity that can be defined as “planned, structured, repetitive, and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness is the objective” (WHO, 2008, par. 4). Therefore physical activity with the inclusion of exercise can be gardening, playing, active transportation, and recreational activities. Nutrition and diet are collaboratively explored within the thesis and referenced is both the individual nutrients of one’s diet in relationship to mental health as well as the whole diet of research subjects in literature explored. For example, one’s diet may be measured as highly nutritious by the amount of fruits and vegetables one eats when compared with a low nutritious diet that contains few fruits and vegetable and many processed and high fat foods.

The lifestyle challenges in the westernized society include an increased sedentary standard of living, poor diet, sleep/wake cycle pressures, substance misuse, and a number of psychosocial factors such as more competition and time pressure, social isolation, and a decreased engagement with the family unit (Sarris et al, 2014). One of the leading causes reported by WHO (2003) for the rapid increase in mental health disorders is urbanization, which is accompanied with higher levels of pollution, disruption of family structures and loss of social support (Srivastava, 2009), stating that “people’s lifestyles and the conditions in which they live and work strongly influence their mental health” (WHO, 2003, p. 8). However, the importance of lifestyle factors such as diet and physical activity on mental health has not gone unrecognized and in 2004 the World Health Organization (WHO) produced a Global Strategy on Diet, Physical Activity and Health to its World Health Assembly (Simopoulos, 2004; Simopoulos, 2006). This is accompanied by a recognition of the increase of available and “aggressive promotion of processed cheap good – generally high in fat, sugar and salt – but
reduced access and affordability of fruits and vegetables” along with “lifestyles becom[ing] sedentary with a rapid shift from energy-expenditure-intensive to automated occupations, changes in transportation and the increased use of motorized vehicles” (Simopulos, 2006, p. 164). Thus, the exceeding demands of modern day living are becoming more recognized, specifically in those living in developed countries of urbanized and industrialized environments, seeking optimal well-being through a healthily balanced lifestyle. Christiansen and Matuska (2006) defined lifestyle balance as “a consistent pattern of occupations that results in reduced stress and improved health and well-being” (p. 50), recognizing that in western cultures, this lifestyle balance is “deeply rooted in the history of society such as the changes brought about by the Protestant reformation, industrialization, and Victorian ideals” (p. 50). These patterns changed the daily living patterns of modern society and contributed to the sedentary, fact-paced, stress-induced lives that we live today (Christiansen & Matuska, 2006).

Juneau and Potvin (2010) conducted an analysis from three National Population Surveys in Canada between 1994 and 2005, finding a significant decrease in the male sample of active leisure time (-9.94%), inactive transportation (-15.31%), and inactivity at work with similar results found in the female population. The declining levels of activity were correlated with the increased levels of being overweight and obesity, illustrating a concerning implication of lifestyle and well-being. Implications from the western world’s increasing sedentary lifestyle and its potential effects on physical and mental health has brought further research into the youth population, with findings of improved mental health effects for those engaged in more physical activity (Ahn & Fedewa, 2011; Tomporowski, Lambourne, & Okumura, 2011; Ratey & Hagerman, 2008). Additionally, implications from the technological advances and changes of modernity over the past few decades have corresponded with changes in the foods we eat
and the nutritional value received in our diets, which can result in malnutrition contributing towards mental health problems (Lopresti, Hood, & Drummond, 2013).

Through establishing this correlation between lifestyle and mental health the treatment implications start to emerge, and physical activity and exercise treatment programs have produced growing evidence of being effective in improving mental well-being, specifically through improved mood and self-perceptions, along with reducing physical health risks such as coronary heart disease, diabetes, and obesity (Fox, 1999). It seems that alternative treatment programs are needed. For example, if we look at the treatment for Major Depression Disorder (MDD) in North America, data from a National Health and Nutrition Examinations Survey between 2005-2008 shows that 11% of Americans 12 years and older are on antidepressant medication, with an increase of over 400% from the previous survey conducted between 1988-1994 (see table 1.). Such data suggests that this ‘go to’ treatment is not showing the greatest effectiveness and given the reported rise of depression diagnosis’s in America, it is therefore possible that mental health professionals may be “underestimating the importance of unhealthy lifestyle factors in contributing to multiple psychopathologies, for fostering psychological and social well-being, and or preserving and optimizing cognitive capacities and neural functions” (Walsh, 2011 p. 579). It may also be suggested that if mental health professionals shifted focus more towards lifestyle factors, such as exercise and nutrition as a plausible integrative treatment for mental health problems, it would not only serve as primary prevention and as a secondary intervention, it would also empower patients to “self manage their own health” (Walsh, 2011, p.579).

Drawing from implications of previous research into lifestyle and mental health, the closing of this thesis will aim to explore the possible treatment implications of physical activity and diet for mental health disorders. Such proposals have been labeled by existing research as
'Lifestyle Medicine,' which involves “the application of environmental, behavioural, and psychological principles to enhance physical and mental well being, adding a therapeutic and potentially preventative approach to illness” (Sarris et al., 2013, p. 2), which includes diet and physical activity.

While there has been much research into lifestyle intervention for physical health and illness, it is an area that remains limited insofar as mental health implications are concerned. In one of the most recent publications, Walsh (2011) introduced eight major ‘Therapeutic Life Changes’ (TLCs) as a model for treatment of multiple mental and physical health disorders, which included exercise, nutrition, and diet, time in nature, recreation, relaxation, and stress management, religious, and spiritual involvement, relationships, and service to others. Additionally, Illardi (2009) presented a similar model of the TLC’s theory within his book “The Depression Cure” where he presented a six-step program of lifestyle factors including sleep, connection with the outdoors, exercise and ‘brain food’. There is also a growing amount of literature over the last few decades exploring the lifestyle elements of diet and physical activity of our hunter-gather ancestors. Eaton and Eaton (2000) present extensive research in exploring the activities of our human ancestors and the comparison to people in contemporary western nations. They present an evolutionary perspective whereby our genetic evolution “has been wholly unable to match the rapidity of cultural change” (p. 154), thus our contemporary lives are mismatched with our genetic makeup and may have important pathophysiological implications (Eaton & Eaton, 2000). Literature reviews comparing modern day diet and physical activity with that of the Palaeolithic humans illustrated implications of increased fruits and vegetable dietary intake and increased exercise (Eaton & Eaton, 2000; Eaton & Eaton, 2003).
Chapter 1 Exercise and Mental Health

It has been said that “human bodies have been shaped by natural selection to engage in much high rates of physical activity than current levels in modern society” (Hidaka, 2012, p. 6). If this is true, then one wonders how humans have evolved to our modern day sedentary lifestyle. When looking over the past 100 years to the past few decades, our lifestyle has changed. And these changes, particularly our technological advances such as transportation and communication tools, have had a significant impact on the amount of physical activity we have in our daily lives (Gladwell, Brown, Wood, Sandercock, & Barto, 2013). I wonder with all this newly advanced technology to make our lives easier, might it potentially be emotionally and physically detrimental to our health?

Although physical inactivity within leisure time has been found only a slightly decreasing trend in North America over the past two decades (US Department of Health & Human Services, 2004; Brownson, Boehmer, & Luke, 2005) the physical activity associated with our daily lifestyle such as transportation, home, and work has significantly declined (Lopresti, Hood, & Drummond, 2013; Brownson et al, 2005; see table 1.) along with our increased sedentary lifestyle behaviours (Brownson et al, 2005; see table 2). A mental health incline has also been found particularly with depression. Compton and colleagues (2006) drew data from two large (Ns exceeding 42,000) cross-sectional surveys of a representative sample of the US population and found an increase in major depression from 3.33% to 7.06%, between 1991-1992 and 2001-2002, suggesting such a rapid change provides implications of our environmental changes taken place over the past decade (Compton, Conway, Stinson, & Grant, 2006). Other increasing physical illness health trends in North America include obesity (Kelly, Yang, Chen, Reynolds & He, 2008; Public Health Agency in Canada, 2011), cardiovascular disease (O'Keefe, Vogel, Lavie & Cordain, 2010), and diabetes (Danaei et al.,
2011), which according to the World Health Organization (WHO), could may well be prevented partly through increasing regular physical activity in the Western nations (WHO, 2015; Okay, Jackson, Marcinkiewicz, & Papino, 2009).

The question is, is there a possible correlation between our rapidly evolving lifestyle and decreasing physical and mental well being? Looking back at our Stone Age ancestral times through anthropological and historical research, it has been suggested that physical activity is a “natural” activity not only engaged in as a necessity for gathering food and providing shelter and safety (Eaton, Konner, & Shostak, 1988; Durant, 2013), but was enjoyed as a “integral component of religious, social, and cultural, expression” (US Department of Health & Human Services, 1996, p. 11.). In today’s western society, this may look like gardening, active transportation and recreational activities such as a game of soccer.

There are many explanations that have been put forward over several decades of research (Simopoulos, 2004; Simopulous, 2006) to explain this correlation between exercise and mental health although many have failed to affirm the direction of the correlation more than they have the treatment effects of exercise integration (Oeland, Laessoe, Olesen, & Munk-Jorgensen, 2010). The focus of this chapter is to explore these studies, analyze the findings and explore the possibilities of integrating exercise programs into counselling therapy as an effective and ethical treatment intervention. Although I acknowledge the existence of compounding variables in the research on physical activity and mental health, and that a correlation is still not entirely clear (Oeland, et al., 2010). It has been proposed that for some mental wellness can be enhanced through exercise, having the same therapeutic effects as some medications, (Blumenthal et al., 2007) but without the common side effects associated with medication use (Cooper-Patrick, Ford, Mead, Change, & Klag, 1997).
The Therapeutic Effects of Exercise: What happens when we move?

Firstly, when we exercise a number of physiological changes happen within the body, these being changes in serotonin metabolism (Stathopoulou, Berry, Smits, Otto, & Powers, 2006), improved sleep (Singh, Clements, & Fiatarone 1997; Stathopoulou et al, 2006), and endorphin release (Walsh, 2011). Beyond these physiological changes, there are several psychological and affective benefits from exercise. Eriksson and Gard, (2011), conducted a literature review exploring the efficacy of exercise as a viable treatment for depression. From the findings they suggested that the enhanced perception of exercise having a positive effect, and increased awareness of one’s body through engagement in exercise may be a mechanism of action that increases self-esteem through improved physical self efficacy, and therefore decrease symptoms of depression. For example, a study treating nonpsychotic psychiatric in patients (n=199) with one of two 16-week psychomotor therapy programs found correlation between improved physical self-concept correlating with increased global self-esteem and lower feelings of depression (Knapen et al., 2005; Eriksson & Gard, 2011). With self-esteem being considered a “focal aspect of psychological health and well-being” (McAuley, Blissmer, Katula, Duncan, & Mihalko, 2000, p. 131), the correlation between self-esteem and physical activity has been explored. McAuley and colleagues (2000) found within a long term (6 months) application of physical activity in sedentary older adults (n=116, 65-75 years) resulted in significant increases in self-esteems, related to improved perception of physical fitness, body fat and self efficacy. Additionally, Craft (2005) carried out a quasi-experimental design study with 19 female participants exploring the anti-depressant effects of exercise through self-efficacy and distraction. It was found that a significant relationship with the increase in self-coping efficacy and reduction in depression symptoms over the course of nine weeks, compared to nonexercising controls. This effect has been supported in subsequent research
that found exercise improved body image and reduction of depression symptoms in a sample of Iranian Women (n=41) when compared to controls (n=41) (Zarshenas, Houshvar, & Tahmasei, 2013).

