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Yoga and Exercise: Implications for Mental Health and Hope

by

Jane McLeod

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Barbara Paulson, PhD, Counselling Psychology, University of Alberta

William Whelton, PhD, Counselling Psychology, University of Alberta

Nancy Melnychuk, PhD, Secondary Education, University of Alberta

Abstract

Although exercise has received support for its physiological and mental health benefits, less is known about mindfulness activities. The purpose of this study was to explore how yoga, exercise, and no activity relate to hope, psychological distress, and mental health. Participants who practiced (1) yoga (n=30), (2) exercise (n=30), and (3) no activity (n=30) were administered the Herth Hope Index, Mental Health Inventory, and General Health Questionnaire. While there was no relationship on the Mental Health Inventory between activity conditions, yoga participants showed higher scores on the General Health Questionnaire, and reported reduced anxiety and insomnia. Both activity groups also scored higher on the Herth Hope Index. The results suggest that physical activity is important for improving mental health and hope, but may vary depending on type.

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Table of Contents

List of Tables

CHAPTER ONE

Introduction

The desire for improved longevity and well-being among North Americans has increased steadily over the last few decades, as evidenced by the increased research studies on chronic health conditions, weight-loss, and psychological health (Breslow, 1999; Daubenmier, 2003; Lee, Paffenbarger, & Hennekens, 1997). Although it is now agreed that physical activity is helpful for the treatment of mental health difficulties, it is still unclear whether the benefits differ depending on the type of activity practiced, and which aspects lead to the participant's improvement (Fletcher, Fairfield, 2002; Parvez, Malik, Kang, & Kim, 2006; Rao, 2002). Examples of some contributors reported in the literature include reduced stress, positive attitude, hope, and better quality of life (Chan, Sze, Cheung, Lam, & Shi, 2009; Code, Reeds, Mondy, Overton, Grassino, et al., 2010; Sone, Tanaka, Iimuro, Oida, Yamasaki, et al., 2010). While these elements are also thought to be important in yoga, they are not clearly understood within the research literature.

The purpose of this study is to explore reported psychological well-being, psychological distress, and hope among yoga participants, exercisers, and those who do not participate in either activity. Because of an inconsistency within the literature on how yoga and exercise improve mental health, it was thought that investigating these variables would facilitate an understanding of the relationship between physical activity and mental health. Furthermore, while yoga and exercise have been compared in the literature in terms of broad mental health

conditions, the underlying contributors to the differences in health benefits are not well-defined. The present study intends to clarify if hope increases from engaging in different types of physical activity, whether a relationship between hope and yoga exists, and if one type of activity increases hope more than another. A better understanding of these mental health variables may increase our understanding of yoga and exercise, and how they may be beneficial for long-term health.

Physical Activity, Exercise, and Yoga

Physical activity is a commonly recommended lifestyle intervention to improve physical health, and describes all forms of bodily movement produced by the contraction of muscle to increase energy expenditure (DeBacker, Ambrosioni, Borch-Johnsen, Brotons, Cifkova, et al., 2004; Ornish, Brown, Scherwiz, Billings, Armstrong, et al., 1990). The term generally refers to a continuum of all forms and intensities of physical activities; however more specific forms fall within this term and are categorized by their intended purpose. *Exercise* is one example, defined as a systematic form of physical activity requiring muscle exertion and strength. It is primarily used to sustain and improve the physical body, and is typically practiced in a gym or group fitness setting (Collins, 1998). *Yoga* is also a form of physical activity, but combines an internally-directed awareness of physical sensations and breathing with muscular activity (Kern, 1994; Lake & Speigel, 2007). The intent of yoga is to integrate the body and mind, and consists of physical postures, deep breathing, and meditation (Desikachar, 1995; Lake & Spiegel). While there are similarities in these types of physical activity, they differ because of their purposes and desired outcome. In this paper, these forms of

activity will be included when we refer to physical activity, however further clarification on the differences between exercise and yoga will be provided throughout the paper.

Exercise

Widely practiced in Western cultures as a method to increase both physical and mental wellness, moderate levels of exercise have been shown to reduce the risk for hypertension, heart disease, diabetes, and stress-related illness (Arnau, 2003; Culos-Reed; Innes, Bourguignon, & Taylor, 2005; Fallucca & Pozzilli, 2009; Teixeira et al., 2006). It also lessens the impact of detrimental health-conditions, such as cancer, osteoporosis, fibromyalgia, arthritis, and chronic pain (Jenkinson, Doherty, Avery, Read, Taylor, et al., 2009; Zanni, 2009). Just as important, however, exercise positively moderates mental health, decreasing symptoms of depression, anxiety, and chronic mood disorders (Babiss & Gangwisch, 2009; Smith, 2006; Strohle, Stoy, Graetz, Scheel, Wittmann, et al., 2009; Westrin & Lam, 2007).

These benefits are of major significance for Canadians, considering the rate of stress-related disease continues to rise (Statistics Canada, 2009). Moreover, at least 5% of the general population suffers from clinical depression, while other mental health conditions, such as anxiety and chronic stress, are also becoming increasingly prevalent (Lam, 2008; Statistics Canada; Waraich, Goldner, Somers, & Hsu, 2004). Exercise is a desirable option compared to some allopathic treatments, as it offers sustained health benefits with few side effects

(Lam). As a result, it is common for health-care educators to recommend exercise as a method to improve overall health and well-being (Statistics Canada).

Yoga

While improved physical functioning provides the foundation for sustained health, psychological health is as important in determining a person's perceived overall wellness (Lake & Spiegel, 2007). *Mind-body activities* have become popular among North Americans because they combine muscular activity with an internally-directed awareness of physical sensations and breathing (Daubenmier, 2003; Kern, 1994; Lake & Speigel, 2007). Yoga is one such activity, and consists of physical postures, deep breathing, and meditation (Desikachar, 1995; Feuerstein, 1976; Lake & Spiegel).

Practiced in Eastern cultures for thousands of years to promote mental and physical wellness, yoga is now a multi-billion dollar industry in North America (Heilbronn, 1992; Lake & Spiegel, 2007). A 2005 survey reported that 5.5% of Canadian adults practice yoga, an increase of 15% from the prior year (Statistics Canada, 2007). In addition, approximately 14 million Americans indicated that a health professional has recommended yoga to them as a method to improve their mental and physical health (Yoga Journal, 2009). This sudden interest in this yoga has led researchers to question what attracts North Americans to the practice.

While its physical health benefits are similar to those achieved from exercise, yoga can be generally less physically demanding, depending on the type, and provides an excellent alternative for individuals who do not exercise regularly

(Daubenmier, 2003; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). The ultimate aim of yoga is awareness and self-understanding, distinguishing its goals from other forms of physical activity (Bhaktivedanta & Prabhupada, 1972; Desikachar, 1995; Shearer, 1982). Furthermore, the deep breathing and meditation exercises taught in yoga also encourage inhibition of the nervous functions associated with stress and anxiety, providing an added boost for mental health (Brown & Gerbarg, 2005). Previous studies have proposed that, with regular practice, the facilitated physical relaxation in yoga provides the basis for decreased stress responding and improved mental health (Brady, 2007; Brown & Gerbarg; Smith, 2006).

Comparison of Exercise and Yoga

There is limited evidence to date, however, comparing the differences in mental health benefits between exercise and yoga. Some studies suggest that yoga provides a more sustained effect on mental health than exercise, while others suggest that there are no differences (Brady, 2007; Daubenmier, 2003; Lake & Spiegel, 2007). Because yoga has only recently gained popularity in North American, these inconsistencies may be attributed to small sample size and non-representative samples used in past studies. In addition, since both exercise and yoga have received support for reducing symptoms in individuals with chronic disease, many studies have used clinical populations as their sample when comparing their benefits (Lake & Spiegel). It would be of value to use a larger, non-clinical population to more accurately investigate discrepancies in mental health benefits between exercise and yoga. It would also be of interest to clarify

which aspects of mental health that differ between yoga participants and exercisers.

Hope and Physical Activity

It is known that physical activity, regardless of type, provides sustained positive mood and ability to deal with stressors in their lives compared to non-active individuals (Arnau, 2003; Brady, 2007; Smith, 2006). Physically active people report a greater level of satisfaction in their lives, a better quality of life, and decreased psychological distress compared to those who do not engage in physical activity (Arnau). These are all elements that define hopefulness, a known contributor to mental health (Snyder, 2002).

Hope has been defined within the literature as a feeling of expectation and desire for a certain event to happen (Arnau, 2003; Herth, 1994). It correlates positively with well-being, health and happiness (Trzebinski & Mariusz, 2004; Snyder, Sympson, Michael, & Cheavens, 2000), and helps an individual overcome anxiety, depression and psychosomatic symptoms (Snyder, 2001). Hope has also been linked with mental health improvements in exercisers (Snyder, 2002), as they report decreased hopelessness, depression, and suicidal behaviour (Taliaferro, Reinzo, Pigg, Miller, & Dodd, 2008; Snyder). They also report increased goal-seeking behaviours and positive anticipation towards the future, important elements of hope (Snyder, 2002).

The relationship between exercise and hope has yet to be clearly defined. To date, different measures have been used to assess hopefulness within the exercise literature, creating variations in study outcomes (Plante & Rodin, 1990;

Stephenson, Pena-Shaff, & Quirk, 2006; Snyder, 2005; Taliageferro et al, 2008). In addition, little is known about how type of activity affects hopefulness. Some studies indicate that aerobic and anaerobic exercises differentially affect hope, while others suggest there are no differences at all (Stephenson et al.; Taliageferro et al.). It is also surprising that studies on exercise and yoga have not established the differences between an individual's perceived level of spirituality, an important aspect of the yoga practice and a known contributor to mental health and hope.

It is of interest for future studies to use multiple measures of psychological health and coping when measuring hope in physically active people. This diversity will provide a more holistic exploration of mental health among exercisers and yoga practitioners. It might also provide explanation for the differences seen in previous literature, and to determine if the relationship between hope and physical activity depends on the type of activity practiced. It is also of particular interest to increase the understanding of how yoga and exercise can help to reduce stress and mental health concerns by exploring the contributing factors that lead to its benefits.

Purpose of Study

The purpose of this study is to explore the relationship that exists between type of physical activity and psychological well-being. This relationship will be evaluated by comparing differences in reported hope, physical, emotional well-being between exercise, yoga, and no activity.

Overview of the study

Chapter Two will address the research literature on exercise, yoga. A description of the study methodology will be presented in Chapter Three, while in Chapter Four the results of the statistical analysis will be described. The study results will be further discussed in Chapter Five, as well as the implications of the findings, how they may be useful for the counselling field, and limitations of the study.

CHAPTER TWO

LITERATURE REVIEW

While there is a large body of evidence supporting the use of physical activity for health improvement (Chan et al., 2009; Smeets, De Wit, Delnoij, Hoes, 2009), some studies suggest that the benefits vary depending on the type of activity practiced. Both yoga and exercise appear to be important for improving overall wellness, as both have been related to physical (Chan et al.) and psychological (Lake & Spiegel, 2007) health improvements. However, it is thought that yoga may offer more mental health benefits because of its meditative and relaxation component (Brady, 2007; da Silva, Lorenzi-Filho, & Lage, 2007). Because of their accessibility and increasing popularity, it is of importance to further explore these two forms of physical activity to gain a better understanding of their use as a health-care tool and their influence an individual's perceived health and well-being.

This literature review will describe previous research supporting the benefits of physical activity and its use as a health-care moderator. It will then explore how exercise (i.e., physically-based activity) and yoga (i.e., mindfulness-based activity) relate to reported health and well-being, some of which indicates that they offer similar physical health benefits, but differing mental health benefits. Prior to exploring the possibility of a relationship between type of activity and hopefulness, the literature on hope and its relation to exercise will be reviewed. This literature review will also provide an explanation for the

underlying factors that might contribute to differences in reported mental health and well-being between exercise and yoga.

Exercise

Exercise is a natural human activity, making it one of the most commonly used lifestyle interventions for reducing stress, chronic health conditions, and mental health (Knowler, Barret-Connor, Fowler, et al., 2002; Ryan et al., 1997). It is accessible to most individuals and is relatively inexpensive compared to long-term medication use (Saper, Eisennberg, Davis, Culpepper, & Phillips, 2004; Westrin & Lam, 2007). Furthermore, it adopts a more natural approach to wellness, offering sustained physical and mental health benefits with minimal side effects (Smeets et al., 2009).

These benefits appear to be relatively well-known among North Americans, as it is estimated that approximately 51% of Canadians and 30% of Americans participate in at least moderate (i.e., three times/week, for 30 minutes in duration) physical exercise (National Center for Health Statistics, 2009; Statistics Canada, 2009). In addition, at least one million Canadians intend to start a regular exercise routine within the next year. This is a considerable rise from 1998, when only 22% of Canadians engaged in exercise during their leisure time (Statistics Canada).