Cognitive benefits of exercise may include improved academic performance, reduced age-related memory loss and other intellectual, emotional, and social functions in both Alzheimer patients along with younger and older adults (Walsh, 2011; Hogan, Mata, & Carstensen, 2013). These may be a result of the neural changes happening, where exercise is found to increase brain volume, vascularization, and blood flow (Walsh, 2011). Hamer and Chida (2009) conducted a systematic review of literature to explore the preventative effects of physical activity and neurodegenerative disease risk, finding strong support for physical activity reducing the risk of dementia and Alzheimer’s disease and preventing cognitive decline. These studies were able to demonstrate how neural changes occurred as a result of improved blood flow and increased oxygen supply within the cerebral circulation along with the promoted vascular health were associated with exercise (Hamer & Chida, 2009). Hopkins, Davis, VanTieghem, Walen, and Bucci, (2012) studied healthy sedentary young adults and found that exercise enhanced object recognition memory and decreased stress on those participants who practiced exercise for a period of four weeks, thus having physiological and cognitive effects.

The available research regarding the positive relationship between mental wellness and exercise is broad and promising but is still in its early stages. One of the most well researched correlations however is the anti-depressive effect of exercise. When we exercise, our body responds by making more serotonin available to the receptive sites along with increasing the production of serotonin, which in turn increases positive mood (Wipfli et al, 2009; Stathopoulou et al, 2006). The same effects are stimulated by anti-depressant drugs such as SSRIs (selective serotonin reuptake inhibitors), which have similar psychological effects.
(Wipfli, 2009). It must be noted that the actual binding of the serotonin levels in the brain cannot be soundly measured as yet, and therefore the exact explanation on increased serotonin and mental disorders such as depression, Generalized Anxiety Disorder (GAD) and Obsessive Compulsive Disorder (OCD) have not met a scientific consensus (Meeks, 2006), although the available evidence is strong. For example, Wipfli (2009) examined the anxiolytic and antidepressant effects of exercise within a non-clinical student sample (n=72, mean age 21 years) assigned to either an aerobic exercise or stretching-control group over a period of seven weeks. The results demonstrated a significant decrease in serum serotonin levels post exercise, suggesting exercise provides a similar mechanism to SSRIs, that shows a reduction of blood serotonin levels after ingestion. Further support for exercise intervention over antidepressant medications is that medications often have side effects such as weight gain, sexual dysfunction, headaches, and nausea (Zoberi & Pollard, 2010), all of which modest exercise interventions would not appear to have.

Another physiological effect of exercise has been observed in the release of endogenous opioids. It has been hypothesized that the inhibitory effects of beta-endorphins on the central nervous system are in part responsible for antidepressant and anxiolytic effects of exercise (Stathopoulou et al, 2006). This opioid activation may explain mood improvement, suggesting a neurochemical adaption to exercise along with the reduction of cardiovascular stress response after exercise training, which may lead to reduced stress response and increased resilience (Stathopoulou et al, 2006; Craft, 2005) in people who exercise regularly and build up this the opioid tolerance (Salmon, 2001).

Although the positive effects of exercise appear promising from the research discussed, there are many other variables that play a part, such as the increased social interaction of some exercise interventions (Stathopoulou et al, 2006; Oeland et al, 2010; Wang
et al, 2011; Zarshenas et al, 2013), skill mastery, the distraction from normal life (Craft, 2005), and expected results. Salmon (2001) conducted a literature review of exercise intervention studies and the associated psychological, antidepressant and resiliency effects. The expectancy effects of engaging in exercise were offered attention, particularly within western society where health, fitness and well-being is portrayed as positively influential on ones health, thus having compounding variables including expectancy effects. These expectancy effects are very difficult to separate within studies of exercise effects, as it requires the physical engagement of the activity. They also found within the literature support finding that exercise reduces ones sensitivity to stress, thus increasing ones resiliency when responding to life stressors, suggesting exercise may have a preventative factor to depression and anxiety. This finds support from correlated findings between decreased depression symptoms in those persons that exercise more (Hassmen, Koivula, & Uutela, 2000; Schmitz, Kruse, & Krugler, 2004; Jacka, Mykletun, & Berk, 2012; Stathopoulou et al, 2006). Additionally, other emotional effects of exercise training found in the review include increased self-esteem, distraction from negative thoughts, and positive thoughts (Salmon, 2001).

**What type of exercise and how much?**

Exercise is a highly regarded as being both healthy and therapeutic (Lopresti, 2013; Stathopoulou et al., 2006; Hassmen, Koivula & Uutela, 2000). However, it is inconclusive what type, frequency, and environment that exercise interventions can be most therapeutic for those with mental health problems. As we look at how our lifestyle has changed over the course of millions of years, it is a tremendously different world to what the first human once knew. Anthropological research suggests that in the Stone Age where we lived together as hunter-gatherers we spent all our time in groups, foraging and hunting for food, shelter, and warmth (US Department of Physical Health and Human Services, 1996; Eaton, Konner, & Shostak,
Humans are social animals who find comfort in interpersonal relationships and social roles. Henry (2001) explored implications of our new social media and information technologies, recognizing through social psychology research that social isolation of this sedentary, closed lifestyle of activity and communication may cause humans pain, which may lead to the development of “depression, helplessness, and sadness in short pronounced psychological discomfort that translates into physiological health decline” (p. 127). With this, it is suggested that beyond the physiological effects of exercise, the increased opportunity for social interactions and support may be considered a major contributing factor to exercises positive benefits on mood disorders (Wang et al, 2011; Zarshenas et al, 2013). This relationship between social interaction and exercise is something to be considered when conducting an effective mode of exercise intervention.

The type of physical exercise subjects engaged in during research has been predominantly aerobic exercise and its effect on affect, specifically in depressed persons (Stathopoulou et al, 2006). However, positive effects of exercise on mood using both aerobic and strength exercise conditions have also been found (Eriksson & Gard, 2011) and several other studies that compared anaerobic and aerobic exercise for treatment of depression showed no significant difference between the two forms of exercise (Doyne, Ossip-Klein, Bowman, Osborn, McDougall-Willson & Neimeyer 1987; Martinsen, Hoffart, & Solberg, 1989; Stathopoulou et al, 2006). Dunn, Trivedi, Madhuka, Kampert, Clark and Chambliss (2005) demonstrated within their longitudinal study that the dose-response relation of exercise and its effect for reduction of depressive symptoms should be no less than the total energy expenditure of 30 minutes of moderate exercise (17.5kal/kg per week), five times per week. This is consistent with the public health organizations recommendation (Dunn et al, 2005; Haskell et al., 2007). Research continues to expand on the effects of activity intensity as being a
strong determinant for positive effect (Eriksson & Gard, 2011; Stathopoulou et al, 2006). Singh and colleagues (2005) found that within a group of depressed older adults, high intensity progressive resistance training (PRT) was more effective in reducing depressive symptoms than low intensity PRT and solely general practitioner care. They also found that higher intensity PRT improved participants’ sleep quality and quality of life (Stathopoulou et al, 2006; Singh, Stavrinos, Scarbek, Galambos, Liber, & Fiatarone Singh, 2005). Although these findings support the notion that more frequent and high intensity exercise is more effective in decreasing progressive symptoms, it has been found that the length of time engaged in physical activity is recommended to be at least 20-30 minutes. Conversely exercise beyond 75 minutes can lead to decreased mood, which can be associated with substantial physiological and psychological fatigue (Reed & Ones, 2006).

The setting in which exercise occurs is becoming increasingly explored, especially given the more modern day sedentary indoor lifestyle and our present chronic disease and mental health endemic in North America (O’Keefe and colleagues 2010). O’Keefe and colleagues (2010) proposed a physical activity outline based on the premise that we remain as humans genetically adapted to the hunter-gatherer lifestyle of our Stone Age Ancestors, whom lived a physically active outdoor lifestyle. It is suggested in their research that outdoor exercise is effective in stimulating the vitamin D synthesis. Vitamin D deficiency is a common risk factor in many mental health problems including depression (Penckofer, Kouba, Byrn, Ferrans & Byrn, 2010). O’Keefe and colleagues (2010) found a reduction in emotional stress levels in those who completed outdoor exercise when compared to indoor exercise and an enhanced compliance to a daily regimented fitness for exercise outdoors when compared with indoor exercise. Pasanen, Tyrväinen, and Korpela, (2014) compared the effects of mental health factors including emotional well-being, sleep quality, and perceived general health, finding a
positive correlation with emotional well-being and physical activity in natural outdoors when compared with indoor and outdoor inbuilt environments. Further self-report research on the measures of individual well-being found natural outdoor activity to result in greater feelings of revitalization, reduced tension and anger, and increased energy and enjoyment (Thompson, Boddy, Stein, Whear, Barton & Depledge, 2011).

Berman, Jonides, and Kaplan (2008) conducted a study with 38 participants, comparing the effects of walking through a nature environment and an urban environment on cognitive performance. They found better cognitive functioning within the natural environment, suggesting that nature may have a restorative function in improving our directive attention mechanisms and cognitive functioning (Herzog, Maguire, & Nebel, 2003). It may be suggested that exposure to nature and our natural outdoor environment is beneficial for our mental health, which is increasingly recognized by city planners as parks and green spaces are being created in North America’s increasing urban environments and infrastructure (Gladwell, et al, 2013). Gladwell and colleagues (2013) considered the possible benefits of the outdoor lifestyle of our hunter-gatherer ancestors when comparing the effects of the reduced outdoor activity within our westernized world. They explored literature that identified the physiological changes that occur when exercising outdoors, “as a product of participating in green exercise” (p. 2.). They suggested green exercise may offer greater engagement in physical activity due to increased social interaction and more enjoyment in activity through less perceived exertion, increased vitamin D exposure and a positive psychophysiological impact on the cardiovascular, endocrine, and autonomic function such as stress reduction and improved mood.

Summary

Although the exact link between exercise and mental health is not clear yet, there is evidence that exercise, particularly activity performed outdoors, is therapeutic for many people
with mental health concerns and with a low perception regarding their quality of life (Schuch et al., 2011). Perhaps then, no single explanation or theory at present can fully explain the relationship between exercise stimulus and its effects on improving mental health through improvements of physiological mobilization, emotion and psychological benefits such as self mastery, self esteem and social integration (Salmon, 2001).
Chapter 2 Nutrition, Diet & Mental Health

The correlation between what we eat and the way we behave is starting to receive interest in psychiatric and psychological research (Jacka, Mykletun & Berk, 2012; Jacka & Berk; 2013). However, this is not a new interest and has been a research topic since the 1950s (Spies, 1958). Pearson and Long (1982) reviewed the early literature identifying the implications of nutritional deficiencies that seem to cause a chemical imbalance in the brain and in turn may have behavioural and emotional effects. For example, Pearson and Long (1982) found that people with anemia, depression, fatigue and other psychiatric disorders such as schizophrenia, appeared to have signs of Vitamin B-complex deficiency. They also found research to support a vitamin therapy for some people with mental health dilemmas such as postpartum depression and paranoia (Pearson & Long, 1982).

Other early research includes a study by Ballentine (1979) who noted that the average American person’s diet between 1969-1979 lost in nutritional value while sugars increased by over 31% during this time. Along with a decrease of fresh fruits and vegetables, concluding overall, that only 50% of the American population consume an adequate diet for optimal health (Ballentine, 1979).

The purpose of this essay is to explore the changes in eating habits within the Western World, in particular North America, over the last century. When addressing the links between a diet and mental health, I hoped to find implications for counselling and psychotherapy that could be aided by nutrition information and dietary interventions. If counsellors know about nutritional implications on mental health they can identify when use of integrative interventions may be beneficial i.e., working in collaboration with nutritionists. This may be

Specific Nutrients

The modern western diet is becoming increasingly researched within the correlation of mental health, as it evolves into a “meat and saturated fat-rich diet, with falling consumption of fresh vegetables and fish” (Hallahan & Garland, 2005, p. 275). Nutritional supplemental such as B-group vitamins, zinc, magnesium, culinary fat, and seafood consumption have been found to decrease risk of depression (Quirk et al, 2013) and other mental health disorders (Karr, Alexander & Winningham, 2011; Kiecolt-Glaser, 2010). The four main nutrients for mental health consistent within research seem to be omega-3 fatty acids, tryptophan, folate, and vitamin b12 (Watson, 2013; McKeown, 2008; Hallahan & Garland, 2005; Dog, 2010; Akhondzadeh, Gerbarg, & Brown, 2013; Lakhan & Vieira, 2008).

The neurological basis for many psychiatric disorders lies within the neurotransmitter functions, looking at whether it they are at deficit or excess, or abnormality with the respective receptors or transports (Hallahan & Garland, 2005). With this, “the dry weight of the mammalian brain is approximately 80% lipid (the highest of any organ)” (Hallahan & Garland, 2005, p.275). Thus, the crucial role of lipids, particularly polyunsaturated fats (PUFAs), modulating neural function, receives interest in the role of nutrition in mental health. With this, it is noted that these essential fatty acids (EFA’s), which are effective on all of neurotransmitter functions, can only be obtained through diet. Therefore, with a shift in the western-diet displaying a significant decline of n-3 PUFA over the last century (Peet & Stokes, 2005), it may pose a threat to the decrease in EFAs consumption and possible correlation with the increasing prognosis of diverse psychiatric conditions (Hallahan & Garland, 2005; Karr, Alexander & Winningham, 2011; Hennebelle et al, 2012). Thus, Omega-3 polyunsaturated
fatty acids (n-3 PUFA) are a well studied dietary intake for cognitive-nutritional research, with possible implications of possible mental health correlations (Peet & Stokes, 2005; Karr et al, 2011).

Within a comprehensive literature review, Hallahan and Garland (2005) reported positive correlations between daily fish consumption and decreased suicide when compared with a non-daily consumption in a large population sample (n=256,118) of Japanese participants from a 17 year follow up. There is also a correlations between low fish consumption and post-partum depression, major depression, bipolar affective disorder, and cognitive impairment (Hallahan & Garland, 2005). Following this, Karr and colleagues (2011) reviewed research over a lifespan of n-3 PUFA and cognition, recognizing how humans evolved from our Paleolithic and hunter-gatherer nutritional habits of much lower saturated fats and almost equal amounts of n-3 and n-6 PUFA. The modern dietary ratio seems to have “disregarded the traditional diet of humans, grossly increasing the dietary ratio from of the EFA over the last 150 years, with n-3 to n-6 ratios estimated as high as 1:15-20 in modern western world” (Karr et al, 2011, p.217). Such a large ratio has found to effect sleep quality, thermoregulation, learning performance, absorption of nutrients, and overall health. In addition to a review of literature showing correlation between n-3 PUFA and physical health issues such as cardiovascular disease and Alzheimer’s disease, there was also a correlation found between n-3 PUFA and various pathologies or cognitive disorders such as attention deficit/hyperactivity disorder (ADHD), autism, depression and mood disorders, schizophrenia and psychosis. Peet and Stokes (2005) found supporting research in their literature review of n-3 PUFA treatments for psychiatric disorders, exploring supporting research for EFA supplementation for individuals with diagnosed ADHD, borderline personality disorder, and obsessive-compulsive disorder had a positive effects on symptomology. Within this data alone
is illustrated the physical and mental health risk behaviour of food consumption in the modern
westernized diet.

Amino acids may be helpful in treatment of mood disorders (Lakhan & Vieira, 2008). Soh and Walter (2011) explored the effects of induced levels of the amino acid tryptophan in people’s diet through a literature review of empirical research. Tryptophan is an essential amino acid for humans that can be obtained only through diet, found in protein rich foods such as eggs, meats, fish, and dairy. Tryptophan is a pre-cursor to serotonin and particularly influential on control of mood as well as sleep, sensitivity to pain, and regulation of blood pressure (Bourne, 2006). Tryptophan is of specific interest as it can cross from the blood into the brain and controls the synthesis of serotonin (5HT) that cannot be saturated under normal physiological conditions (Bourne, 2006), it is suggested that altering dietary intake of these protein and carbohydrate foods can “theoretically modify mood by manipulating the tryptophan uptake by the brain” (Soh & Walter, 2011, p. 4). An example would be the satiating effects people experience when exposed to protein rich foods such as chicken and suggest changes in serotonin can also modulate dietary behaviour, playing a role in “the process of determining hunger during consumption of food and in the sensation of satiety that follows” (Bourne, 2006, p. 393).

B vitamins such as vitamin B12 and folate are involved in a “series of methylation reactions that produce monoamine neurotransmitters, phospholipids, and nucleotide” (Dog, 2010. p. 43). Both vitamin B12 and folate are major determinants of S-adenosylmethionine (SAMe), which facilitates methyl groups, and the production of neurotransmitters including serotonin, dopamine, norepinephrine, and epinephrine which are crucial for neural function, in particular affect, mood, and cognition (Coppen & Bolander-Gouaille, 2005; Dog, 2010; Zhao, Ford, Lee, Greenland, Croft & Balluz, 2011). Vitamin B deficiency has been found to be
often present in depression, bipolar disorder, panic disorder, psychosis, phobias, and dementia (Tufan, Bilici, Usta, & Erdogan, 2012; Dog, 2010; Coppen & Bolander-Gouaille, 2005). Zhao and colleagues (2011) explored the efficacy of research that suggests Vitamin B12 and folate levels are deficient in people with depression and anxiety. Within a cross-sectional US population-based survey (n=46,119) they found that women overall were more likely to take folic acid and use of vitamin supplements. Men with ever diagnosed depression or anxiety were more likely to take folic acid and vitamin supplementation than those never diagnosed, suggesting that low vitamin and folic acid was present in those ever diagnosed with depression and vitamin supplementation may be in part a treatment for depression. Within the relationship of folic acid and vitamin deficiency of those with depression and anxiety, such supplementation may be relevant as not only a treatment but also as a preventative measure among people with elevated symptoms (Zhao et al., 2011). Coppen and Bolander-Gouaille (2005) also offered supporting research for the relationship of folate and vitamin B12 status in depression in their literature review, also highlighting the low levels of folate found in people with depression, specifically folate concentrations in serum and red blood cell (RBC) being associated with disorder severity. Similarly, it was found in a community-based study using a large sample (n=700) of older age women (mean age 77 years), that metabolically significant Vitamin B12 deficiency was more present in 17% of mildly depressed older participants and 27% of severely depressed participants (Coppen & Bolander-Gouaille, 2005; Penninx et al., 2000).

Exploration of individual nutrients provides some indication of correlated deficiencies in our western diet and onset of mental health disorders. However the limitations in studying the correlation of individual nutrients and mental disorders is that the absorption and interactions of these nutrients consumed are far more complex (Quirk et al., 2013). This is
because “diet is a multidimensional exposure and thus it remains difficult to attribute differential disease prevalence or symptomology to a single nutrient or food group” (Quirk et al, 2013). Therefore, dietary patterns over single nutrients are becoming increasingly accepted as predictors of the effects of diet and disease prevalence or mental health (Quirk, et al, 2013; McMartin, Jacka & Colman, 2013; Akbaraly, Brunner, Ferrie, Marmot, Kivimaki, & Singh-Manoux, 2011).

**Dietary Patterns & Mental Health**

Research to date has found correlations between mental health and poor or undernourished dietary consumption (O’Neil et al., 2014; Appelhans et al., 2012). Quirk et al. (2013) carried out a review of 25 studies that explored diet quality and depression in adults. Through grouping the overall habitual dietary intake of the western diet (considered the “less healthy diet”), traditional diets (i.e. Mediterranean), and whole food or well-balanced diets (considered more “healthy”), they found several positive associations (p=<0.05) between the Western diet and the likelihood of depression or depression symptomology (Park, You & Chang, 2010; Tangney, Young, Murtaugh, Cobleigh & Oleske, 2002; Jacka et al., 2010; Kuczmarski Cremer Sees, et al., 2010; Jacka, Mykletun, Berk, Bjelland & Tell, 2011), along with a significant association (p=<0.05) between people with depression consuming a lower quality dietary intake (Akbaraly et al., 2011; Sanchez-Villegas et al., 2011). There are several studies that conflict with the significant causal relationship between diet quality and mental health due to possible methodological shortcomings (such as measurements of dietary intake and measurements of individuals mental health). Although the present research has not taken into consideration all of the multi-factoral influences on mood disorders such as alcohol (that is often high in sugar) and nicotine consumption (which may decrease appetite), the western diet
does appear to be a possible risk factor of great importance to public health, particularly when depression alone is one of the leading public health concerns (Quirk et al., 2013).