Because the average North American lifestyle has become burdened by increasing time constraints and stress, the opportunity for physical exercise to occur naturally is minimal (Ryan, 1997). Consequently, exercise has developed into a structured activity to improve physical health (Ryan, Frederick, Lepes,

Rubio, & Sheldon, 1997). It is common for people to go to a gym, fitness classes, or play team sports as a way to pursue exercise (Ryan et al.). National guidelines were also developed to ensure that Canadians achieve adequate amounts of exercise (Warburton, Katzmarzyk, Rhodes, & Shephard, 2007), suggesting that individuals should engage in exercise at least three times a week for 30 minutes to achieve physical health benefits (Warburton et al.).

Various forms of structured exercise have also developed to accommodate specific health concerns and personal preference. *Anaerobic* exercises use weight or resistance to strengthen both the major and minor muscle groups as a means to protect the joints and surrounding tissues of the body (Lake & Spiegel, 2007; O'Connor &Crowe, 2006). *Aerobic* exercise consists of any physical activity that uses the large muscles of the body in continuous motions (Wilmore & Knuttgen, 2003) and increases the heart rate to improve blood circulation and energy expenditure (O'Connor & Crowe). Finally, *flexibility* exercise is a non-vigorous form of physical exercise in which a specific muscle group is deliberately elongated, to gain increased muscle control, flexibility, and a greater range of motion in bodily joints (Willmore & Knuttgen).

Benefits of Exercise

These aforementioned exercise forms address health concerns by initiating improvement and development of the physical body, emphasizing observable results (Daubenmier, 2003; Kern, 1994; Ryan et al., 1997). However, the specific motivators of exercise may vary depending on the individual. Approximately half of Canadians (49.4%) reported beginning an exercise program to enhance their

quality of life, lose weight, relieve stress, reduce pain from injury or disease, and to prevent future health issues (Ryan et al.; Statistics Canada, 2009). Furthermore, a large portion of exercisers indicated that these benefits often extend beyond the physical (Lake & Spiegel, 2007). It is necessary to understand how the physical and psychological benefits of exercise may positively influence people's beliefs, attitudes, and behaviours related to exercise participation.

Physical health benefits

Cardiovascular benefits. Physical exercise has been shown to reduce the risk for hypertension and heart disease in healthy individuals (Bassuk & Manson, 2003), one of the most prevalent illnesses among Canadian adults (Statistics Canada, 2009). It also lowers blood pressure and resting heart rate, reducing overall strain on the heart (Bassuk & Manson; Woodard, Mark, & Berry, 2001). Interestingly, these benefits appear to be similar to those produced from medication but with no side effects (Bassuk & Manson).

Body Mass. Berkel and colleagues (2005) found that exercise was essential in weight-loss success, as overweight exercisers report a better ability to control food cravings, and manage a more consistent body weight compared to non-exercisers (Berkel, Poston, & Reeves, 2005). Healthy exercisers also show reduced overall body weight, glucose levels, and cholesterol compared to non-exercising controls (Lewis, Jacobs, McCreath, et al., 2000; Kumanyika, Obarzanek, Settler, Bell, Field, et al., 2008).

Type II Diabetes. Both aerobic and resistance exercise have been associated with a decreased risk of type II diabetes (i.e., non-insulin dependent),

(Bassuk & Manson, 2003; Turk et al.; Warburton, Nicol, & Bredin, 2009). Warburton and colleagues (2009) found that moderate levels of activity produce the same physiological effects as medication, reducing the need for medication. These improvements were found to be greatest with combined aerobic and resistance training, suggesting that type of activity may produce differential benefits (Sigal, Kenny, Boule, Wells, Prud'homme, et al. 2007).

Chronic disease and immune functioning. Exercise is also fundamental in the prevention of disease occurrence and re-occurrence, including fibromyalgia, arthritis, multiple sclerosis, and chronic pain (Culos-Reed et al.; Jenkinson, Doherty, Avery, Read, Taylor, et al., 2009; Zanni, 2009). This was attributed to decreased inflammatory response and improved immune functioning in chronically-ill patients (Mosher et al.; Zanni). Further, moderate physical exercise is associated with reductions of specific cancers, particularly colon and breast cancer (Lee, 2003; Shephard & Futcher, 1997; Warburton et al., 2009).

Longevity and aging. Finally, exercise is of importance for the elderly, who are at greater risk for degenerative disease and chronic health conditions than any other age group. Resistance training, stretching, and aerobic exercises are effective in attenuating the rate of bone loss (Liu-Ambrose, Khan, Eng, Heinonen, & McKay, 2004; Kemmler, Lauber, & Weineck, 2004), while weight -bearing exercise increases bone mineral density more effectively than other types of exercise (Warburton et al., 2009). This lowers the incidence of hip fracture and falling, common afflictions associated with aging (Gregg, Pereira, & Caspersen, 2000; Stevens, Powell, & Smith, 1997).

Mental health benefits of exercise

While most individuals begin an exercise program to improve their overall physical health and appearance, there is a clear relationship between exercise and improved mental wellness (Babiss & Gangwisch, 2009; Snyder, 2002). Given the substantial reports of lifestyle stress and demands amongst Westerners (Statistics Canada, 2009), these additional mental health benefits are of importance in the treatment of co-morbid diseases.

Depression. Exercise has been found to enhance mood and alleviate symptoms of depression, and has been shown to be as effective as antidepressant use and psychotherapy over long-term use (Babiss & Gangwisch, 2009; Smith, 2006; Westrin & Lam, 2007). Prolonged physical exertion, particularly cardiovascular exercise, increases serotonin and dopamine in the brain, known enhancers of mood (da Silva, Ravindran, & Ravindran, 2008). It also improves perceived quality of life and risk for the re-occurrence of depression (Blumenthal, Babyak, Doraiswamy, Watkins, Hoffman, et al., 2007). Interestingly, individuals who are depressed are often able to reduce or eliminate antidepressant medication while partaking in at least moderate levels of physical activity (Lake & Spiegel, 2007; Smith). These positive changes in mood sustain both during and after the exercising period, and become more consistent the more frequently an individual engages in exercise (Willmore & Knuttgen).

Anxiety disorders. While less is known about the effects of exercise on anxiety, a noticeable reduction in stress and anxiety is consistently reported amongst exercisers (McEntee & Halgin, 1999; Milani & Lavie, 2009). In

individuals with generalized anxiety disorder, aerobic exercise was as effective as cognitive behavioural therapy and pharmacological treatment (McEntee & Halgin; Steptoe, Edwards, Moses, & Matthews, 1989; Strohle, Hofler, Pfister, Muller, Hoyer, et al., 2007). Further, while acute bouts of intense exercise may actually increase subjective anxiety in individuals with panic disorder, long-term physical activity reduces the frequency and severity of their panic attacks (Broocks, 1998; Barlow, Brown, & Craske, 1994). It is thought that the physiological changes induced by exercise (e.g., heightened heart rate) helps to increase tolerance of symptoms associated with panic and anxiety (Barlow et al., 1994)

Psychological distress. One of the most frequently reported benefits from exercisers relates to decreased psychological distress (Ai, Park, Huang, Rodgers, & Tice, 2007; Brown, Lemyre, & Bifulco; Martarello, Cocchioni, Scuri, & Pompei, 2009). Martarello and colleagues (2009) found that athletes who performed 20 minutes of intense aerobic exercise showed decreased blood cortisol levels and increased melatonin, both correlates of stress reduction. Self-reports in this study indicated that exercisers perceived themselves as having reduced stress following a period of exercise, particularly when it was of higher intensity (Martello et al.). This deduction is attributed to decreased focus placed on stressors, because more thought is devoted to maintaining the exercise itself (Martarello et al., 2009). Enduring difficult physical challenges is also thought to foster a sense of accomplishment and resiliency, increasing an individual's confidence to overcome future challenges (Snyder, 2002).

Importance of exercise as a health tool

Because of the vast health improvements, it is not surprising that exercisers perceive themselves to be in better health and report a higher quality of life compared to their non-exercising counterparts (Elavsky & McAuley, 2007; Lake & Spiegel, 2007; Mosher, Sloane, Morey, Snyder, Cohen, et al., 2009). However, the number of exercisers is still relatively low considering its known benefits (Statistics Canada, 2009).

Contrary to popular belief, addressing this lack of initiative to exercise may not be as simple as setting aside specific times to exercise (Ryan et al., 1997). The perceived exertion and physiological stress may make the exercise experience aversive (Davis, Fox, Brewer, & Ratusny, 1995; Ryan et al., 1997), decreasing an individual's interest in exercising regularly, particularly if they are not physically fit (Lind et al., 2009). Introducing exercise as an intervention is also problematic because of the wide-held view that medications are more easily implemented than an exercise or lifestyle change (Phillips, Schneider, & Mercer, 2004; Woodard, Mark, & Berry, 2001).

More important to note, however, is that most North Americans spend their days juggling demands of work, home, and extra-curricular activities (Masalach, Schaufeli, & Leiter, 2001). It is not surprising that they lack the energy or time to exercise, regardless of how positive its benefits. Furthermore, popular forms of exercise promoted in North America involve pushing the body to its limits, such as exercise "boot camp" and "extreme exercise" classes. This

adds to an already abundant stress level, and may not be feasible for long-term maintenance.

Mind-Body Activity

The shift in focus to the mental aspect of physical activity has led individuals to pursue activities not only for its physical health benefits, but also in terms of mental health (Gill, Gross, & Huddleston, 1995; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). *Mind-body* activity is a term used within the research literature to describe forms of physical activity with a concentrated awareness of bodily sensations (Collins, 1998; Daubenmier, 2003; Kern, 1994). In North America, commonly practiced mind-body activities include Qigong, Tai Chi, Karate, and Yoga (Astin, Shapiro, Eisenberg, Forys, 2003; Yoga Journal, 2009). Because of their encompassing approach to health, mind-body exercise has become increasingly popular within the past two decades (NCI, 2009; Statistics Canada, 2009). This may also be partially attributed to the recent recognition of the combined benefits of physical and mental activities within the medical community (Lake & Spiegel, 2007).

The aim of mind-body activities

The main intent or goal of mind-body exercise is to foster the mind's ability to listen and respond accordingly to the body's signals (Daubenmier, 2003; Miller, Fletcher, Kabat-Zinn, 1995). Instead of focusing on external processes, such as movement, duration, and intensity, mind-body activities encourage individuals to coordinate movements with the flow of breath (Daubenmier; Kern, 1994). For example, if a person becomes aware of a part of the body that is

injured or tired, they may adapt by reducing the intensity of the activity. Having this direct body awareness could profoundly impact one's understanding of the mind-body connection (Daubenmier). This awareness translates to the mind being aware of what is happening in the body at any given moment during the activity. Further, Collins (1998) and Daubenmier (2003) distinguish mind-body activities from physical or *body-oriented* exercises (e.g., running). They proposed that, while body-oriented exercises strive to develop the physical body through activities, mind-body exercises combine muscular activity with internally-directed awareness of sensations, breath, and energy of the body (Daubenmier). They also focus on the process, rather than outcome or goal of the activity, allowing practitioners to move within their comfort zone (Daubenmier, 2003). From a mind-body perspective, health is defined in terms of the integration of mind and body, emphasizing their reciprocal relationship (Daubenmier, 2003). People who are looking for ways to improve their overall health may therefore benefit most from exercises that draw their attention to the actual experience of the body, as opposed to just physical sensation and appearance (Daubenmier).

Yoga

Yoga has become one of the most popular forms of mind-body activity in North America in the past two decades (Yoga Journal, 2009; Daubenmier, 2003). Originating in India over 1500 years ago, yoga was developed as a system of physiological and philosophical practices designed to treat the imbalances of the body, and maintain overall well being (Bikram, 2007; Desikachar, 1995). On the surface, yoga appears to be only a physical activity. Practitioners move through a

series of postures that target specific body areas to stretch or balance (Daubenmier, 2003). It is common for beginners to view yoga solely as a physical exercise to improve strength, flexibility, weight loss, and relaxation (Desikachar, 1995; Shearer). However, yoga is as much a mental and spiritual practice as a physical one.

The term *yoga* literally translates as 'union', referring to yoga's aim to bring the mind and body together in harmony (Daubenmier, 2003; Desikachar, 1995). As a movement-based form of meditation and relaxation, one major aim of yoga is to combine one's personal experience with awareness and spirituality (Daubenmier; Feuerstein, 1989; Sharma, Yadava, and Hooda, 2005). The process of regulating attention to the present-moment experience is paramount for the yoga practitioner (Roach & McNally, 2004), and helps to develop greater insight into their psychological state. *Spirituality* is also an essential component of yoga, with the general intent to increase interconnectedness among all living beings (Roach & McNally). Although somewhat different for each person, developing a spiritual yoga practice involves having a regular, disciplined practice (e.g., daily practice of postures and meditation) and possessing a belief that there is something 'beyond the self.' The yoga practice acts as a guideline for self-reflection, learning to promote happiness and peace, and as a way to connect with a spiritual figure (Roach & McNally). Even if a practitioner does not achieve the ultimate 'union,' the learning process itself fosters a greater understanding of one's psychological state and self-awareness.