Appelhans and colleagues (2012) explored the correlation between the prevalence of Major Depressive Disorder (MDD) in clinical weight-loss settings, proposing a link with poorer diet quality and lower physical activity (Appelhans et al., 2012). Within a sample of 161 women seeking treatment for MDD and obesity they measured the dietary intake of participants through three unscheduled telephone calls with a registered dietician over the course of three weeks, measuring the diet quality through a healthy eating index. Poorer diet quality was found in greater depression severity compared to the general population, showing more severe depression correlating with high sugar intake and greater calories from saturated fats along with greater intake of sodium. Although the direction of the correlation is not identified in this particular research, the general correlation between dietary lifestyle choices and mental health is implied.

Austin and colleagues (2011) explored the trends in carbohydrates, fat, and protein intakes and association with energy intake in a US representative sample of normal-weight, overweight, and obese individuals between 1971 (n=13,106) and 2006 (n=4381). They found that obesity increased from 11.9% to 33.4% in men and 16.6% to 36.5% in women during this time, with a significant energy intake coming from carbohydrates in particular the intake of sugars from these foods (Austin, Ogden, & Hill, 2011).

In another recent large survey of Canadians, McMartin and colleagues (2013) looked at the relationship between fruit and vegetable consumption as a marker of diet quality and mental health (McMartin, Jacka & Colman, 2013). Participants from each province had their dietary intake of fruits and vegetables measured in waves over the time period of 2000-2009 and their mental health measured by assessing depression episodes in the last 12 months using
the Composite International Diagnostic Interview-Short form (CIDI-SF) along with symptoms of psychological distress, using the Kessler Psychological Distress Scale (K6). Several important socio-demographic and psychological factors were controlled in the analyses including total household income, smoking status, level of education physical activity level, and chronic illness. The overall findings suggested that greater fruit and vegetable consumption were associated with lower odds of depression, psychological distress, self-reported mood and anxiety disorders, and poor perceived mental health. However, when measuring fruits and vegetables as separate dietary intakes from one another, they did not find consistent correlations with mental health, which they suggested to be the “habitual dietary pattern associated with fruits and vegetable intake rather than actions of specific nutrients from fruits and vegetables” (McMartin et al, 2013, p. 229).

This study receives support from another longitudinal study in the UK examining the associations between whole foods (rich in fruit, vegetables, and fish) and processed foods (high in processed meats, fried food, refined cereals and high-fat dairy products) dietary pattern and symptoms of depression. Consistent with previously discussed findings (McMartin et al, 2013; Appelhans et al, 2011; Quirk et al., 2013), diets rich with whole foods were associated with lower odds of depression and high processed foods associated with high risk of depression.

Elements of the whole food diet such as the antioxidants in fruits and vegetables could be a preventative and a protective factor from oxidative stress and inflammation (McMartin et al, 2013; Kim, Yang, Yang, Oh, Hong, Lee & Kwon, 2011; Kiecolt-Glaser, 2010). It has been suggested that dietary intake can influence the magnitude of inflammatory responses to stress and depression which in turn may increase sensitivity or prime inflammatory response and therefore alter inflammation-relevant behaviour such as sleep and emotional responses (Kiecolt-Glaser, 2010). Also, large amounts of folate found in leafy greens and dried legumes
may be correlated with decreased risk of depression with studies showing low levels of folate in depressed individuals (Coppen & Bolander-Gouaille, 2005). Papakostas and Colleagues (2012), in a randomized, double-blind, placebo-controlled study took a sample of SSRI-resistant outpatients with major depressive disorder (MDD) and treated them over a period of two months with varying levels of L-methylfolate (the biologically active form of folate that crosses blood-brain barrier). They found significant improvement in the adjunctive use of L-methylfolate with SSRI’s for treatment of MDD, specifically for those individuals whom do not respond to SSRI’s alone (Papakostas et al., 2012).

As mentioned, the direction of correlation between dietary patterns and one’s mental health is still unknown, thus it is unclear whether dietary factors bare a causal factor in the onset of mental health problems or vice versa. Additionally, multi-factorial influences are lacking in much of the data such as pre-existing health conditions and socio-demographic factors. Le Port and colleagues (2012) examined the longitudinal association between dietary patterns and depressive symptoms. Data was drawn from participants of the GAZEL cohort study between 1998-2008, assessing diet through a Food Frequency Questionnaire in 1998 and subsequently assessing depressive symptoms every three years after. The Western diet was found to have a higher association of depressive symptoms. Traditional dietary patterns high in fish and fruit consumption showed a lower association with depressive symptoms (Le Port et al., 2012), which reveals the implications of an habitually poor diet, such as the highly processed western foods, including a likelihood of depression (O’Neil et al., 2014). In addition, one study on feeding mice a high fat diet showed subsequent signs of depression and anxiety like symptoms in the mice (Sharma & Fulton, 2012).

Bottomley and McKeown (2008) listed several mental health factors that may affect nutritional intake (see Table 3), particularly in those individuals receiving care in mental health
settings where good nutrition may be being overlooked or underestimated as a significant risk in symptoms and a person’s health. Additionally a lack of screening tools to assess under-nutrition may be a cause for this oversight (see Table 4), with physical illness being the primary focus (Bottomley & McKeown, 2008).

**Summary**

While the role of diet in treating and preventing physical health conditions is well accepted, there is conflicting research on the dietary role in mental health (Bottomley & McKeown, 2008). Peet and Stokes (2005) suggested through their comprehensive literature review of n-3 fatty acids the importance of integrative and holistic mental health approaches that draw on nutrition and specific fish consumption for patients with mood and psychotic disorders. With such research as discussed, I believe there is an increasing need to bring awareness to the possible correlation in dietary intake and its effects on mental health within the counselling profession.
Chapter 3 Counselling Implications of Lifestyle & Mental Health

The mental health of the North American population has been experiencing a decline throughout the past century (Jacka & Berk, 2012), a decline that is accompanied by significant societal and economic implications in addition to personal health costs (McKenzie, Murray & Booth, 2013). With over half the world population now living in urban areas—which is only predicted to rise—and urban environments being risk factors for mental health conditions (Peen, Schoevers, Beekman & Dekker, 2010) it has been suggested that “research into understanding the potential impacts of urban versus rural living on individual mental health is becoming increasingly pertinent” (McKenzie et al, 2013, p.1020).

As discussed in the above, two particular foci for research include the shift in physical activity and diet of the urban and western modernized world. Drawing upon the implications of this research, mental health disorders such as depression and anxiety are becoming major public health concerns, with depression being one of the largest mental illnesses in the developed world (Jacka, Mykletun & Berk, 2012). Additionally, many physical disorders and diseases such as diabetes, cardiovascular disease, obesity, and coronary heart disease are a result of the western world’s modern lifestyle (Jacka et al, 2012). This chapter aims to draw upon research that explores lifestyle changes, namely exercise and diet as plausible treatments to mental health problems.

When addressing mental health disorders, specifically depression and anxiety, the main focus has been on individualized treatment (Jacka et al, 2012). One of the largest sources of treatment of depression is through anti-depressant medications such as Selective Serotonin Reuptake Inhibitors (SSRI’s), a treatment to which only 50% of patients respond to yet have continued to be increasingly prescribed and preferred method of treatment throughout the US
(Skaer, Sclar & Robinson, 2009; Zhong et al., 2014). However, preventative factors through lifestyle initiatives such as physical activity and nutrition are starting to generate attention as growing evidence shows that diet and nutrition are risk and causal factors of such mental illnesses as discussed in chapter 1 and 2.

**Integrating Exercise Therapy**

People may exercise to be healthy, to lose weight, to socialize, or for recreation. However, the factors that predict intention to exercise include attitudes, social norms, self-efficacy, a positive state of mind, and a positive attitude towards exercise and predicting positive effects from engaging in exercise (Catellier & Yang, 2013). Consistent with the Theory of Planned Behaviour (Ajzen, 2011), which is a behavioural model designed specifically to explore health behaviours over which the individual has the ability to exert self-control. The theory proposes to predict behaviour through one’s beliefs systems about the behaviour (i.e., attitudes, subjective norms, social norms, perceived power, and perceived behavioural control) (Ajzen, 2011). This intention “captures the motivational factors that influence behavior; they are indicators of how hard people are willing to try, how much effort they are willing to exert in order to perform behavior” (Ajzen & Driver, 1991). Although it is becoming widely recognized that exercise can be an effective form of therapy for a wide range of mental disorders such as anxiety (Oeland, 2010) and depression (Song et al., 2011), it is rarely integrated into psychotherapy. One of these main reasons for this is participant resistance and lack of motivation, self-efficacy, and internal locus of control (Salmon, 2001). Catellier and Yang (2012) explored the role of affect and exercise, finding that, consistent with the Theory of Planned Behaviour (Ajzen, 1991), participants who were exposed to negative affect (using video clips selected to produced negative affect) were less likely to show intentions to exercise, generalizing the negative affect stimuli in the study to the outcome of their immediate
environment i.e., option to exercise. People struggling with anxiety and mood disorders are often showing symptoms of negative affect such as sadness and low motivation (American Psychiatric Association, DSM-4, 2000). Therefore, for those therapists who are advocates of exercise and inclined to integrate such treatment into their practice, it would be important to integrate therapeutic practice of reframing negative perceptions and increase motivation to engage in physical activity when working with resistance in to exercise therapy. Exercise is particularly beneficial in treating depression as it serves as a modification of action tendencies where one is normally inclined to withdraw and isolate and may instead engage in opposite behaviour (Stathopoulou et al., 2006), such as social engagement and activity with the effect of increasing positive affect. Thus, the implication of exercise as an adjunct to psychotherapy is only a portion of what could be a realm of behavioural activation activities such as mindfulness practices (Netz & Lidor, 2003), contingency management and relaxation.

A limiting factor for therapists wishing to integrate the promotion of exercise and recreation into their treatment repertoire is the lack of training and knowledge surrounding the implementation, planning, and maintenance of such behavioural change (Pollock, 2001). Exercise is not part of most clinical training (Pollock, 2001). One of the reasons why this is the case, is that it is very difficult to prescribe and facilitate exercise as a form of treatment, requiring extensive biopsychosocial knowledge along with time, motivation, and effort from the therapist (Pollock, 2001). The client is also in question with regards to their physical ability or their own personal beliefs and willingness to engage in physical activity within therapy. If clients resist or are disengaged with exercise suggestions, they may become non-compliant over time and likely not to not prioritize exercise in their daily life (Oeland et al., 2010). Oeland et al. explored whether people with depression and/or anxiety disorders were able to achieve a level of physical activity that would increase their fitness and quality of life. They found that
people were able to effectively engage in physical activity during a mild to moderate depression, however, only when an instructor was present. This may mean that the social interactions and encouragement may have been a large part of the therapeutic effects of exercise rather than the physical movement. Nevertheless, the research provides some indication on the most effective ways to implement exercise as an effect treatment for such disorders. As discussed in Essay 1, there is a broad range of research exploring the type of physical exercise one can engage in but generally the most evidential improvements are seen in frequent (3-5 times a week) and moderate to high intensity exercise (Stathopoulou et al, 2006; Dunn, Trivedi, Madhuka, Kampert, Clark, & Chambliss, 2005). Ilardi (2009) recognizes humans’ natural and inherent resistance to engaging in physical activity, based on the assumption that humans are still largely designed for that of our hunter-gatherer lifestyle where there was no need to work out as physical activity was a part of daily life and had a primary goal to preserve energy. With this, it is suggested that exercise should be as engaging and enjoyable as possible. Thus, if advising physical activity within a therapeutic intervention, exploring ones beliefs and levels of resistance would be helpful in the gentle introduction of exercise with the most suitable activity for the individual (Ilardi, 2009).

Another difficulty present in the research on exercise and mental health is the sample size and duration of studies. Most studies are carried out over short periods of time and have significant dropouts throughout the study, which can limit analysis and comparisons to control. As mentioned, exercise is a difficult and unnatural task to perform with force (Ilardi, 2009), and therefore an element of ‘psychological resistance’ is to be expected, especially from those individuals who may have had poor exercise experiences in the past or negative beliefs about the possible benefits (Daley, 2002; Ajzen & Driver, 1991). For example, participants left in study samples may have been a select few who were motivated and hopeful for positive
benefits. It is also difficult to take into consideration the confounding factors within sample groups such as gender, socio-economic status, previous treatment and preexisting mental health symptoms, marital status, and how exercise was defined (Wang et al., 2011). For example, Wang and colleagues (2011) drew data from the National Population Health Survey (NPHS) conducted by Statistics Canada and drew data of both men and women with depression, identifying a significant effect of leisure-time physical activity (LTPA) over a period of two and four years only within the women. These findings are consistent with other epidemiological surveys that show after adolescence women are twice as likely than men to be diagnosed with depression (Brown, Goldstein-Shirley, Robinson & Casey, 2001). These activities were measured by the Minnesota Leisure Time Physical Activity Questionnaire and included a list of 20 activities including fishing, gardening, biking, walking for exercise, and swimming. The therapeutic effects of LTPA were found most valuable for women over a long period, specifically if they were divorced, separated, or widowed, suggesting that women have a stronger need for belonging and require social support to reach optimal psychological health (Wang et al., 2011; Piccinelli & Wilkinson, 2000).

Integrating exercise therapy with other forms of treatment has also been found helpful in several studies. Blumenthal and colleagues (1999) explored the combination of sertraline and aerobic exercise with a clinical depressed adult sample, finding the greatest effectiveness being a combined pharmacotherapy treatment. What was also found was the participants in the exercise group were significantly more likely than those solely in the medication group to reach partial or full recovery. A significantly high number of relapsed participants whom where in the combined (31%) or medicine group (38%) fully recovered, compared to those solely in the exercise group (8%) (Blumenthal et al., 1999; Stathopoulou et al., 2006).
Although much of the research discussed here has been based on people with anxiety and mood disorders, particularly depression, exercise can also help with alcohol abuse (Stathopoulou et al., 2006). In many addiction and treatment centres, daily exercise is part of the program. For example, Wendy Lee at Bellwood Health Services explains how integrating a regular structured fitness program into their recovery program. The identified benefits included improved cardiovascular health, better strength and balance, improved sense of well-being, maintaining healthy body weight, and better self-esteem. It was suggest that an “exercise routine (a minimum of four times per week) plus abstinence, can provide a natural, effective alleviation of depressive symptoms that are common for people in recovery (Bellwood Health Services, n.d., par. 5).

When considering the integration of exercise into treatment plans one must consider clients’ goals and values along with their ability and willingness to exercise without compromising other aspects of treatment. Therapists must also consider how exercise therapy can be connected to goals such as stress-management, well-being enhancement, or depression management (Stathopoulou et al., 2006). There are several guidelines for clinicians to be mindful of when selecting exercise as an intervention including screening of patients for health concerns, selection of training taking into account age, gender, exercise experience, and location. Clinicians also need to be aware of the need for post-training evaluation (Meyer & Broocks, 2000) along with ethical guidelines of exercise practice (Hays, 1999).

Several psychologists and counsellors in North American are starting to effectively integrate psychotherapy with exercise therapy as a combined intervention. Torel, a psychologist and personal trainer, takes her sessions off the couch and onto the treadmill. She combines cardio, weight training, and stretching with talk therapy, believing that “physical discomfort of strenuous exercise [cardio] is thought to help some clients break through to the
next level of emotional exploration” (Torel, as cited from Natural Health, 1999, p. 1). Additionally, strength training and stretching can help client break through trapped emotion in their tight joints (Natural Health, 1999). Several other cases of walk and talk therapy have been put into motion by practitioners across North America. One well known practitioner, clinical and sports psychologist Hays explains “for some people, physical activity seems to allow more access to right-brain thinking, which is more holistic, more intuitive. They are able to figure a problem out better than if they were sitting down with it” (Hays, as cited in Goodman, 2005, p. 112, par. 5). Dubé, explains; “when you are out walking, you’re working from a position of health. Lying on a couch is what we do when we're sick” (Dubé, as cited in, Goodman, 2005, p.112, par. 7.).

**Incorporating a Therapeutic Lifestyle Change into a Therapeutic Conversation**

Although extensive scientific research and validation to support the correlation between high nutrition diets, regular physical activity, and mental wellness has been provided, this thesis has yet to explore how it can be applied directly into a therapeutic conversation. As a counsellor, I first need to assess whether a therapeutic lifestyle change is suitable for the client, i.e. do they show indications of a poor diet and/or limited engagement with physical activity. I would be inclined to assess whether their lifestyle seems adaptable to such lifestyle therapy integration in addition to assessing their support system and resources. Taking a collaborative approach to the conversation, a therapist may first introduce the idea of lifestyle changes, introducing basic psycho-education, highlighting the positive effects making such changes may have. Following this, it would be important to assess the level of engagement and motivation the client has towards the suggested lifestyle changes. Being that motivation and genuine belief in the positive effects of exercise can contribute to a positive change in behavior it is important to ensure that the client is engaged, motivated and has been introduced to the
lifestyle change within a collaborative process with the counsellor. A cognitive-behavioural approach may be one strategy to introduce behavioural change interventions by exploring how an individual thinks about their behavior’s and present situation addressing how they may modify or enhance their lifestyle. To assist with this behavioural change it may first be helpful to collaboratively explore what it would look like to introduce such lifestyle changes into the client’s daily routine. Goal setting is found to be helpful in this sense especially when goals are small and specific, enabling the client to increased self-efficacy from successful goal achievement. In this way health-related behaviors are more inclined to be positively reinforced and continued (Artinian et al, 2010). Self-monitoring is another idea in which a client can take ownership in measuring the effects of such lifestyle changes and something that can be collaboratively brought upon session. For example, within the walk and talk therapy session, the therapist could encourage the client to engage in the nature around her and have her rate on a scale of 1-10 before and after the walk how she feels. Subsequent sessions may engage a rating scale, exploring how one feels before and after exercise or healthier meals and therefore validating the experience. This is also helpful in allowing the client to build a greater understanding and awareness of the correlation between lifestyle behaviors and their physical and mental health.

The follow up and problem solving around the barriers to maintaining a therapeutic lifestyle change of consuming increased nutritional foods and exercise is important to promote such changes. Solution-focused techniques are often helpful in exploring with the client how their existing resources and past experiences can be drawn upon to overcome such barriers. Motivational Interviewing is another technique that can also be helpful in eliciting behavioural change in those clients lacking readiness towards change (Artinian et al, 2010). A client may be ambivalent towards readiness to start exercise and it would be the therapist’s role to seek
understanding of the client’s frame of reference through reflective listening and selective reinforcing clients motivational statements (Artinaian et al, 2010).

It is often argued that there are minimal negative side effects, specifically when compared to the treatment of anti-depressants (Blumenthal et al, 2007). However, exercise can develop into a form of addiction when effects such as “runners high,” increased muscular growth, and weight loss produce an obsession of a less than healthy nature (Garman, Hayduk, Crider, & Hodel, 2004). Additionally, a “narcissistic concern with the body” or form of masochism along with weight or dieting preoccupation, are possibilities although unsupported in the literature (Salmon, 2001, pp. 41-42). Therefore, as healthy and well intended the exercise prescription may be, practitioners should be aware of these possible effects.

Research has not been unanimous in its positive correlation of exercise effects and improved symptomology and although much supported research has been presented here, it must be recognized that those participants who take part in such studies are likely to be more inclined to engage in physical activity habitually or have positive expectation of its effects than their not so inclined counterparts. It has been found that participants who are nonexercisers from the start may experience a decreased mood and they may find the experience unpleasant. Exercise has to be framed in a positive light prior to engagement in intervention in order to create positive expectation (Salmon, 2001; Ajzen & Driver, 1991). What we may take from the research is that exercise as a form of intervention should only be suggested to patients who are so inclined and physically well (Salmon, 2001).

Integrating Nutrition into Psychotherapy

Nutrients that affect the central nervous system (CNS) are relevant to clinical mental health practice and treatment programs, as they affect health brain function (Akhondzadeh, Gerbard, & Brown, 2013; Bourne, 2006). This is because when a person is under conditions of
oxidative stress, inflammation and mitochondrial insufficiency possibly as a result of dietary deficiencies, stress, illness, or aging to name a few, great amounts of nutrients are needed to “maintain cellular function and repair, and to prevent cumulative damage” (Akhondzadeh et al., 2013, p26). These include several of the key nutrients discussed in Essay 2, being B Vitamins (specifically vitamin B12), Vitamin D, folate, omega-3 fatty acids, and tryptophan. Although the research has suggested nutrient deficiency in a wide range of mental disorders such as Alzheimer’s disease, Schizophrenia, Autism, and Mood Disorders (Karr, Alexander, & Winningham, 2011; Bottomley & McKeown, 2008, Peet & Stokes, 2005) the most researched and consistent in findings involve the correlation between nutrient deficiencies in those with diagnosed major depression disorder. Thus, much of the research into nutritional treatment for mental health disorders has focused on people with depression. Depression is a leading mental illness, mostly treated with prescribed anti-depressant medications that are found ineffective for almost 50% of this population (Coppen & Bolander-Gouaille, 2005) with only half of those responding to anti-depressants achieving full remission (Garcia-Toro et al, 2010). Therefore, it is no wonder therapists are seeking alternative modes of treatment to integrate into therapy. The research on dietary components and its correlation to the development and treatment of depression is based on the “biological changes seen in depression and the potential for nutrients to exert beneficial effects on modulating or correcting such biochemical imbalances” (Volker & Ng, 2006, p.220), as discussed in Essay 2 of the paper.