Five types of yoga

Five traditional types of yoga were developed to cultivate this sense of spirituality and awareness (Shearer, 1982). *Bhakti* yoga, translating as devotional yoga, signifies a practice with an active involvement in finding a source of spirituality and focuses on meditation (Shearer, 1982; Yoga Journal, 2009). Similarly, *Kundalini* yoga attempts to give the practitioner spiritual energy through meditation on energy moving through various points of the body. *Jnana* yoga is a process of increasing one's awareness and learning to discriminate between what is real and what is not (Desikachar, 1995). This yoga form helps the practitioner accept changes that occur in their body (e.g., an injury, chronic illness) without having an impact on their mental health (Desikachar; Shearer, 1989). *Karma* yoga, meaning discipline of action, encourages individuals to help others without the expectation of a return (Desikachar). Finally, *Hatha* yoga is a particular system of yoga that includes physical postures and breathing exercises to purify the body and develop a calm mind (Daubenmier, 2003; Iyengar, 1992). Because most people seek out mind-body activities to improve all aspects of health, Hatha yoga has become more commonly practiced and is what North Americans typically associate with the word "yoga" today. Because of its popularity, there are several branches of Hatha yoga practiced, including Ashtanga, Iyengar, Bikram, Vinyasa, or a combination of any of these types. Hatha is also the most common form of yoga used within the research literature.

While there are many different forms of Hatha yoga practiced, three major aspects of the practice remain common among all of them (Desikachar, 1995;

Iyengar, 1992). *Pranayama* (*Prana*=breath; *yama*= control) is a set of specific breathing techniques used to heat and/or cools the body. This breathing technique also facilitates a sense of relaxation (Feuerstein, 1989; Iyengar). *Asanas* are the physical postures used to stimulate specific organs, muscles, and circulatory system (Iyengar; Bikram). These postures are thought to improve physical health and healing of injuries. Finally, the meditative (*Dhyana*) aspect of hatha yoga helps calmness and psychological wellness to the practitioner (Feuerstein, 1989; Iyengar; Jois, 2002). It also is traditionally thought that the physical yoga practice helps prepare the body to become more physically flexible, so to sit for long periods of time in meditation.

The Benefits of Yoga

Almost half of yoga practitioners in North America begin yoga to reduce physical pain, increase flexibility, and alleviate stress (Lake & Spiegel, 2007; Yoga Journal, 2009). Yoga postures involve the compression and stretching of various organs and muscle tissue. Common yoga postures involve touching one's toes, balancing on one leg, back bending, and specific breathing exercises (Feuerstein, 1976; Iyengar, 1992). While the benefits of yoga have been reported in Eastern literature for centuries, it has only been recently that its physical and mental health benefits have been defined in the scientific literature.

Physical health benefits

Injury prevention and recovery. Yoga seems to decrease symptoms of carpal tunnel syndrome, and is effective in patients who do not respond to physical therapy (Piazzini, Aprile, Ferrara, Bertolini, Tonali, et al., 2006).

Piazzini and colleagues (2006) found that yoga emphasizing upper body postures and relaxation was more effective than traditional splinting methods and steroid injections in decreasing wrist and arm pain (Piazzini et al.). Another study found that individuals with chronic lower back pain who attended 24 weeks of biweekly yoga classes showed significant reductions in functional disability, pain intensity, and medication use compared to standard medical care (i.e., pain medication and doctor visits) 6-months post intervention (Williams, Abildso, Steinberg, Doyle, Epstein, et al., 2009).

Cardiovascular and pulmonary health. In a review of the literature, Innes, Bourguignon, and Taylor (2005) found that yoga was effective at reducing blood pressure, cholesterol, and markers associated with heart disease and hypertension. Yoga also appears to improve overall cardiovascular functioning, as the deep breathing strengthens the muscles of the diaphragm and lungs (Fried, & Grimaldi, 1993; Innes & Vincent, 2007; McCaffrey, Ruknui, Katthakit, & Kasetsomboon, 2005).

Diabetes. Although there are few investigational studies on yoga and diabetes, yoga seems to reduce several risk factors for diabetes, including glucose tolerance, insulin sensitivity, and blood lipid levels (Innes & Vincent, 2007). Yang and colleagues (2009) found that diabetics assigned to a 12-week, biweekly yoga program showed lowered blood glucose levels and insulin response, as well as sustained relaxation compared to controls (Yang et al.). Similar to exercise, diabetics who practice yoga on a regular basis report a decreased need for medication and follow-up care (Innes & Vincent).

Aging. Yoga is particularly beneficial for the elderly, as it is easily accessible and may be modified to alleviate various health conditions (Iyengar, 1992; Yang et al., 2009). Yoga postures practiced over time increase joint flexibility and stimulates blood flow to alleviate symptoms of osteoarthritis and arthritis (Bikram, 2007; Lake & Spiegel, 2007). It also significantly improves balance and bone mass (Liu-Ambrose et al., 2004), which reduces the risk of falling and bone fracture, events that may lead to lowered quality of life and mortality in the elderly (Yang, 2007).

Chronic illness. Finally, yoga has received support for decreasing the symptoms of chronic illnesses (Bower et al., 2005; Yang, 2007). Cancer patients who took bi-weekly yoga classes for a one-month period reported that it decreased the side effects of chemotherapy (Ando, Morita, Akechi, Ito, Tanaka, et al., 2009; Avis, 2008). Further, patients with fibromyalgia who participated in 8 sessions of yoga showed greater improvements in treatment, reduced fatigue, and needed less medication compared to those in the non-yoga group (Danhauer, Mihalko, Russell, Campbell, Felder, et al., 2009; da Silva et al., 2007).

Mental health benefits

Because of the mental component of yoga, it is thought that yoga offers several benefits for improving psychological well-being.

Depression. Several studies have found that yoga is effective in reducing perceived depression and may be as beneficial as antidepressant treatment (Babyak, Blumenthal, & Herman, 2000; Brown & Gerbarg; da Silva et al., 2008). Oretzky (2007) reported that chronically depressed individuals who participated

in a 5-week, twice weekly yoga group showed significant decreases in both self-reported and observer-rated depressive symptoms, as well as improved sleep quality compared to a control group (Oretsky, 2007). The meditative component reduction in yoga is thought to aid the likelihood of recovery (Lake & Spiegel, 2007). As a result, yoga is now being incorporated into hospital and outpatient treatment programs for individuals experiencing chronic mental health conditions (Danhauer et al., 2009)

Anxiety and stress. Yoga also appears to be effective in decreasing the symptoms of anxiety and panic disorders (Brown & Gerbarg, 2005; Heilbronn, 1992; Michalson, Grossman, Acil, Langhorst, Ludtke, et al., 2005). A study conducted by Miller et al. (1995) found that patients with clinical anxiety disorders show significant improvement in anxiety and panic following an 8-week mindfulness-based yoga program. Follow-up studies three years after the study indicated that yoga was still effective in alleviating their symptoms (Miller et al., 1995). With regular practice, it is thought that the deep breathing in yoga encourages provides sustained relaxation effects on the body (Heilbronn; Fried, & Grimaldi, 1993; Martarelli, Cocchioni, Scuri, & Pompei, 2009).

Body image and self-esteem. Adults who practice yoga show higher levels of self-efficacy and confidence in their abilities, fewer eating problems, and less time focusing on their body size compared to non-practitioners (Daubenmier, 2005; Oleshansky, 2004). Daubenmier (2003) also found that yoga practitioners report a decreased tendency to compare their physical appearance to those of

others, less body image distortion, and improved acceptance of physical limitations compared to aerobic exercisers.

Coping. Finally, yoga has been shown to be helpful for coping and stress reduction in those with chronic illness and psychological stressors. Cancer patients who practice yoga have reported decreased symptoms of sadness and depression post-treatment (Williams et al., 2009). They also report that it is helpful for them to cope with their diagnosis (Ando, Morita, Akechi, Ito, Tanaka, et al., 2009; Avis, 2008), as it increases acceptance, faith, and awareness of the present experience (Roach & McNally, 2004). Further, Cater & Byrne (2004) reported that an Iyengar yoga program produced significant improvement in coping with post-traumatic stress among, reducing disturbances in sleep and flashbacks among war veterans.

Exercise and Yoga

While the physical benefits between exercise and yoga are similar, some researchers have proposed that yoga practitioners show better coping and stress-reduction than those who exercise regularly (Brady, 2007; Daubenmier, 2004; Lake & Spiegel, 2007; Yang, 2007). Brady (2007) found that an 8-week hatha yoga program was effective in reducing anxiety in healthy participants, while an 8-week weightlifting program actually increased both generalized and situational anxiety. Yoga practitioners may also develop a reduced risk for anxiety disorders and depression with regular practice (Lake & Spiegel). A recent study found that, while both gym-based and yoga exercise improved psychological well-being, people taking part in the yoga-group showed reduced somatization and body-

related anxiety, as well as improved physical and emotional well-being after 20 sessions (Hafner-Holter, Kopp, & Gunther, 2009).

The actual contributors that underlie these reported health benefits might vary, however, and is somewhat speculative to date. Because there are many variations in yoga styles and methods of teaching, defining the practice of yoga is challenging and difficult to control empirically. Furthermore, studies of yoga to date contain small subject pools, and often include clinical populations or convenience samples (da Silva et al., 2008; Lake & Spiegel, 2007). The literature has also focused primarily on the physiological changes that occur both during and after a yoga practice, which is easier to quantify empirically but neglects the spiritual and mindful differences between yoga and exercise.

All studies, however, are in agreement that what likely differentiates yoga from exercise is the mental awareness component (Daubenmier, 2004; Lake & Spiegel, 2007; Yang, 2007). The increased deep breathing, meditation, and physical relaxation taught in yoga provide the basis for improved mental health in addition to the physical aspect (Brady, 2007; Brown & Gerbarg, 2005; Smith, 2006). With practice, the yoga practitioner may develop ways to use these relaxation exercises to manage stress outside of the yoga environment. Further, the yoga philosophy teaches practitioners to turn their awareness away from the external experience towards more subtle physical changes. For example, the yoga practitioner is directed to attend to their breathing rate and muscle tension, which is helpful in reducing the focus on the perceived exertion and physiological stress (Iyengar, 1992; Lake & Spiegel; Lind et al., 2009). The yoga teacher may also

provide a dialogue that encourages individuals to focus on the positive benefits received from the postures (Feuerstein, 1976). As a result, individuals who practice yoga may be more likely to think about, and feel confident about, the positive health benefits in each posture (Desikachar, 1995; Lind et al., 2009).

Yoga also includes progressive series of postures that increase in difficulty, but may be easily modified based on the practitioner's physical limitations. This provides the practitioner with continuous opportunity to learn and progress in the postures while maintaining an element of safety. They may notice mental barriers that inhibit them both in yoga and other life situations. Mastering previously difficult yoga postures may also induce a sense of accomplishment and resiliency in the practitioner (Lake & Spiegel, 2007; Lind et al.). This feeling of self-efficacy is thought to increase their confidence in overcoming challenging situations in the future (Tsang et al., 2002). However, this experience is not necessarily unique to yoga, as Ryan and colleagues (1997) found that the developed competence and sense of challenge are imperative to the psychological aspect of exercise. More investigation is necessary to determine how exercise and yoga differ from each other.

Hope as a Mental Health Contributor

Interestingly, the abovementioned differences in mood, coping, and perceived stress are all related to hopefulness (Herth, 1994; Taliaferro, Reinzo, Pigg, Miller, & Dodd, 2008). *Hope* is a known contributor to emotional well-being, and has been previously linked with exercise (Dufault & Martocchio, 1985; Herth, 1994; Snyder, 2002). However, no studies to date have explored only the

relationship between hopefulness and mind-body activities (Snyder, 2002). It is therefore of interest to explore hope among exercisers and yoga practitioners, and to identify if each activity type differentially relates to hopefulness.

Models of hope

Hope has been described within the literature in respect to future possibility, experience of individual spirituality, beliefs, and caring (Dufault & Martocchio, 1985; Herth, 1993; Jevne, 2005; Miller & Powers, 1988; Nekolaichuk, Jevne, & Maguire, 1999; Thompson, 1994). It appears to support health and happiness, and provides the foundation upon which individuals may look positively towards the future (Arnau, 2003; Herth, 1994; Snyder, 2002; 2005). Hope is also a fundamental emotion evoked during times of difficulty or change (Herth, 1990; Herth, 1994; Owen, 1989; Snyder, 1996).