Vitamin B12 and folate are becoming increasingly used in the treatment for Major Depression Disorder (MDD) for those who show low levels of serum vitamin B12 and folate, commonly found in people with MDD and who show poor response to antidepressant treatment (Syed, Wasay, & Away, 2013; Coppen & Bolander-Gouaille, 2005). Mischoulon and colleagues found low serum folate in 19% and Vitamin B12 in 12 % of their sample of
outpatient depression treatment sample (n=213), which is a significantly high prevalence among a more heterogeneous population of depressed patients. This suggests the need for screening for folate and B12 in depressed persons, as they may benefit from supplementary treatment, especially if individuals are suffering from comorbid states such as dementia, alcoholism and malabsorption syndromes (Mischoulon, Burger, Spillman, Worthington, Fava & Alpert, 2000; Coppen & Bolander-Gouaille, 2005).

A recent study of two males suffering from MDD with cognitive dysfunction who were not responding to antidepressants and who showed an underlying medical etiology in the form of low serum vitamin B12 levels serve as relevant case studies. Within case one, the participant, age 43 years, revealed he was a vegetarian, had no family history of mental illness and a history of tobacco dependence syndrome. His initial symptoms consisted of insomnia and then slowness of thinking and forgetfulness, followed by a major depressive episode. Following no improvement over many years of taking different medications, he was eventually tested for low levels of vitamin B12 and placed on a series of vitamin B12 supplements treatment along with folic acid supplements while remaining on the antidepressant medication (Kate, Grover, & Agarwal, 2010). Improvement with sleep and depressive symptoms was found within three weeks. Similarly, the second case within the study with a male subject age 29 years revealed anxious-avoidant personality traits and a history of MDD of five years with no improvement when treated with anti-depressants and psychotherapy. He was also a vegetarian and suffered from both depressive symptoms and forgetfulness. After 2 months of Vitamin B12 treatment combined with folic acid, cognitive improvements were shown along with reduction of depressive symptoms when combined with supportive psychotherapy and no change to existing antidepressant medication prescribed. This research suggests that vitamin B12 deficiency is not only a risk factor for MDD but also a plausible supplement to
the disorder and must therefore not be overlooked in those cases with depressive symptoms and cognitive dysfunction, specifically in those whom show treatment resistant symptoms to medication (Kate et al., 2010). This case is supported by several other research findings, which concluded successful treatment of Vitamin B12 for people who have shown psychotic disorder and acute psychotic depression with Vitamin B12 deficiency (Dogan, Ozdemir, Sal, Dogan, Ozdemir, Cesur, & Caksen, 2008; Bar-Shai, Gott, & Marmor, 2011).

It has been shown in recent study of a sample of depressed patients (n=199) with over half the sample showing a low to deficient measure of Vitamin B12 (36% low normal and 22% deficient in Vitamin B12), that when compared to randomized control sample, showed significant improvement with routine treatment of antidepressant medication (SSRI) and Vitamin B12 supplementation. This study not only illustrates that those with Vitamin B12 deficiency can benefit from supplemented treatment but also those with low normal B12 and co-occurring depression (Syed, Wasay, & Awan, 2013).

Research on the benefits of omega-3 fatty acids for improved mental health has presented consistent findings (Volker & Ng, 2006). One study with a small sample (n=20) of participants diagnosed with recurrent unipolar depressive disorder who were receiving maintenance antidepressant therapy were randomly assigned a specific omega-3 fatty acid, ethyl ester of eicosapentaenoic acid (E-EPA) as adjunct treatment to current antidepressant treatment. They found a significant improvement in the interaction of E-EPA within the treatment group and a significant reduction in depressive symptoms (12.4 points) on the Hamilton Rating Scale for Depression (HRSD) compared to participants receiving placebo (1.6 points) (Nemets, Stahl & Belmaker, 2002). These findings have been supported in similar research of treatment for depression when comparing omega-3 polyunsaturated fatty acids
(PUFAs) supplementation with existing treatments to placebo-controlled trials (Su, Huang, Chiu & Shen, 2003; Peet & Horrobin, 2002).

If such nutritional supplementation can in fact be a plausible treatment for such mental health disorders as MDD, how best to increase this nutrient in one’s diet along with using the nutrient supplementation as a viable treatment for mental health problems? Recommendations of increased fish intake have been suggested for decreasing risk of depressive illness along with prevention of cardiovascular disease (Peet & Stokes, 2005; Volker & Ng, 2006). Drawing upon the research that correlates omega-3 fatty acids and physical and mental health, nutritional supplementation may be suggested as part of a holistic approach to treating mental health disorders such as depression and schizophrenia in addition to physical health disorders such as coronary heart disease and cardiovascular disease. Assessment of undernutrition and overnutrition is commonly overlooked as a tool for mental health professionals. As far as I am aware, it is not a common theme of assessment one comes across in counselling and psychotherapy literature in great detail, although assessment through biopsychosocial model appears the most sensitive to the interplay of biological, social and psychological factors related to mental health. Bottomley and McKeown (2008) proposed several assessment tools for people who may be undernourished or overnourished such as social factors, handling of food, appetite, mental or behavioural response to food, and physical or medical health and appearance. Additionally, they recognized the health risks that accompany such nutrient deficiency as low self-esteem, excessive fatigue and other mental health problems such as depression.

Nutritional advice and guidelines are a suggested intervention accompanied with close monitoring of nutritional intake and encouragement of physical activity. However, it is regarded outside the training and competence level of therapists alone and therefore seeking
specialists that offer nutritional assessment such as a dietician, occupational therapist, and GP is suggested (Bottomley & McKeown, 2008).

**Socio-economic barriers to the therapeutic lifestyle change**

The affordability and access to optimal physical activity opportunities and consumption of nutritious foods pose a number of limitations. Firstly, within Canada and other industrialized countries, it is consistently found that those with high socio-economic status (SES) have better health and greater access to nutritious foods (Ricciuto & Tarasuk, 2007). Additionally, with the expansion of global trade and food technology, the food supply is becoming increasingly more divided between the higher income groups who can afford nutrient-dense foods and the lower income groups who are drawn towards energy-dense foods at lower cost but with little nutritional value (Darmon & Drewnowski, 2008). Additionally, there seems to be less physical activity in lower SES families, which correlates with the poorer health outcomes when compared to higher SES families. The socioeconomic barriers to physical activity for those of lower SES may be due to lack of social support to exercise, lack of access to parks and recreational facilities, air pollution, lack of time, poor health, lack of transport and the possibility of an unsafe neighbourhood. Additionally, for any therapeutic conversation and intervention incorporating a lifestyle change, one must also appreciate the diverse cultural norms, values, attitudes, beliefs and lifestyle patterns of clients (Artinian et al, 2010). Thus, every intervention must be person-centered and collaboratively approached within the clients’ frame of reference.

With regards to overcoming such socio-economic barriers to lifestyle changes, I suggest working with clients to find realistic ways to increase physical activity in lower SES individuals, encouraging integrating exercise into daily routines and increasing access to social and community support. The therapist can also assist the client to locate and access affordable
programming, funding, and support in the community. Similarly, while enhancing nutritional food consumption, exploring community support programs such as the YMCA (which offers family cooking evenings) while exploring enjoyable, affordable and nutritious foods unique to each individual is also beneficial. Finally, the therapist is also encouraged to engage in community level activism in order to educate the policy and decision makers along with society as a whole of the importance of creating equal access to quality exercise opportunities and nutrition for all Canadians.

Summary

There is reason to suggest that with the significant changes in lifestyle for western populations over the last several decades, there may be a correlation between the increased prevalence of increased mental health, in particular depression, and reduced physical activity and reduced levels of nutrition (Garcia-Toro et al., 2010). For example, one contributing factor may be our increased sedentary and indoor lifestyle routines such as working in an office and using enclosed forms of transportation (i.e., cars and trains), resulting in less exposure to natural sunlight and less needed physical activity. These gradual changes are very different to us as a species, as “we have evolved under the selective pressure of vigorous physical activity, essential for success in the harvesting, hunting and scavenging that allowed our ancestors to survive. This activity took place outdoors and conditioned our diet and our way of living” (Garcia-Toro et al, 2010 p. 5). Could it be then that our developed world and lifestyle changes are contributing to the rise in mental health disorders, namely depression? The research for mental treatment combining some of these lost elements in the modern day lifestyle, such as specific nutrients as Vitamin B12, Folate, and Vitamin D along with physical activity and engaging in exercise outdoors have displayed sufficient plausible evidence to suggest that the individual application of these elements into treatment could be beneficial. It may also be
useful to look into the integration of both diet and exercise into mental health treatments through increasing the use of multi-model approaches that consider the role of nutrition and physical activity in mental health. This will allow for a better understanding of the symptoms that might possibly be caused by inadequate diet and exercise in ones life (Pearson & Long, 1982).
Discussion

When looking at the relationship between mental and physical health within this thesis, I have aimed to explore the correlated effects of physical activity and nutritional diets on mental health along with the implications of integrating such lifestyle factors (diet and exercise) as treatment methods for mental health problems. The last chapter of this thesis will summarize the research findings and present the future implications in light of these findings.

Physical Activity and Mental Health Implications

The relationship between physical activity and mental health has been illustrated increasingly over the last few decades to illustrate a significant positive correlation of increased physical activity and increased mental health (De Mello, de Aquino Lemons, Moreira Antunes, Bittencourt, Santos-Silva & Tufik, 2013; Stathopoulou, Berry, Smits, Otto, & Powers, 2006; Eriksson and Gard, 2011). Extensive support was found within the literature review for the correlation between physical exercise and decreased mental health symptoms. Most of these effects were found within people who suffered from depression and explained by the potential multiple beneficial effects of exercise. One of these being increased self esteem (McAuley, Blissmer, Katula, Duncan & Mihalko, 2000), increased body awareness, body image, and self efficacy (Eriksson and Gard, 2011; Craft, 2005; Zarshenas, Houshvar, & Tahmasei, 2013). Additionally, the anti-depressant and anxiolytic effect of exercise explained through the increase in serotonin has provided the most promising research specifically when exploring treatment for depression without using medication (Wipfli, 2009). Additional support was also found in the preventative effects of exercise, finding that those people who exercised regularly showed greater resilience to both anxiety and depression (Salmon, 2001; Hassmen, Koivula, & Uutela, 2000; Schmitz, Kruse, & Krugler, 2004; Jacka, Mykletun, & Berk, 2012; Stathopoulou, Berry, Smits, Otto, & Powers, 2006) in addition to the cognitive benefits of physical activity.
and the preventative factors it may have on neurodegenerative diseases such as dementia and Alzheimer's disease (Hamer & Chida, 2009).

Although the research reviewed still struggles to conclusively explain the direction of the correlation between mental health and increased physical activity, there appears little reason to dispute the positive benefits physical activity has on mental health which in many cases may be so strong as to prevent the prevalence of mental disorders and also treat the onset of mental disorders with minimal risks of negative side effects.

**Exercise as a Treatment Modality**

Although exercise is becoming an increasingly respected treatment modality of mental health disorders, specifically depression and anxiety, there has been little summarization into what an holistic treatment program incorporating therapeutic exercise interventions would successfully look like when drawing from all research implications. From the research literature reviewed within this thesis, one of the emerging implications of exercise on mental health concerns the context of which the exercise was being performed, this being indoors or outdoors. Humans have spent thousands of years adapting to their natural environment yet to now only over the last few generations become to inhabit an urbanized habitat (Illardi, 2009; Maller, Townsend, Pryor, Brown and St Leger, 2005; O'Keefe, Vogel, Lavie & Cordain, 2010). Research found a greater prevalence and risk of mental health problems (Peet, Schoevers, Beekman & Dekka, 2010) along with higher psychiatric mortality in urban versus rural environments (Paykal, Abbot, Jenkins, Brugha & Meltzer, 2000) with mediating factors in urban environments, possibly including limited access to green space (Centres for Disease Control and Prevention (CDC), 2008; McKenzie, Murray & Booth, 2013). Thus, research suggests that living “in a green environment can have positive effects on mental health” (McKenzie et al, 2013, p. 1023). Maller and colleagues (2005) explored the correlation between
healthy people and contact with nature, hypothesizing nature's benefits from evolutionary terms whereby it may be found today’s western modern society, people are insulated from outdoor environmental stimuli and regular contact with nature, a lifestyle that humans may not be fully adapted to and with such an urban existence with human health, community and cultural, well-being suffering as a result. Within their review of the literature they made several key points to how nature promotes health and well-being including the physiological effects that occur when humans interact with nature (i.e., nervous system activity is reduced and restoration of harmony to the brain functions), recovery from mental fatigue and physical restoration, the research results on the effectiveness of nature-based therapy (such as animal-assisted therapy, wilderness therapy), increased positivity and life satisfaction in those whom are in close proximity to nature and enhanced ability to cope with and recover from stress, illness, and injury, and improved concentration and productivity (Maller et al, 2005). Further support from the research discussed in Chapter 3 also illustrates the effectiveness in stimulating the vitamin D synthesis, a vitamin deficiency commonly identified as a risk factor for mental health problems, especially depression (Penckofer, Kouba, Byrn, Ferrans & Byrn, 2010). Exercise is also found more enjoyable in the outdoors and enjoyment will enhance compliance with daily regimented fitness when compared to indoor exercise (Pasanen, Tyrväinen, and Korpela, 2014) providing implications for greater client collaboration and treatment program retention. Also discussed was the effectiveness of ‘Walk and Talk’ Therapy, which consists of taking therapy outdoors and on a walk essentially, thus directly integrating exercise, natural environment and psychotherapy all into one therapeutic session. Although this type of therapy is not mainstream, the research discussed, in relating exercise as a potential viable treatment for mental health problems, shows significant benefits of taking place outdoors.
Additionally the social aspect of exercise engagement was found to be a positive contributing factor in the effectiveness of exercise therapy. It may be suggested people are becoming more socially isolated given the increased sedentary lifestyle elements such as transportation, work environments and technological communication methods (Henry, 2001) and this is something humans as social animals, do not thrive from. Thus, exercise may be found more beneficial and therapeutic as it increases opportunity for greater social interaction (Wang, Dai, Lagace, Morrison, DesMeules & Luo, 2011; Oeland et al). This provides future implications into the context of exercise programs that should they be considered as a possible therapeutic intervention for a client, being a group activity interventions.

With regards to the type and amount of exercise, although the research suggests 30 minutes of moderate exercise five times per week (Dunn et al, 2005; Haskell et al., 2007; Clark and Cambliss, 2005), the type of exercise performed is rather inconclusive and beneficial effects have been found in both anaerobic and aerobic activities (Eriksson & Gard, 2011; Doyne, Ossip-Klein, Bowman, Osborn, McDougall-Willson & Neimeyer 1987; Martinsen, Hoffart, & Solberg, 1989; Stathopoulou et al, 2006). With this, one may conclude that it is clients’ initial perception and beliefs on what type of exercise most resonates with themselves that will determine their willingness to participate in the activity and the ultimate therapeutic effectiveness (Catellier & Yang, 2013; Ajzen, 2011; Ajzen & Driver, 1991).

While appreciating the limitations to integrating physical activity or exercise programs into therapeutic interventions, including psychological resistance (Illardi, 2009), persons physical ability, the skills being beyond scope of counselling practice and the restricted resources of a therapist (including therapists time, knowledge and equipment) (Pollock, 2001), it has still been shown a consistently effective and plausible intervention both independently and in combination with other treatment modalities (i.e., medication and psychotherapy) for
the treatment of many mental health problems (Blumenthal et al., 1999). Ratey and Hagerman (2008) explored the science of exercise and the brain, and reviewed hundreds of research articles that supported the positive effects of exercise on depression, addiction, stress, anxiety, attention deficit, aging, and learning, which they used to present a plausible exercise regimen for optimal cognitive and psychological health. They suggest that it is important to distinguish between low (i.e., walking) (55-65% of maximum heart rate), medium (i.e., jogging) (65-75% of maximum heart rate) and high intensity (i.e., running) (75-90% of maximum heart rate) aerobic exercises and affirm to the individual that “A little is good, and more is better” (p. 250), thus one might start with walking two days a week for 30 minutes and gradually increase time, frequency, and intensity. They also advocated the “strength in numbers” (p.262) principle to which being part of a group or working with a personal trainer is likely to be more effective in sticking with the regimen and building up social interactions and relationships. Illardi (2009) promotes a similar philosophy within his book the ‘The Depression Cure,’ advocating the implementation of aerobic exercise, working 60-90% of your maximum heart rate starting with an activity that is ideally outdoors for connection to nature and light exposure, it is engaging and enjoyable to the individual (i.e., walking, tennis, cycling), making the activity sociable and creating a regiment or schedule that is flexible (Illardi, 2009).

With this, in summary of the research explored here, it seems that integrative interventions would imply exercise interventions being most effective if taken place in a group under the instruction of a trainer, in the outdoors spending time with nature, engaging frequently up to five times a week for at least 30 minutes and in an activity that the participant finds enjoyable and believes to be beneficial. Such therapeutic interventions that are taking place within this therapeutic framework include walk and talk therapy along with clients being
introduced to therapeutic teams i.e. personal trainer or community centre referral of social and physical activity integration.

**Nutrition and Mental Health Implications**

The relationship between nutrition and mental health implications has gained increasingly more attention over the last few decades, specifically in the modernized western countries where food consumption is becoming increasingly processed and genetically modified. These food modifications are now coming to the point where people may be missing out of important vitamins and nutrients that have significant implications to both our physical, emotional, and psychological health (Illardi, 2009; Durant, 2013; Hallahan & Garland, 2005). Research reviewed within this thesis selected the most prevalent and researched themes in the relationship between diet and mental health. Firstly, it appears the decline in Omega-3 polyunsaturated fatty acids (n-3 PUFA) found in plant oils such as seeds and nuts along with animal sources such as fish, egg, and krill oils are becoming more scarce in western diets, causing a growing imbalance between omega-6 and omega-3 fatty acids (FA), (Karr, Alexander & Winningham, 2011; Hennebelle et al, 2012; Hallahan & Garland, 2005). This imbalance of omega-3 FA has found to correlate with mood disorders such as depression and bi-polar disorder (Hallahan & Garland, 2005) and resistance to stress (Hennebelle et al, 2012; Quirk et al., 2013). The research also found a strong correlation between physical health issues such as cardiovascular disease and cognitive functioning such as Alzheimer’s disease. Supporting treatment studies that supplement n-3 PUFA have been shown beneficial for several psychiatric disorders including ADHD, borderline personality disorder, and obsessive-compulsive disorder (OCD) (Peet & Stokes, 2005).

Vitamin B-12 and folate were also found as strong determinants in the correlation between
the proper functioning of mood and cognition. The research showed consistent significant correlations between the deficiency of Vitamin B12 and folate levels in individuals suffering from depression, in addition to effective preventative and treatment for depression through vitamin supplementation (Zhao, Ford, Lee, Greenland, Croft & Balluz, 2011; Coppen & Bolander-Gouaille, 2005).

Although these individual nutrients provide some insight into the possible correlations between diet and mental health, it was widely acknowledged in the research that it is the dietary patterns that are more accepted predictors on the effects of nutrients and mental health (Quirk, Williams, O'Neil, Pasco, Jack, Housden, Berk, & Brennan, 2013; McMartin, Jacka & Colman, 2013; Akbaraly, Brunner, Ferrie, Marmot, Kivimaki, & Singh-Manoux, 2011). With this, the research appears to commonly agree on the modern western diet are a less healthy diet due to the high consistency of high processed foods, refined sugars and saturated fats. This diet was commonly associated with increased physical and mental health problems such as depression, anxiety and obesity (Akbaraly et al., 2011; Sanchez-Villegas et al., 2011; Jacka et al., 2010). Conversely, the consumption of a higher quality diet, consisting of more whole foods such as fruits and vegetables was least found in those people with mental disorders (McMartin, Jacka & Colman, 2013; Appelhans et al., 2012).

The research suggests that it is the antioxidants in the fruits and vegetables that act as a preventative and protective factor to oxidative stress and inflammatory responses to stress and depression. Additionally, the vitamins such as folate found in leafy greens for example, plays an important role in the production of neurotransmitters including serotonin and dopamine, which are crucial for effective neural function, in particular effect mood and cognition (Coppen & Bolander-Gouaille, 2005; Dog, 2010). Thus, the research did
not only show a strong correlation between a high quality diet and better mental health but also served to illustrate the potential preventative and protective factors.

**Nutrition as a Treatment Modality**

Although literature relating the therapeutic effects of vitamin supplementation for mental disorders is still in its early stages, the strength of the research discussed suggests an increased effectiveness of mental health treatment practices if nutritional factors were integrated into client care plans. Understanding that clinical counsellors are not qualified to give nutritional and dietary advise within their practice, it is suggested that the knowledge and awareness of the key correlations within this research would not only be helpful in recognizing the possible relational factors in a persons disorder or symptomology, but would also help better expand the possibilities of treatment modalities for the individual.