While the literature is in agreement on some aspects of hope, it is a diverse phenomenon for which no concrete meaning exists (Herth, 1992; Plante & Rodin, 1990; Stephenson, Pena-Shaff, & Quirk, 2006; Snyder, 2005; Taliageferro et al, 2008). In an effort to theorize how hope may relate to differences in mental health benefits between activity types, three models of hope are explained.

Dufault & Martocchio hope model. To encompass the multidimensional concept of hope, Dufault and Martocchio (1985) developed a model to describe the process of developing and experiencing hope (Herth, 1992; Rice, 2000). In their model, they emphasized the feelings of confidence, uncertainty, and questions about the outcomes that emerge during the hoping process (Rice, 2000). These questions and feelings provide the foundational thought processes that

occur when an individual conceives of a hopeful event, and the required action required to attain a goal (Rice, 2000). They also describe how an individual's relationship with others or a spiritual figure may provide support and increased hopeful thinking during times of difficulty (Rice). For example, an action that may be motivated by hope may include praying, provides an individual with a sense of hope but not necessarily a tangible outcome (Rice). Finally, Dufault & Martocchio identify how the hoping process is influenced by previous and anticipated experiences, as well as contextual information (Rice).

Snyder's state hope model. C.R. Snyder and colleagues developed an alternative definition of hope, with the guiding assumption that all human actions are goal directed (Snyder, 1994; Snyder, 2002; Snyder, Cheavens, & Sympson, 1997; Snyder, Sympson, Michael, & Cheavens, 2000). They emphasized that the basic act of hoping is enough to provide an individual with the thought processes necessary to bring about a successful pursuit of goals, regardless of the outcome (Snyder et al., 1991; Snyder et al., 2009). They also surmised that an individual who has goals in mind develops a sense of positive anticipation and excitement towards the future, providing the foundation for hopeful thinking.

In this model, goals are categorized by their general attributes, as well as by their temporal frame (e.g., short-term vs. long-term goals). Goals are also categorized in the degree to which they are specified, with more specific goals being more likely to occur in high-hope thinking (p.250). That is, it is more plausible to imagine having the ability or means to pursue concretely defined goals because they induce more sustained thought (p.250). Thus, each hope-

producing goal may look different for each individual, as it depends on the situation and how concretely each goal is defined.

Herth hope index. Kaye Herth developed an understanding of hope and hope-fostering strategies through her experience as a nurse and health-care practitioner (Herth, 1990, 1993, 1996; Jevne, 2005). Throughout a series of longitudinal studies with terminally-ill patients, the results indicated that as symptoms worsened, patient's goals became more global and focused less on self and more on others (Jevne, 2005; Herth 1990, 1996). The primary caregivers of these patients also reported that initial goals became a more general sense of hope as the patient became closer to death (Herth; Jevne, 2005). This highlighted the dynamic nature of hope for individuals who are in consistently changing environments. It also emphasized how individuals incorporate personal values, interpersonal relationships, and the needs of others when defining goals and hopes.

In an attempt to incorporate these more recently identified concepts, Herth and colleagues created a model of hope expressed in a manner of feeling, thinking, and as a way of behaving and/or relating to others (as described in Jevne & Miller, 1999). According to their model, the feeling aspect of hope develops when an individual surmounts seemingly impossible or difficult obstacles (Farren et al., 1995). This enables them to access alternative coping strategies in future problematic situations, and serves to increase an individual's self-confidence and positive attitude (Herth, 1992). The spiritual aspect of hope allows individuals to depict faith in oneself and in others in their lives (Farren et al, 1995). This faith is

fundamental when an individual is faced with unknowns or seemingly uncontrollable situations. The relational aspect of hope is described as the hope developed between two individuals, facilitated through communication and gathering of resources (Herth, 1991). Finally, the rational aspect describes the strategic decision making to overcome problems (p.10).

Commonalities in hope theory

Despite the discrepancies identified in the current models, various commonalities exist to define what a hopeful experience would look like, and how the process of hope emerges. These are emotional connectivity, goal-seeking and problem-solving behaviours and expectation of positive change.

Emotional connection. Having close emotional connections and a reliable support network appears to be fundamental in defining an individual's level of hope. High-hope people have a strong network of friends or family upon whom they may call upon during times of difficulty (Herth, 1995; Kwon, 2002; Snyder, 2002). This emotional connection appears to be learned from an early age, as high hope individuals report having close bonds with their caregivers and spend large amounts of time with them (Reiger, 1993; Snyder). In addition, they show more positive interpersonal relationships, are able to form strong attachments to others, and have more perceived social support throughout their lifetime (Barnum et al., 1998; McNeal, 1997; Snyder; Snyder, Cleavens, & Sympson, 1997).

Goal seeking. According to most models of hope, there is some element of goal-seeking and goal-attainment that provides individuals with motivation and positive regard towards the future (Herth, 1994; Snyder, 2002). Personally

relevant goals provide individuals with motivation and a sense of purposefulness (Jevne, 2005; Snyder). High-hoping individuals are also more confident in their ability to achieve the desired outcome because they are able to clearly define the route necessary to attain it (p. 251). Higher hope has also been associated with feeling more confident, energized, and challenged by life goals (Snyder et al., 1991; Jvene 2005).

Problem-solving/expectation of positive change. High-hope individuals are good at producing alternate routes when an initial problem-solving strategy does not work (Snyder, 2002). They also describe themselves as being flexible thinkers and resilient during times of difficulty (Snyder). As a result, high-hope individuals more frequently perceive environmental stressors as challenges and obstacles that may be overcome, rather than an insurmountable barrier (Affleck & Tennen, 1996; Snyder, Cheavens, & Michael, 1999; Tennen & Affleck, 1999). Low-hope individuals, however, often use avoidant or disengaged coping skills (Jevne et al., 2005; Snyder, 2002). This coping style is attributed to increased psychological distress, poor adjustment ability, and decreased quality of life when used regularly (Jevne et al.; Suls & Fletcher, 1985).

Hope and the Counselling Practice

Much has been written about the role of hope in psychological health (Snyder & Lopez; Petry, Tennen, & Affleck, 2000). In adults, hope is a predictor in life satisfaction and feelings of self-worth (Chang, 1998; Chang & deSimone, 2001; Snyder, Hoza, et al., 1997, Jvene, 2005). This is because they show more positive self-talk and affirmations (e.g., “This will happen”; “I will find a way to

get this done") (Snyder, Lapointe, Crowson, & Early, 1998, as reported in Snyder, 2002). As a result, high hoping individuals display better psychological adjustment and overall mental health (Jevne et al., 2005; Snyder, 2002).

Hope is also an essential component in the therapeutic context, and helps individuals overcome health adversity, interpersonal difficulties, and psychological distress (Bohart & Tallman, 1999; Snyder, 2002). High-hope clients typically seek out their own methods of healing and improving wellness, and are capable of defining what is considered optimal psychological health for them (Bohart & Tallman). In essence, they become their own personal change agents towards a successful treatment outcome. This is because a the change responsibility lies in the patient's belief in the clinician and/or treatment modality, their hope and expectation that change will happen, and the ability to employ their personal strengths to overcome difficult situations (Snyder & Lopez). High hoping individuals therefore tend to show improved success and psychological improvement in therapy (Dufault & Martocchio, 1982; Snyder, 2002; Snyder et al., 2005).

Physical Activity as a Support for Therapy and Psychological Health

The question that emerges is in defining how different types of physical activity relate to hopefulness and mood improvement, and how this may be of use for counsellors. As mentioned previously, has been related with increased hopefulness (Snyder, 2005). Those who engage in moderate exercise experience decreased depression, suicidal behavior, and hopelessness (Taliaferro, Reinzo, Pigg, Miller, & Dodd, 2008). Similar to high-hoping individuals, exercise

increases goal-seeking behaviours and belief in their ability to achieve these goals (Snyder, 2002). This appears to be true regardless of the intensity or duration of the exercise (Simon, Powell, & Swann, 2004; Ferron, Narring, Cauderay, & Michaud, 1999; Taliaferro et al.). However, greater exercise frequency appears to positively correlate with greater levels of hope (Simon et al.) It is currently unknown, however, how different types of physical activity (i.e., exercise vs. yoga) contribute to the development of hope. This is of importance for clinicians, who want to recommend activities that will best support their client's psychological health.

In an effort to theorize how different types of physical activity might affect one's hopefulness and psychological well-being, two principles of yoga and exercise are described. These are (a) differences in acceptance of present-moment experiences and self-awareness (b) body awareness/self-trust (Daubenmier, 2003).

Acceptance and self-awareness

In the beginning, a novice yoga practitioner may strive to improve their yoga postures by imitating a teacher's demonstration of the pose or observing other students (Daubenmier, 2003). Yoga often starts as an activity focused on the body. However, experienced practitioners understand that, if their practice involved thinking of an ideal physical posture and not of what is actually happening in a pose, the yoga practice would not evolve (Daubenmier). Rather, it is often taught that, when the yoga practitioner accepts their place in a pose instead of trying to push beyond their physical limitations, the pose actually progresses more quickly. This non-striving attitude and acceptance of one's

limitations ironically allows an individual to move beyond them (Daubenmier). Adopting a mental attitude of acceptance is also an overarching goal of yoga, and is thought to allow an individual to see things realistically (Daubenmier). Letting go of personal expectation and judgment also allows an individual to see themselves and their experiences in a positive light, a fundamental attribute of hopeful thinking.

In contrast, an exercise program typically begins with a specific goal in mind. Exercisers often have the goal of overcoming rather than accepting their initial physical or emotional limitations, known as the attitude of "no pain, no gain" regularly emphasized amongst North Americans. Progress is measured numerically through the numbers of calories burned or time spent exercising (Ryan et al., 1997). Although these goals often strive to develop the physical body, achieving their goals may provide the exerciser with the motivation to pursue even more goals (Snyder, 2002). Furthermore, while physical fitness and appearance initially motivate a person to exercise, it is the enjoyment of the activity, competence developed, sense of challenge, and social interaction that maintains their adherence (Ryan et al., 1997). This suggests that the combination of goal-attainment and positive reinforcements are what lead to the individual's improved well-being, and not just the physical component (Ryan et al.). The motivational exercise attitude also allows individuals to push beyond any preconceived limitations as they gain greater physical and mental strength (Daubenmier, 2003). Overcoming these targets leads to more self-confidence to

face future challenges (Snyder, 2002), leading the exercise practitioner to view their abilities in a more positive light.

Self-trust

In yoga, postures are initiated through the movement of the breath (Daubenmier, 2003). For example, in a forward bend, the out breath allows the body to deepen further into the stretch, while the in breath slightly opens the pose to initiate opening in the back (Iyengar, 1992; Michael & Roach, 2004). Coordinating the movement with the breath is most efficient and safe for opening the body. Daubenmier (2003) indicates that "[yoga practitioners are] taught to pay attention to when they have gone far enough in the pose, when they are tired and need to rest, or when they need to focus their breath to a non-energetic portion felt in their body" (p.18). This process allows the practitioner to use body awareness and sensations to guide their movement, rather than focusing on external sources of reinforcement. It is for this reason most yoga studios do not have mirrors. Instead, the internal experience defines a pose and allows the individual to respond appropriately to what their body needs (Daubenmier, 2003; Newmark, 1994).

This process may be either similar or dichotomous for exercisers, depending on the type of exercise practiced. In an independent exercise (e.g., running), the participant is typically motivated to progress in speed, agility, health improvements, and strength. Individuals who exercise may initially depend on external reinforcements to quantify their progression. However, as the individual becomes more comfortable with their physical abilities, they may be less reliant

on external motivators and instead attend to more subtle physical changes. For example, an experienced long-distance runner may notice changes in their breathing patterns and stride length, rather than on the time spent running. Over time, this internally-directed process would allow the exerciser to develop increased body awareness and self-reliance.

Alternatively, individuals who relate best with tangible markers of progression may best track improvements within a gym environment. Most gyms have weight machines and exercise equipment that allow the individual to measure their progress in an observable form. Mirrors also allow the exerciser to focus on proper alignment and see physical improvements in their body. While this method relies on primarily external reinforcement, it provides a concrete indication of progress made. Furthermore, pairing an observable change (e.g., increased muscle tone) with an internal experience (e.g., feeling more energetic and happy) may help the exerciser attune to the mind-body connection. This may contribute to letting go of preconceived self-limitations, trusting one's self potential, and developing new standards for what is believed possible.

Significance of the Literature

Because of the aforementioned qualities of yoga and exercise, it was reasoned that physical activity might provide a unique opportunity for individuals to develop increased self-awareness, confidence, and understanding of personal limitations. However, it is possible that these benefits might vary depending on the type of activity practiced. No comparison studies to date have been performed to assess differences in hope and mental health between different types of activity.

Because yoga is both a spiritual and physical practice, it is proposed that hope may contribute to the increased mood improvement received from its practice. It is also thought that this potential change in hopefulness and attitude of acceptance decreases an individual's perceived levels of psychological distress. However, because the goal-oriented nature of exercise increases an individual's self-confidence, it is thought that exercisers will also show elevated mental health reports compared to those who do not engage in either yoga or exercise.

Present Study

This study will compare those who do yoga or exercise on self-reported mental health, decreased psychological distress, and hope. Because all forms of physical activity are thought to increase physical and mental health, individuals who reported themselves as not participating in physical activity were selected as the comparison control group.

Hypothesis 1: Compared to the exercise and control groups, the yoga participants will report a significantly higher degree of psychological well-being on the General Health Questionnaire (GHQ).

Hypothesis 2: Compared to the exercise and control groups, the yoga participants will report a less degree of psychological distress and mental health difficulties. Specifically, the yoga participants will report lower scores on a measure of psychological distress, the Mental Health Inventory (MHI).

Hypothesis 3: Compared to the exercise and control groups, the yoga participants will report a higher level of hope. Specifically, the yoga participants

would score higher on the Herth Hope Index (HHI) compared to the exercise and control condition.

CHAPTER THREE

METHOD

Because of increasing time constraints and demands, North Americans are seeking ways to improve their emotional well-being and stress management (Iversen, Rushforth, & Forrest, 2009; Maslach, Schaufeli, & Leiter, 2001; Paluska & Schwenk, 2000). The current study considered whether individuals who are active perceive themselves to be in better emotional health than those who are not physically active. Is there one type of physical activity that may best help them to achieve these goals? Do yoga and exercise offer similar or different mental health benefits? While the literature supports the usefulness of exercise as a stress-moderator, less is known about mind-body activities. There are, however, an increasing number of individuals pursuing yoga and other mind-body activities, suggesting that it offers something different compared to traditional/physical fitness exercise. What is it about these activities that are attractive, and do their mental health benefits differ from those of physically-based exercise?

The primary intent of this study was to explore the mental health benefits of exercise and yoga compared to non-physically active individuals, and to determine if there were any differences between the two types of activity. Because the etiology of stress and mental health status is unique for each individual, it was thought that using mental health measures that provide a broad perspective on the contributors of mental health would be best for the current study. Two measures of mental health were used to explore this relationship to obtain a broad perspective on mental health. A second goal of this study was to identify any

differences in hopefulness between activity types. A measure of hope that emphasized spirituality and positive outlook was chosen for this study to assess differences in hope and between yoga and exercise.

Participants

Adults between the ages of 18-65 from the surrounding Edmonton area were recruited to complete an online survey on "Yoga and Exercise: Implications for Hope" (Appendix A). A total of 138 individuals visited the online survey between September, 2008 and June, 2009, and 114 individuals consented to participate. Of these participants, 44 individuals participated in the yoga group, 40 in the exercise group, and 30 in the no-activity control group. Twenty-four participants withdrew or did not fully complete the online questionnaires after consenting to participate.

Fourteen yoga participants and 10 exercisers were removed at random once all data had been collected in order to create equivalent group sizes. This was achieved by entering participant numbers into an online random number generator (http://www.randomizer.org/form.htm) to select participants that would be removed from the final analysis. This methodology was reasoned to be useful for the current study, because non-random sampling was used to select participants from the population. Creating equal sample sizes for each group has been found to increase robustness against violations of statistical analyses, including non-homogeneity of variance/covariance and unequal numbers within each dependant variable sub-category (e.g., age categories, gender) (Henson, 2006; Johnson & Field, 1993; Keselman, Huberty, Lix, Olejnik, Cribbie, et al.,

1998; Rencher, 1998), which have a high likelihood of occurring in a non-random sample (Rencher, 1998).

Group Characteristics. Characteristics of the final study population are presented in Table 1. The mean age for the entire sample was 33.5 and the median participant age category was 26-30 (Table 1).

Table 1

Mean Demographic Variables for Exercise, Yoga, and No Activity Types

Variable	Exercise	Yoga	No Activity	Total
Number of Participants	30	30	30	90
Age				
Mean	36.8	33.6	30.2	33.5
18-25	9	3	8	20
26-30	11	8	9	28
31-35	1	5	7	13
36-40	0	4	4	8
41-45	1	1	1	3
46-50	1	6	0	7
51-55	4	2	0	6
56-60	3	0	1	4
61+	0	1	0	1
Gender				
Male	8	1	8	17
Female	22	29	22	73

Note. Age categories were reported on a 9-point scale ranging from (1) 18-25; (2) 26-30; (3) 31-35; (4) 36-40; (5) 41-45; (6) 46-50; (7) 51-55; (8) 56-60; (9) 61+.

A chi square analysis identified a relationship between activity type and age (Table 2). Participants who were between the age of 46-50 were more likely to choose yoga over exercise and no activity, while significantly fewer individuals

participated in yoga between the age range of 18-25 compared to exercisers and controls (F= 30.265, df= 16, p<.05). Furthermore, 67% of participants were between the ages of 18-35, creating a relatively young sample population. Therefore, age was used as a variable in later analyses.

Table 2.

Chi square analyses of exercise, gender, and age

	Value	Degrees of Freedom	Significance (2-sided)
Gender* Exercise	7.107	2	0.029*
Age* Exercise	30.265	16	.002**
Gender*Age	3.825	8	.873

Note. * indicates significance, p<.05; **, p<.005

There was also a significantly greater number of females (n=73) in the study compared to males (n=17) in all activity conditions (F(2, 87)= 7.107, df= 2, p<.05). The chi square analysis found that the gender distribution was significantly different between activity groups (Table 2). Those in the yoga conditions had a significantly larger percentage of females compared to the exercise and control groups (F= 7.107, p<.05). While all but one of the yoga participants were female, both the exercise and no activity group comprised of 22 females and eight males. Because of this significant finding, gender was included as a variable in later analyses.

Procedures

Participants were solicited to complete the online survey through poster advertisements and flyers at yoga and exercise studios, fitness centers, community centers, and universities. Permission to post these advertisements was granted by discussing the nature of the project with managers of these studios and fitness centers. Potential participants were told that the investigator was conducting a research project through the University of Alberta on individuals who participate in yoga, exercise, or no activity. If they were interested, participants were given the contact number and e-mail address of the primary investigator so they could participate.

Recruitment. Because of the amount and variety of classes and teaching styles available in Edmonton, yoga participants were recruited from several yoga studios, with the intent of sampling from various styles of yoga (e.g., Hatha, Kundalini, Bikram, Ashtanga). The yoga classes at these studies normally ranged from one to 1.5 hours in duration and varied in difficulty. Participants were recruited from all difficulty levels of yoga classes, but had to be practicing yoga at least 3 times/week for three months prior to completing the survey. Similarly, exercisers were recruited from fitness centers and gyms that offered a wide variety of exercise programs, including aerobic equipment, fitness classes, and weights. Participants were recruited on the criteria of having a regular fitness routine (e.g., at least three times/week, 30 minutes each time) for three months prior to completing the survey.

The control condition was defined as individuals who had not participated in yoga or exercise three times/week, for three months prior to their completing the survey. These control participants were recruited in two ways. First, the author solicited control participants through poster advertisements placed in public areas, universities, and markets. Second, when yoga and exercise participants were recruited, they were asked if they knew of anyone who had not practiced exercise or yoga regularly in the past three months. If so, they were asked to pass along the study information to them.

Online questionnaire. After contacting the researcher, participants were e-mailed a link directing them to the online website (www.zoomerang.com) where the questionnaires were administered. The questionnaire contained a brief description of the project, consent form, and the survey instrument itself (see Appendix A). Before beginning the questionnaires, participants were informed of the nature of the study, their role as participants, and the inclusion criteria. It also outlined the potential risks and benefits of participating in the study. Participants had to consent prior to beginning the questionnaire, and were given the option of withdrawing from the study at any point without penalty.

Each participant was administered the GHQ, HHI, and MHI in a single session. Approximately 25 minutes was required to complete the questionnaires. At the end, participants were given the contact information for the primary researcher if they wanted to discuss concerns or adverse experiences while completing the questionnaire.

Measures

To measure the study variables, three self-report measures were used in the online-questionnaire. Psychological well-being was measured through the General Health Questionnaire (GHQ, Goldberg & Hillier, 1979), psychological distress was measured with the Mental Health Inventory (MHI; Davies, Sherbourne, Peterson, & Ware, 1988); and hope was measured with the Herth Hope Index (HHI, Herth, 1992);. As explained in the procedures question, participants completed these three self-report measures in one online questionnaire session.

General health questionnaire. Psychological well-being was quantified using the General Health Questionnaire (GHQ; Goldberg & Hillier, 1979), a 28-item questionnaire designed to provide a summary of presenting mental and general health (Brodman, Erdmann, Lorge, & Wolfe, 1949). Previous analysis revealed that the factors identified in the scale are applicable across all populations (Barsan, 2005; Werneke, Goldberg, Yalcin and Ustun, 2000). The questionnaire provides an overall measure of health, as well as four sub-scales: (1) Somatic Symptoms (Items 1-7); (2) Anxiety/Insomnia (Items 8-14); (3) Social Dysfunction (Items 15-22); and (4) Severe Depression (Items 22-28).

Total possible scores on the GHQ ranges from 0 to 84, and allows for means to be calculated for both the global total, as well for the four sub-scales. The GHQ is scored using a 4-point Likert scale (0-3), with higher scores relating to more severe reported symptoms, and lower scores relating to fewer symptoms and better psychological health. It was reasoned that the large scope of

psychological health measured by the General Health Questionnaire would provide an interesting exploration of how activity type related to an individual's conceptualization of psychological well-being.

Mental health inventory. The Mental Health Inventory (Davies, Sherbourne, Peterson, & Ware, 1988) is a 38-item measure designed for use in clinical or non-clinical samples to assess psychological distress and psychological well-being (Shorey, Little, Snyder, Kluck, & Robitschek, 2007; Veit & Ware, 1983). Each item on the MHI includes a description of a particular symptom or state of mind and the respondent indicates the degree to which they have been experiencing those symptoms in the past month (MHNOCC, 2009).

The MHI yields three subscales contributing to psychological distress (anxiety, depression, and loss of behavioral/emotional control) and three subscales contributing to psychological well-being (general positive affect, emotional ties, and life satisfaction) (p.1921). An example psychological distress item is: "How often, during the past month, have you felt so down in the dumps that nothing could cheer you up?"(p.1921); an example of a psychological well-being item is: "How much of the time, during the past month, have you felt cheerful and light-hearted?" (p.1921). All of the scales, except for two, were rated on a six-point scale.

The subscales are scored in two steps: item scoring, and the subscales themselves. Thirty-five of the 38 subscale items are used to score the six mental health subscales (items 2, 22, and 38 omitted from the subscales) (Davies et al., 1998). Each item appears only in one subscale. In addition, a global

psychological distress and psychological well-being score was calculated (NOCC, 2009). Total scores on the MHI allows for means to be calculated for both the global total, as well for the six sub-scales relating to individual aspects of psychological health.

Herth hope index. Participants' level of hope was measured through administration of the Herth Hope Index (HHI), a 12-item, four-point scale that quantifies three major dimensions of hope (Herth, 1992). The Herth Hope Index (HHI) was analyzed by adding the total scores once the participant has completed the questionnaire. The items of the HHI are in Likert-format and are divided over the three subscales; each item was scored on an ordinal scale from 1 to 4, where a score of 1 indicates 'strongly disagree' and a score of 4 indicates 'strongly agree.' Total scores could range from 12 to 48, with a higher score indicating higher level of hope (Herth, 1992).

The HHI reflects the dimensions of hope (in both clinical and non-clinical populations, and has adequate validity and reliability estimates. Criterion validity was established by correlating the HHI with the parent HHS (Hope Herth Scale, r=0.92), the Existential Well-Being Scale (r=0.84) and the Nowotny Hope Scale (r=0.81) (Herth, 1992). The HHI reliability coefficient ranges between 0.94 and 0.98, and concurrent validity ranging from 0.81 to 0.92, which are considered to be adequate for the current study.

Ethical Considerations

All methods complied with the University of Alberta Standards for the Protection of Human Research Participants. A proposal for this study was

submitted to and approved by the Faculties of Education, Extension and Augustana Research Ethics Board (EEA REB) at the University of Alberta on August 8th, 2008. Although some of the questionnaires in this study were considered to be emotional in nature, the potential risks or discomfort involved were considered to be minimal.

Confidentiality of all participants was protected; no identifying information (name, age, gender, etc.) was kept on record, and all responses were coded into numerical value during the assessment and analyses. Free and informed consent was obtained, and participants were informed that they might discontinue the study at any time, without consequence or explanation.