Studies using vitamin supplementation such as Vitamin B12, Folic acid and omega-3 FA as an integrative treatment modality has been most researched for the care of those suffering from major depressive disorder. It has been found to be to have significant treatment effects especially when accompanying a persons routine treatment of antidepressant medication (Syed, Wasay, & Awan, 2013; Nemets, Stahl & Belmaker, 2002) in addition serving as an effective alternative treatment to people not responding to SSRI medication (Kate, Grover, & Agarwal, 2010).

This research provides support and great implications for a more holistic and integrative approach to mental health treatments, one that not only leads mental health practitioners to expand their treatment modalities down a nutritional avenue, working alongside registered dieticians and nutritionists, but also sheds more light on the dietary assessment protocols for clients, specifically those with depression, and to what extent this should be measured during a clients intake assessment (Bottomley and McKeown, 2008).
Conclusion

I have recognized of the intricate relationship between physical and mental health within my own experience as a counselling student, healthcare worker and resident within the Western world of Northern America which stirred interest in the potentiality of lifestyle factors having a therapeutic impact on mental health. Upon further exploration, it appears I am not alone with these concerns. The recent the World Health Organization has recently made adjustments to their plan for prevention and control of noncommunicable diseases (diabetes, cardiovascular disease, respiratory illness and cancers) understanding these cannot be addressed without the importance of co-morbid mental illnesses as amplifiers of the global burden of these noncommunicable diseases (Kolappa, Henderson & Kishore, 2013). It has been suggested that the lifestyle changes over the last century; particularly within the Western society may be more significant that first anticipated for a healthy mind.

Dan Siegal, a well authored and award winning clinical professor of psychiatry developed the ‘The Healthy Mind Platter’ (see Figure 1) which displays the seven essential ‘mental nutrients’ for a healthy mind, these being sleep time, physical time, focus time, time-in (internal reflection and meditation), downtime, playtime & connecting time (with others or with nature) (Rock, Siegal & Payne, 2012). Following the U.S. Government re-launch of the food pyramid as a ‘Health Eating Plate’ (United States Department of Agriculture, 2011) which recommends the daily diet for the optimal physical health, Siegal and his colleagues decided to do the same model for the mind, namely the ‘Healthy Mind Platter’ (Rock, Siegal, & Payne, 2012), recognizing how that within modern life in the Western world “filled with an overwhelming focus on the outer world and an experience of being isolated from meaningful connections with others” (Siegal, 2010) that as much as it is important to eat well, society may be lacking the promotion of how to maintain a health mind. This model reflects a lot of the
research reviewed within this thesis including the correlation between physical and mental health, time in nature (activity outdoors) and mental health, social time with others (social benefits of exercise) and mental health and also playtime (a physical activity one enjoys) and mental health.

Similarly, the nutritional quality with the modern western diets is becoming increasingly concerning and it appears that much of the nutrients and dietary patterns that are universally agreed as a ‘higher quality’ diet, mimic that very close to our ancestral hunter-gatherer diet. The hunter-gatherer diet consisted of an overwhelming plant-based (fruits and vegetables) food source, a small amount of animal flesh and much lower levels of refined carbohydrates and sodium, both of which are more presents as the main food sources in today’s western dietary patterns (Konner & Eaton, 2010).

In sum, it is suggested through this research that our human genetic make-up, having been “shaped through millions of years of evolution, determines our nutritional and activity needs”, needs in which are not being met in today’s largely sedentary lives and highly processed synthetic diets (O’Keefe & Cordain, 2004, p. 101). Thus, it is with hopes of the synthesis of research exploring the correlation between mental health and lifestyle factors, that nutritional dietary and physical activity, can be recognized as two of the most important environmental factors in maintaining health and well-being (Simopoulos, 2004) and be more widely implemented into the prevention, protection and treatment of mental health disorders in the future.
References


Artinian, N. T., Fletcher, G. F., Mozzaftfarian, D., Kris-Etherton, P., Van Horn, L., Lichtenstein, A. H., Kumanyika, S., Fraus, W. E., Fleg, J. L., Redeker, N. S., Meininger,
J. C., Banks, J., Stuart-Shor, E. M., Fletcher, B. J., Miller, T. D., Hughes, S., Braun, L.
Houston-Miller, Burke, L. E. (2010). Interventions to Promote Physical Activity and
Dietary Lifestyle Changes for Cardiovascular Risk Factor Reduction in Adults.
American Heart Association. 122; 406-441.

Intakes and Association with Energy Intake in Normal-weight, Overweight, and Obese


Nature. Association of Psychological Science. 19(12): 1207-1212

A., Herman, S., Craighead, E., Brosse, A. L., Waugh, R., Hinderliter, A., & Sherwood,
Disorder. Psychosomatic Medicine. 69: 587-596

Blumenthal, J. A., Babyak, M. A., Moore, K. A., Craighead, W. E., Herman, S., Khatri, P.
(1999). Effects of Exercise Training on Older Patients with Major Depression.
Archives of Internal Medicine, 159; 2349-2356

Problems. Nursing Standard. 22(49), 48-55.

Bourne, J. M. (2006). Effects of Nutrients (In Food) on the Structure and Function of the
Nervous System: Update on Dietary Requirements for Brain. Part 2: Macronutrients.
The Journal of Nutrition: Health & Aging. 10 (5) 386-399.


eicosapentaenoate in Patients with Ongoing Depression Despite Apparently Adequate
Treatment with Standard Drugs. Archives of General Psychiatry, 59(10):913-919
Drugs. 65(8). 1051-1059.
Penckofer, S., Kouba, J., Bryn, M., & Ferrans, E. (2010). Vitamin D and Depression: Where is
all the Sunshine. Issues in Mental Health Nursing. 31(6); 385-393
Vitamin B12 Deficiency and Depression in Physically Disabled Older Women:
Epidemiologic Evidence from the Women’s Health and Aging Study. American
Journal of Psychiatry, 177; 486-492.
Session Psychotherapy in Practice, 57(11), 1289-1300
United States, 2005-2008. NCHS Data Brief, no76. Hyattsville, MD: National Center
for Health Statistics
Health Agency of Canada and the Canadian Institute for Health Information; 12-6.
Retrieved from: http://www.phac-aspc.gc.ca/hp-ps/hl-mvs/oic-oac/assets/pdf/oic-
oac-eng.pdf


Soh, N. L., & Walters, G. (2011). Tryptophan and Depression: Can Diet Alone be the Answer? Acta Neuropsychiatrica. 23(3); 3-11


Tomporowski, P. D., Lambourne, K., & Okumura, M. S. (2011). Physical Activity Interventions and Children's Mental Function: An Introduction and overview. Preventive Medicine. 52(Supp 1); 3-9


Appendix

Table 1 – Trend of taking antidepressant medications

Percentage of persons aged 12 and over who take antidepressant medications by age and sex:
United States, 2005 - 2008

NOTE: Access data table for Figure 1 at: http://www.cdc.gov/nchs/data/db76_tables.pdf#1.
Table 2 – Trends in occupational activity from 1950 - 2000


Table 3 – Daily television viewing from 1950 – 2000

Table 4 – Mental health factors that may affect nutritional intake

<table>
<thead>
<tr>
<th>Factor</th>
<th>Effect in Nutritional intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Psychotic Symptoms</td>
<td>Delusions about food and visual hallucinations.</td>
</tr>
<tr>
<td>Social Withdrawal</td>
<td>Avoiding mealtimes, embarrassed to eat in front of others and not wanting to go out shopping.</td>
</tr>
<tr>
<td>Overactivity in mania, anxiety and dementia</td>
<td>Unable to sit long enough to eat, eating ‘on the anxiety and dementia go’ and increased energy output.</td>
</tr>
<tr>
<td>Memory impairment</td>
<td>Forgetting to eat – or forgetting that meal has been taken – and overeating.</td>
</tr>
<tr>
<td>Lack of motivation or poor energy levels</td>
<td>Not going shopping or feeling like preparing food or cooking and poor food hygiene.</td>
</tr>
<tr>
<td>Low income</td>
<td>Not having enough money to spend on nourishing food.</td>
</tr>
<tr>
<td>Hospital admission</td>
<td>Usual preferences or cultural diets may not be adequately catered for. Mealtimes may not be a pleasant experience. Alternatively this may be an opportunity to eat healthy, and have a social mealtime so diet improves</td>
</tr>
<tr>
<td>Physical changes</td>
<td>Possible swallowing difficulties, problems feeding self and conditions requiring specialist diets</td>
</tr>
<tr>
<td>Medication</td>
<td>Increased appetite and weight gain are side effects of some antipsychotic medication. Some drugs can cause diarrhea and vomiting early in treatment, while others may contribute to constipation. Dry mouth often present.</td>
</tr>
<tr>
<td>Depression</td>
<td>Poor appetite and poor motivation to cook, eat and drink. Comfort eating.</td>
</tr>
<tr>
<td>Social exclusion</td>
<td>Lack of access to health promotion messages and/or support. Poor access to specialist assessments, for example dietician or speech and language therapist. Poor access to other services such as a dentist.</td>
</tr>
</tbody>
</table>

Table 5 – Assessing possible factors in undernutrition

<table>
<thead>
<tr>
<th>Social Factors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the person able to shop for food? Does he or she rely on a carer for shopping and cooking?</td>
<td></td>
</tr>
<tr>
<td>Is he or she able to cook safely? Is the person able to eat in front of others if in hospital? Does he or she have information on healthy food choices?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Handling Food</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the person need assistance to eat? Does body posture hinder swallowing? Does he or she require specialized eating or drinking equipment?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Swallowing and Choking</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the person hold food in the mouth, or spill food or drink from the mouth? Can he or she chew? Are there any difficulties with swallowing, for example does he or she cough and splutter at mealtimes? Does he or she leave the table breathless or have a wet ‘gurgly’ voice? Have there been any choking incidents?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mouth care and teeth</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the person have bad teeth or poorly fitting dentures? Does he or she have a dry or sore mouth? Does medication affect mouth hygiene?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mental health/behavioural</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the person experiencing delusions or hallucinations about food or the ability to eat? Is he or she too restless to sit and eat? Does he or she refuse food or spit it out? Does the person avoid eating with others? Does his or her medication affect his or her appetite?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appetite</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the person have a poor appetite; does he or she derive no pleasure from food? Is he or she drinking adequate fluids?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical/Medical</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the person have repeated infections? Does he or she have problems with tissue viability? Does he or she have a diet-related illness that is not under control? Is the person constipated? Does he or she have an illness that uses more energy than usual?</td>
<td></td>
</tr>
</tbody>
</table>

Table 6 – Ingredients of the healthy mind platter

The Healthy Mind Platter

*The Healthy Mind Platter for Optimal Brain Matter*

Copyright © 2012 David Rock and Daniel J Siegel M. D. All rights reserved.