Participants were informed that if they became uncomfortable while completing the questionnaires, they could discontinue the study. Participants were also given the contact information to reach the primary investigators or the University of Alberta Ethics board for questions or concerns.

Statistical Analyses

Data was compiled and analyzed using SPSS v.17.0. All comparisons were designed to answer the research questions. To explore differences between the exercise, yoga, and control conditions in reported levels of psychological well-being and psychological distress, a mixed-model 3x2x9 (Activity Type x Gender x Age) Multiple Analysis of Variance (MANOVA) was used. Specific demographic variables, including gender and age, were included in each MANOVA because earlier analyses revealed significant differences between the groups on these variables. The MANOVA results were calculated to assess

differences in the means between each group, as well as how each age and gender interacted with the reported symptom of participants in each activity group. Because of potential violations of the MANOVA assumptions due to non-random sampling, Pillai's trace criterion was used as the significance criterion for all calculations. To explore the differences between the activity conditions in reported levels of hope, a mixed-model 3x2x9 (Activity Type x Gender x Age) Univariate Analysis of Variance (ANOVA) was used.

Univariate/Between-subjects analysis and post hoc t-tests were performed to examine differences between activity conditions on each rating scale, to obtain an understanding of the differences between activity conditions from the MANOVA and ANOVA findings. For all analyses, a cut-off of $p < .05$ was used as the criterion for significance, as used in most scientific research studies to accommodate effects of Type I and Type II error.

CHAPTER FOUR

RESULTS

The focus of this section is the statistical analysis of the data obtained from the online questionnaire. A relationship between psychological well-being between activity types was found on the General Health Questionnaire, but not on the Mental Health Inventory. A between-activity (i.e., exercise vs. yoga vs. no activity) difference was identified on the GHQ anxiety/insomnia subscale. Furthermore, both the exercise and yoga group showed higher levels of hope compared to the no activity control group. Not all hypotheses were supported, but it is not clear whether this is due to unanticipated results or because of non-random sampling methods.

Assumptions

Box's test was found to be significant in the mixed-model MANOVA for the General Health Questionnaire (Box's M= 1.656, p=.001). Moreover, in the mixed-model MANOVA for MHI, Box's test of equality of covariance matrices could not be computed as there were fewer than two nonsingular cell covariance matrices. Accordingly, the Pillai's Trace criterion omnibus statistic was used in preference to Wilk's lambda for the MANOVA analyses, because it is considered to be highly robust to such violations.

Levene's test of equality of variance was also found to be significant for all three ratings scales and many of the subscales (Table 3). Tamhane post-hoc analyses were therefore used for all three questionnaires, because this test does not assume equivalent error of variance (Rencher, 1998).

Table 3.

Levene's Test of Equality of Error Variances

	F	Sig
GHQ		
Somatic Symptoms	2.188	.005*
Anxiety and Insomnia	1.687	.044*
Social Dysfunction	1.247	.244
Severe Depression	2.496	.001*
Sum GHQ	2.373	.002*
MHI		
Psychological Distress	5.266	.000*
Well-Being	3.116	.000*
Anxiety	5.742	.000*
Depression	2.896	.000*
Emotional Control	2.727	.001*
Positive Affect	4.214	.000*
Emotional Ties	4.968	.000*
Life Satisfaction	1.653	.051
Total Score MHI	2.173	.006*
HHI		
Sum HHI	2.649	.001*

Note. * indicates significance

Tests of the distributional properties of the data in each analysis cell revealed violations of normality in the gender ($p<.005$) and age ($p<.05$) cells. These were attributed to outliers within the data, but none of the distributions exhibited z-skewness/kurtosis ≥ 2.00. Also, univariate ANOVA and MANOVA are relatively robust to withstand such violations of normality when the sample sizes are equal (Rencher, 1998). Therefore a decision was made to not apply logarithmic transformation to the data but was taken into consideration in the interpretation of the data.

Findings

Psychological Well-Being-General Health Questionnaire

The first research hypothesis was that yoga participants would report better psychological well-being as defined by overall scores on the GHQ compared to the other two activity types. The means on the General Health Questionnaire are presented in Table 4.

Table 4.

Means GHQ Score for Each Exercise Condition

Variable	Exercise	Yoga	No Activity
Mean	47.927 (2.080)	43.775** (2.060)	52.236 (2.052)
Subscales			
Somatic Symptoms	13.47 (3.115)	11.87 (3.014)	14.90 (3.595)
Anxiety & Insomnia	14.53 (3.972)	10.53* (3.203)	14.57 (4.470)
Social Dysfunction	13.23 (2.223)	14.00 (2.378)	13.80 (2.709)
Severe Depression	7.33 (.577)	7.47 (1.106)	8.30 (2.322)

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Note. Standard deviations presented in parentheses. *p<.01. **p<.005.

The one-way MANOVA on the General Health Questionnaire revealed a significant multivariate main effect (F (2, 87)= 2.623, p<.05, η^2=.187) between activity conditions (Table 5). Power to detect the effect was found to be .949. Of the 90 participants who completed the entire questionnaire, the mean GHQ score for yoga participants was higher than the scores for the exercise and no activity control conditions (Table 4). No main interaction effects were observed in this analysis.

Given the significance of the overall test, the univariate main effects were examined. Those in the yoga condition reported significantly higher scores on the GHQ compared to the exercise and no activity condition (F= 4.494, p<.05).

Because reported symptoms decreased and psychological health was better among yoga participants, hypothesis 1 was supported.

Table 5.

Main Effect of Activity Type on GHQ MANOVA

General Health Questionnaire			
	F	df	Sig.
Activity Type	2.623	58.0	.007*
Age	.975	232.0	.517
Gender	.650	29.0	.292
Gender* Exercise	1.645	56.0	.163
Gender*Age	0.989	300.0	.482
Activity Type*Age	0.823	300.0	.796
Activity Type*Age*Gender	1.198	56.0	.322

Note. *indicates significant value.

GHQ subscales

A between-subjects analysis revealed that activity type affected scores on the Anxiety and Insomnia subscale, $F(2, 87)=5.282$, $p<.01$ $\eta^2=.150$) between activity conditions. Power to detect the effect was found to be .817. Subsequent Tamhane post-hoc analyses indicated that those in the yoga condition reported less symptoms on this scale compared to the exercise ($p<.01$) and no activity control group ($p<.001$). A review of the subscale items indicated that symptoms

contributing to this subscale included: feeling nervous, like things are piling up, less scared and panicky, and less edgy/bad-tempered. No differences were identified on the other GHQ subscales.

Psychological Distress - Mental Health Inventory

The second research question was addressed through the Mental Health Inventory, to explore how yoga and/or exercise participants report their level of stress and coping compared to those who do not. It was hypothesized that yoga participants would report the least psychological distress between the activity groups. The MHI specifically asks questions relating to overall psychological distress, psychological well-being, anxiety, depression, emotional control, positive affect, emotional ties, and life satisfaction. The means of each category are presented in Table 6.

Table 6

Means of MHI Ratings Each Exercise Condition

Variable	Exercise	Yoga	No Activity
Mean	125.834 (1.857)	126.065 (1.857)	119.355 (1.849)
Subscales			
Psychological Distress	78.63 (7.981)	76.60 (11.569)	73.83 (6.148)
Psychological Well Being	47.50 (4.256)	49.20 (7.959)	46.03 (5.925)
Anxiety	27.82 (3.765)	27.17 (4.602)	27.30 (2.507)
Depression	14.30 (2.003)	14.20 (2.578)	13.17 (1.877)
Emotional Control	30.63 (3.146)	30.27 (5.489)	29.03 (3.124)
Positive Affect	36.57 (3.191)	37.67 (5.744)	34.60 (3.359)
Emotional Ties	4.27 (1.484)	4.33 (2.591)	4.70 (1.418)
Life Satisfaction	4.27 (1.015)	4.67 (.802)	3.83 (.913)

Note. Standard deviations are presented in parentheses.

It was found that type of activity did not have a main effect on the Mental Health Inventory one-way MANOVA, $F(2.87) = 0.965$, $p>.05$ (Table 7). No main effects of age, gender, or interaction effects identified on this scale (Table 7). Therefore, hypothesis 2 was not supported by the current findings.

Table 7.

MANOVA results for the MHI

	F	df	Sig.
Activity Type	.965	16.0	.499
Age	.860	480.0	.769
Gender	.644	8.0	.737
Gender* Exercise	1.037	53.0	.421
Gender*Age	.997	285.0	.480
Activity Type*Age	.924	480.0	.661
Activity Type*Age*Gender	.887	53.0	.533

Hope- Herth Hope Index

The final research question explored potential differences in hopefulness between the activity groups. Specifically, yoga participants were hypothesized to report higher levels of hope compared to the exercise and control conditions. The means of the Herth Hope Index after completion of the questionnaire were compared for each activity condition using a univariate ANOVA.

Table 8

Mean Hope Ratings for Each Exercise Condition

	Exercise	Yoga	No Activity
Mean	37.90 (2.618)*	38.47 (2.980)**	35.57 (3.421)

Note. Standard deviations are in parentheses. *p<.05. **p<.005.

There was a main effect of type of activity on reported hopefulness, F (2.87)= 4.691, p<.05, η^2 =.135) (Table 9). Power to detect the effect was found to be .767. No main effects between the other variables were identified in this comparison (Table 9).

Given the significance of the ANOVA, post-hoc analyses were performed. Both the exercise (p<.05) and yoga (p<.005) groups reported significantly higher hope scores compared to the no activity control group. No main effects of age, gender, or main interactions identified on this index (Table 9). Therefore, hypothesis 3 was partially supported. Rather, it was found that both forms of physical activity increase hopefulness compared to the no activity condition.

Table 9

Univariate ANOVA results for HHI

	F	df	Sig.
Activity Type	4.691	2	.013*
Age	.685	8	.703
Gender	1.290	1	.260
Gender* Exercise	.000	1	1.000
Gender*Age	.252	5	.937
Activity Type*Age	.773	10	.654
Activity Type*Age*Gender	2.349	1	.641

Note. *indicates significant value.

Summary

The statistical analysis revealed both anticipated and unanticipated results. As expected, the yoga participants reported better psychological well-being compared to the exercise and no activity conditions. Furthermore, yoga participants reported reduced anxiety compared to both the exercise and no activity group. Therefore, the hypothesis that yoga participants would report significantly better mental health was confirmed with group differences on the GHQ.

The statistical analysis revealed that there were no differences between the three activity conditions on the Mental Health Inventory. This suggests that all three conditions experience similar levels of psychological distress, regardless of

whether they participate in physical activity or not. Therefore, the hypothesis that yoga participants would report significantly less psychological distress was not confirmed on the MHI.

Finally, the statistical analysis revealed that both the exercise and yoga participants reported higher levels of hope compared to those in the no activity condition. Therefore, the hypothesis that yoga participants would report significantly higher levels of hope was partially confirmed.

CHAPTER FIVE

DISCUSSION

The purpose of this study was to understand how yoga, a mind-body activity, and physical exercise differ in their relationship with psychological well-being, distress, and hope. It was hoped that this would provide individuals with increased options for managing stress and emotional well-being while maintaining their physical health. Individuals who practice yoga and exercise were compared to those who do not engage in physical activity. Overall, the results support the notion that a mindfulness-physical practice, such as yoga, can improve reported psychological well-being. The results also support the notion that physical activity in general helps to increase hopefulness compared to those who participate in no activity. It is therefore of interest for future research to consider physical activity from a mind-body perspective, as it may offer increased avenues for anxiety reduction and mental health interventions. However, because of violations of assumptions attributed to the non-random samples used for the current study, the results were interpreted with caution and require follow-up investigation.

Evaluation of Findings

General health questionnaire

In this study, yoga practitioners report improved mental health compared to the other activity conditions on the General Health Questionnaire. This supports previous findings that yoga provides increased psychological health benefits compared to those who exercise and no activity. However, the

significant chi square analysis for age and gender raised the question of how these variables influence the relationship between activity choice and reported mental health.

A review of the current data indicated that participants between the ages of 46-50 appeared much more likely to choose yoga compared to the other activity conditions. Furthermore, two thirds of the participants (n = 61) fell between the ages of 18 to 35, skewing the samples towards a younger population. One reason that may explain this pattern of findings is that younger populations are at less risk of chronic disease and injury (Stamler, Stamler, Neaton, Wentworth, Daviglus, et al., 1999). They may be more likely to engage in riskier physical activity, and feel less of a need to pursue restorative, gentle activities (e.g., yoga). As a result, younger populations may naturally have a more positive outlook and hopefulness compared to an older population, regardless of activity type. Moreover, they would have had less opportunity to experience adverse life events. This may have affected variation in participant response on the current survey, reducing the ability of the instruments to detect between-group differences.

Another likely explanation is that older populations seek activities that are restorative in nature, supported by the finding that the yoga condition had the highest average age compared to the other two activity conditions. This may be reasoned by the instructor-student component offered by in the yoga class, as well as the restorative nature of yoga. For example, yoga participants were recruited from studios that offer led yoga classes from experienced yoga teachers. During a typical class, students receive both verbal instructions and physical adjustments

from the teacher. Furthermore, yoga instructors may easily modify yoga postures according to each individual's physical needs. This specialized attention is of importance for an older population, as they are more likely to experience physical limitations and injuries. Because of these accommodations, however, older participants may feel more able to participate in yoga compared to other forms of physical activity. Furthermore, the yoga practitioner would also be able to choose a yoga class that best suits their ability level, creating a group environment where they are more likely to accept their abilities and limitations and progress at a rate that is safe for them.

However, yoga has also become increasingly popular amongst young adults in Western culture, suggesting that this sample yoga population used in this study may not reflect what would be seen in the typical North American yoga class. Rather, it was anticipated in the design of this study that the no-activity group would have had the highest average age, as older populations are more likely to be restricted by illness and chronic injury. This result might reflect a newer trend amongst older populations to seek out their own methods of improving quality of life and health as they age. It was once a misconception that, once a person reached a certain age, physical and mental health would decline to the point that it would restrict their ability to pursue physical activity. However, gentle forms of activity, like yoga, actually help to improve their physical range of motion and strength (Lake & Spiegel, 2007), providing them with a non-medication way to reduce pain and health degradation.

It is also of importance to note that yoga instructors traditionally practice yoga for an extended period of time and must have knowledge of the spiritual component of yoga prior to teaching. Because of this, an experienced yoga instructor typically describes during class how the yoga postures may relate to ultimate spiritual component or "union with the divine" (Daubenmier, 2003). Furthermore, the student-teacher relationship that might develop would provide a potential source of support and spiritual guidance in addition to the physical yoga practice. These qualities may also be attractive for older individuals seeking greater meaning in their lives and developing greater spirituality as they age.

Anxiety and insomnia differences. Follow-up analyses on the GHQ were conducted to examine whether differences in sub-scale scores accounted for yoga practitioners' higher psychological well-being ratings. It was found that they reported lower anxiety and insomnia compared to the exercise and control group. Questions that contributed to these lower ratings included nervousness, feeling that 'things are piling up,' fear/panic, and edgy/bad-temperedness. Each of these items highlights how yoga may help to induce a sense of calm and relaxation in the practitioner.

The practice of focusing on both physical and mental relaxation in yoga (Roach & McNally, 2004) may explain the current results, and may be a powerful way for individuals to observe how anxiety manifests in their lives. For example, yoga practitioners may gain increased awareness of how emotional tension can translate to physical discomfort, by noticing how the breath is restricted in certain postures. Daubenmier (2003) suggests that as awareness is brought into tight or

uncomfortable areas of the body with an attitude of acceptance, a spontaneous release of physical tension occurs that allows the body to move more deeply into a posture. This may also create a new understanding of their mental health, one based on mindfulness rather than striving to overlook bodily cues that signal stress (Daubenmier). Yoga practitioners may realize that, while they may not be able to change the stressors that emerge in their daily lives, they may create a sense of mental relaxation through the use of breathing and staying aware in thought. It is also something that can easily be used at any point of the day, outside of the yoga class, when experiencing physical tension and anxiety.

Gender explanations. It was interesting to note that a marked proportion of the study participants (81%) were female, as noted on earlier chi-square analyses (Table 2). Furthermore, all but one of the yoga participants was female, while both the exercise and no activity group comprised of 22 females and eight males. One explanation for these results is that gender has been shown to influence activity choice (Davis, Fox, Brewer, & Ratusny, 1995; Eagen, 1995). Evidently, this is supported by the current gender-bias, suggesting that women are more drawn to practice yoga. There may be a few reasons for which this prevalence of women practicing yoga was noted. One reason is that men may be less likely to participate in yoga because it is predominantly practiced by females in North America (Yoga Journal, 2009), and has the perception of being a "softer" form of activity. Similarly, women are less likely to participate in strength related exercises because it is perceived as being male-dominated (King, Blair, Bild,

Dishman, Dubbert, et al., 1992). This may translate to a dichotomy in activity preference between the genders.

Females may also be more inclined to participate in activities that improve both mental and physical health, making them more open to learning more about the yoga practice and experiencing its subsequent benefits (Franzoi, 1995; Gavin & McBrearty, 2010). Again, the supportive student-teacher relationship could provide a consistent source of support for the practitioner, and may be particularly attractive to females. The yoga teacher also provides verbal and physical adjustments and encouragement for the individual as they learn and progress through the postures. The act of being touched physically and hearing positive encouragement from the teacher provides a feeling of nurturing and acceptance. Furthermore, because the focus in yoga is always placed on what *can* be done with the body, rather than what *cannot* be done, they may be more likely to gain a feeling of support during the yoga class (Roach & McNally, 2004).

However, it is also known that females are more willing to participate in research studies (Cannon, Higginbotham, & Leung, 1988; Wiederman, 1999), regardless of the personal benefit (Talyor, 1994). Furthermore, the current study did not ask gender-specific questions that might define why females may be more drawn to yoga. To address these questions, further investigation is required.

Mental health inventory

Results on the mental health inventory did not support the second hypothesis, that yoga practitioners would show the lowest levels of psychological distress compared to the other conditions. Therefore, the current data suggests

that physical activity does not help individuals manage stress in a way that is different from those who are not physically active. Because of the relaxation component of yoga, as well as the known stress-reduction effects of physical activity in general, it was surprising that no differences in psychological distress was found on this questionnaire.

Why were there no differences found on the Mental Health Inventory? One plausible explanation could be attributed to the ordering of questionnaires. Because the MHI and GHQ address similar aspects of mental health, participants completing the survey might have felt the questions were redundant. For example, the GHQ asked about anxiety "Have you recently been feeling nervous and strung-up all the time?" versus an anxiety question on the MHI "During the past month, have you been anxious or worried?" Both questionnaires were also somewhat lengthy to complete. Because the MHI was placed after the GHQ on the survey website, participants may have been less attentive to the second questionnaire or lost interest compared the GHQ. The non-significant difference may therefore have been more attributed an overlap in questions, rather than an actual lack of difference between the activities.

The results may also be explained by an inappropriate selection of questionnaire for the current non-clinical study population. Although no specific questions were asked regarding previous health history, it was assumed for the purposes of the study that the majority of the participants were healthy and in relatively good physical condition. This was reasoned by the fact that over half of the participants were participating in regular physical activity, requiring a certain

level of physical fitness and/or ability. Because of this, some questions on the MHI might not be appropriate for a generally healthy participant group, such as questions pertaining to suicidality or depression (e.g., "How often, during the past month, have you felt so down in the dumps that nothing could cheer you up?"(p.1921); "During the past month, how often have you thought that others would be better off if you were dead?").

Furthermore, it is also possible that psychological distress was not adequately defined for the current study. The Mental Health Inventory was originally chosen because it identifies various components of mental health in addition to psychological distress, and was thought to be useful for identifying group differences in this exploratory project. However, it may have been more appropriate to include a measure that specifically addresses perceived stress and psychological distress. A more complete picture of psychological distress might have been achieved with a qualitative interview or open-ended question.

It is also possible that the lack of findings on this questionnaire is attributed to the spread within the data itself. As mentioned previously, Box's test of equality of covariance matrices could not be computed for the MHI as there were fewer than two nonsingular cell covariance matrices. Furthermore, a review of the data revealed that Levene's test for equality of error variances was significant for all MHI scales and subscales, except for the Life Satisfaction subscale. This suggested that the data was not homogeneous within each category of the MHI, largely attributed to non-random sampling, unequal gender proportions, as well as different participant numbers within each age category.

Consequently, this exploratory study lacked the desirable normal population distribution, making the statistical analyses more difficult to interpret. It is also possible that participant variables not accounted for in the current study influenced the relationship between the independent variables (e.g., participant health, expectations). To gain a better understanding of these findings, a randomly sampled study population is necessary, with the inclusion of more clearly defined variables.

Herth hope index

The final hypothesis of this study was that yoga, a spiritual and physical activity, would be associated with higher levels of hope than physically oriented exercise and no activity. This is because yoga is thought to increase the practitioner's self-awareness and acceptance, and provides a potential source of spirituality. Partially supporting this hypothesis, the current findings for the Herth Hope Index showed that both the exercise and yoga conditions showed increased hope compared to the no activity control group. This provides support for previous findings that physical activity increases hope (Snyder, 2005). Although the trend in the data suggested that the yoga condition reported the highest levels of hope, it was not significantly different from exercise.

One explanation for the lack of difference between exercise and yoga is that the Herth Hope Index did not adequately identify hope and mindfulness for the purposes of the current study. Because various definitions of hope exist within the literature, it is still a relatively unclear concept and not easily quantifiable. The Herth Hope Index was originally chosen because its inclusion

of a spiritual component was thought to be advantageous to capture all elements of the yoga practice (Herth, 1994). However, because of its brevity, it did not provide the opportunity for participants to elaborate on the significance of the physical activity in their lives. The spiritual aspect of yoga is equally as vague, as it thought to be dependent on the individual and their experience with the practice (Feuerstein, 1989). The tangibility of hope would also make it difficult for participants to describe their personal experiences of it within the constraints of a questionnaire.

The Herth Hope Index also neglects the goal-oriented nature of exercise programs, which is a potential contributor to the differences between exercise and yoga. As mentioned previously, exercisers often rate their progress through goal setting and achievement (e.g., weight loss, duration of time, distance travelled, and health changes) (Ryan et al., 1997). Similarly, although yoga does not necessarily promote traditional "goals," practitioners of yoga often have the goal of becoming more flexible, gaining increased mental well being, and ultimate *Samadhi* (union with god) (Roach & McNally, 2004). Because of this, it was questioned whether greater differences in hope would have been identified had a different hope rating scale been used for the current study. For example, the Snyder Hope state scale, which focuses on the goal-oriented nature of hopefulness, may have provided insight into how activity type affects the way individuals use goal-attainment. This might have also affected the trend in the current hope data (e.g., the exercise group might have shown the highest level of hope with the Snyder scale).

Another obvious explanation is that yoga and exercise are equally as effective in increasing hopefulness, and that the mental aspect of yoga does not provide an additional source of hope compared to exercisers. Although spirituality has been defined as an important contributor to hope (Herth, 1992), it is highly possible that many North American yoga practitioners would not consider their yoga practice to be a spiritual one. For example, the same physical postures are taught to a group of individuals during a hatha yoga class. Some people might focus on the physical benefits of the postures, while others might focus on using their breathing to reduce stress. Unless they had a special interest in the yoga philosophy and its relation to a spiritual figure, they could easily practice the postures without any intention of spirituality, particularly if the teacher does not mention it during the class. In this case, yoga would be relatively comparable to exercise in terms of spiritual benefits if the yoga practitioner was not seeking to connect with something 'beyond the self.' This unknown might have been clarified if the participant's view of the yoga practice and it's relation to spirituality was included in the questionnaire.

Another question raised during the analysis is that those in the exercise and no-activity conditions may find sources of spirituality and mindfulness in other areas of their lives. This study did not account for the various personal definitions of meditation and spirituality and other spiritual activities that the participants engage in (e.g., a spiritual experience could happen with a specific meditation exercise, while hiking in a quiet forest, while at church). Because hope and meditation are dependent upon each person and their experiences, a

standardized rating scale may not have captured these discrepancies between the groups.

On a final note, the Herth Hope Index has not been as rigorously tested within the literature compared to the GHQ and MHI, in both clinical and non-clinical populations (Goldberg, Gater, Sartorius, Ustun, Piccinelli, Gureje, et al., 1997; Rumpf, Meyer, Hapke, John, 2001). Although the HHI has been found to be adequately reliable and valid within the hope literature, hope itself is still a relatively unclear concept, and may cause variations in instrument outcome (Snyder, 2002). In this case, it may have been more prudent to use multiple assessment measures, including a qualitative measure of hope, in order to develop a better understanding of hope differences between activity conditions. This may also provide insight into how non-active individuals find sources of hope in their lives.

Research Implications and Further Research

This study was the first to consider whether differences in mental health ratings between activity types may be accounted for by discrepancies in hope ratings. Articles have been written in yoga magazines and several research studies allude to differences in spirituality and positive outlook, but little empirical investigation had been conducted to specifically explore how it compares to exercise (Daubenmier, 2003; Lake & Spiegel; Yoga Journal, 2009). While the current results suggest that there are differences in psychological well-being between activity types, psychological distress does not appear to factor into this difference. Other aspects of mental health not addressed by the Mental

Health Inventory may contribute to the different psychological health benefits received from yoga and exercise. Instead, the current results suggest that differences in anxiety and insomnia may account for these psychological health differences. The results also show that hope is a contributor to psychological well-being among physically active people, but does not appear to depend on the type of activity practiced. However, because of non-random sampling, as well as questions raised during the course of the study, further investigation is necessary to confirm these findings.

This study does, however, contribute to future research and theory development on physical activity. Since the research to date on yoga is still relatively new, most studies have focused on its comparison to exercise. Few studies have defined underlying reasons to account for differences in psychological functioning. This study provides some clarification on the mechanisms thought to account for these outcomes, which may include differences in anxiety and insomnia ratings, as well as differences in overall psychological well-being and hopefulness. This is of benefit for individuals who are looking for ways to improve their overall psychological functioning and stress management. It will also help individuals best decide which type of activity that may best suit their health needs. For example, those who are looking to increase their coping with stress and anxiety would be best choosing a yoga-based program. However, those who are primarily interested in improving their physical health, and who feel best when they experience tangible results, should choose an exercise-based program.

The current results also contribute to the literature on symptom reduction of anxiety and insomnia. They suggest that yoga practices may enhance the effectiveness of current treatments, because they reduce symptoms of anxiety. Future studies should further investigate the effect of yoga and physical exercise for those who experience anxiety disorders (e.g., general anxiety disorder, post-traumatic stress, panic disorder). It would also be useful for future studies to implement these activities among individuals who are high risk for experiencing stress (e.g., university students, health-care workers, chronic disease patients).

This study also contributes to the literature on physical activity and mental health, which has been primarily focused towards physical-based exercise. The present study emphasizes the benefits of both mind-body and physical exercise, and provides insight on how they might be helpful for the counselling field. It also provides insight into the predominant female interest in mind-body activities, and how gender influences type of activity an individual engages in.

Finally, this study contributes to the literature on physical activity and hope, which has been relatively sparse to date. The present study shows that both yoga and exercise are beneficial for increasing hopefulness, which may be of significant use for counsellors and health care practitioners working with individuals experiencing chronic disease, long-term depression, and poor life satisfaction. Because this is one of the first studies to explore the relationship between type of activity and hopefulness, further research is necessary to confirm these findings.

Implications for the Counselling Practice

Because the current results indicate that both exercise and yoga relate positively with psychological well-being and hopefulness, it is of interest for counsellors and health-care clinicians to use this as a therapeutic support. While good social networks, coping ability, and positive outlook are all commonalities amongst healthy individuals, these supports may not be readily available or accessible to everyone. Furthermore, those who have experienced trauma or a history of recurrent mental illness are less likely to employ constructive coping strategies (Jevne et al., 2005). This may have an impact on their progress in therapy and subsequent psychological health.

Yoga and exercise could be a valuable resource for both the therapist and client. Primarily, they could provide clients with a support system that is easily accessible and enjoyable. Generating no appreciable side effects, both activities are easy to initiate and maintain. They can also be practiced on a regular basis, and may seem more easily integrated into social activities compared to other therapeutic techniques. For example, it might be easier for someone to go for a walk on their lunch break three times during a week compared to attending a group therapy class. Because exercise produces equivalent symptom reduction to medication, the client may be more likely to use physical activity on a regular basis to manage stress, increasing the likelihood of their treatment success (Blumenthal, Babayak, Moore, Craighead, Herman, et al., 1999; Ryan et al., 1997). The counsellor can also strategize with their client to use physical activity as a source of continued support after therapy (Herth, 2000; McDermott &

Snyder, 1999; Snyder & McCullough, 2000). This will equip the client with a concrete coping strategy, so they are more likely to feel in control rather than apprehensive when encountered by future stressors (Herth, 2000; McDermott & Snyder; Snyder & McCullough). As a result, the client will become less reliant on the therapist and improve their overall outcome from therapy.

Physical activity as a therapeutic tool

In order to outline how yoga and exercise could be used therapeutically, various activities are outlined in the following section. These include deep breathing and progressive relaxation for anxiety reduction, as well as the use of physical activity for specific populations.

Yoga for Anxiety. Yoga uses mindfulness techniques similar to those used in cognitive behavioural therapy, body-centered, and mindfulness therapy (Manjula, Kumariah, Prasadaro, & Raguram, 2009; Manzoni, Pagnini, Castelnuovo, & Molinari, 2008). One of these common techniques includes deep breathing (Leahy, 2003). Yoga primarily includes the use of deep breathing to reduce physical tension and to prepare the body for meditation (Desikachar, date). It also has the added benefit of decreasing heart rate (Vempati & Telles, 2010). Because many symptoms of anxiety and panic often manifest from shallow and rapid breathing, yoga may help to facilitate relaxation (Brown & Gerbarg; Martarelli, Cocchioni, Scuri, & Pompei, 2009). For example, yoga postures that require twisting of the torso temporarily restrict breathing capacity, mimicking feelings of anxiety and panic. While the breathing restriction would naturally subside once the individual becomes more physically flexible, it would provide

them with a unique opportunity to develop a tolerance to these anxiety-provoking sensations.

Primarily, the student would initially learn that the more they restrict their breathing, the more difficult the posture becomes (Daubenmier, 2003). That is because yoga teaches that it is the breath that initiates the movement and deepening of the yoga postures, requiring a natural, non-restricted breathing rhythm. In order to progress, the yoga practitioner must become aware of how they are breathing, and how to regulate it into a more natural rhythm. They must also learn to ease their breathing into a more relaxed state, which reinforces the notion of the mind-body connection (e.g., how relaxing the mind may easily modify physical tension). With practice, this learned ability to actively relax the body when it is restricted, either physically or mentally, could be applied to a situation outside of the yoga class.

The student-teacher relationship and trust would also be paramount in this situation. When moving into these physically restrictive postures, the yoga practitioner might initially feel fear and reluctance to enter the pose (Roach & McNally, 2004). The teacher could then provide verbal guidance and reassurance to the practitioner while transitioning through the posture. They may also modify the posture, so that it becomes a progressively deeper twist as the client becomes more comfortable with the breathing techniques. Over time, participants may learn to observe rather than respond to their symptoms of panic. With practice, they may later be able to access these techniques when they are experiencing similar feelings of anxiety in a non-therapeutic environment.

A second technique, *Progressive relaxation* (PR), is often used in cognitive behavioural therapy to reduce symptoms of anxiety, panic, and post-traumatic stress (Leahy, 2003). It involves the tensing and relaxing of muscle groups in a sequential pattern, allowing the patients to concentrate on the contrast in tension release (Leahy). This technique is very effective for producing sustained relaxation, but somewhat difficult to incorporate outside of therapy. However, PR could be easily initiated at the end of a yoga class because the yoga teacher could provide the required dialogue. The participants would have the added benefit of being physically relaxed after practicing yoga.

Physical activity for ageing populations. The current data suggests that yoga may be more frequently chosen by individuals between the ages of 45-50, and may be a specific form of activity counsellors could recommend to clients within this age - group. Although they may be more aware of age-related physical limitations and injuries compared to a younger population, yoga may help them feel more vital by increasing their physical flexibility and strength. Furthermore, the postures are also easily modified according to each individual's physical needs, increasing their self-confidence and willingness to participate in this form of physical activity. Teachers should also spend time to encourage their students to explore and accept one's limitations, rather than feeling discouraged by them. It would also be of importance to encourage them to be fully aware of, accept, and explore their mental and emotional reactions to being at their edge.

Alternatively, exercise might be particularly beneficial for individuals within a younger age group. The concept of pushing the body beyond what was

believed possible may provide the necessary trigger for increased confidence to other aspects of their lives. For example, it would be useful to have the individual develop exercise goals that they would like to achieve within a certain time period (e.g., run 5kms within 2 months of training). This would allow them to define the rate of their progression, increasing the likelihood of their success in achieving the goals. Positive reinforcement would also be useful to remind them of the adversity and challenges they have overcome. For example, it would be of use to intermittently reflect back on the progress they have made, whether it is through weight loss, distance travelled, or changes in physical appearance. Furthermore, focusing on the individual's ability to overcome the challenges, discussing how they strategized to overcome difficulties in the pursuit of their goals, and the experience they felt after achieving their goals would be fundamental. This will help the exerciser transition from recognizing not only the physical benefits of exercise, but also the mind-body connection. This may also be an effective strategy in helping the individual adhering to a regular exercise program, because they will be more aware of its positive health benefits.

Yoga could also be of particular value for individuals seeking a source of greater spirituality, particularly for individuals experiencing existential concerns regarding death and personal significance. The yogic practice of acceptance may help these clients face the typical fear and emotions that arise when in physically challenging postures. For example, the last pose (*Savasana*, or corpse pose) involves lying on the back with the legs and arms resting on the floor slightly apart, and the eyes closed. Ironically, it is considered the most difficult of poses,

and is intended to induce complete "letting go" and facing one's true thoughts (Daubenmier, 2003). It is also traditionally thought that this posture prepares the body and mind for death. The goal is to rest in a state of relaxation, while still being aware of sensory information and to let go of any reactions that occur (Daubenmier, 2003). This state of mindful attention, when minimal thoughts are present, will transcend to other aspects of the individual's life. Over time, the client may learn to also accept fears that emerge in a similar manner outside of the therapeutic environment.

Improving hope. The current results suggest that both exercisers and yoga practitioners report improved hopefulness. This could be of importance for individuals who are suffering from chronic mental or physical illness, as they are more likely to experience hopelessness and decreased quality of life compared to healthy individuals (Snyder, 2002). It might be beneficial to develop therapeutic activity programs specifically for patients with chronic disease. Some examples would be devoting a portion of the yoga class to meditating on the positive aspects of their lives or any positive outcomes that have occurred from treatments. Guided meditation may also increase an individual's thoughts of healing and visualization of their body without disease (Leahy, 2003). Alternatively, an exercise program could be developed to target areas of the body weakened by disease. This may provide the individual with increased physical strength, which may have a positive effect in their belief in overcoming their illness. A group exercise environment would also be particularly beneficial, because it would provide them a realistic comparison group for setting personal goals and

expectations. For example, patients might learn that their expectations change after spending time with others experiencing similar afflictions. They would also have the support and connection of the group members, a valuable resource in supporting hope.

Hopefulness could also be developed through acceptance, a common goal of the yoga practice (Daubenmier, 2003). Roach and McNally (2004) suggest that this mental attitude is of value for individuals who face chronic illness because it allows them to truly appreciate their experiences *in the moment*. For example, yoga is learned over a progressive series of postures, classes, and meditation techniques (Roach & McNally). It is therefore difficult to quantify when a yoga posture is "mastered" by traditional standards, because one person's yoga might look completely different from the next, depending on their physical, emotional, and spiritual needs (p. 284). The yoga practitioner must also become aware that a quick-fix for physical and mental health is unrealistic. Measuring progress in small increments instead fosters a sense of patience and empathy towards the self (Roach & McNally). This may be of particular value for those developing new expectations of themselves when experiencing physical or mental health illness (e.g., learning that change is more easily integrated when approached with an attitude of acceptance versus resistance).

Women's support. Finally, the current findings strongly suggest that yoga practitioners are predominantly female. This may be because it provides the necessary environment for women to feel both challenged and accepted by their peers and teachers. Women may also be more inclined to seek yoga because of its

supportive mental health component. While the current results do not provide an explanation for the female-orientation towards yoga, it is thought that the decreased anxiety and improved psychological well-being help balance out the stressful demands placed on the average North American.

Therefore, it may be of use for clinicians to recommend to their female clients an instructor knowledgeable in both the spiritual and physical components of the practice. Encouraging the client to find a teacher they may trust is essential, so that the student-teacher relationship may provide a source of support and guidance through their yoga practice. Similarly, it may be of more value for a therapist to recommend a physically-based exercise to their male clients. This may best help the client receive mental health benefits from the physical activity, and would increase the likelihood of the client feeling as though the therapist understands their needs. Because no gender-specific questions were used in the current study, further investigation is needed to understand this relationship.

Limitations and Recommendations for future research

Because of the exploratory nature of the study and current interaction effects, it is of importance for future research to improve upon the following limitations, so that more conclusive results may be defined.

Definition of activity type. The current study did not control for the type of yoga or exercise practiced, producing a limitation in the data interpretation. Yoga was generally defined as a spiritual and philosophical discipline that includes breath control, meditation, and specific postures. Most forms of yoga could fall within this description, even though some place more emphasis on

either the spiritual or physical component. For example, Kundalini yoga focuses almost completely meditation, while Bikram yoga uses physical postures almost exclusively (Yoga Journal, 2010). Moreover, while participants were recruited primarily from Hatha yoga studios, they may also practice two or more forms of yoga. Exercise was equally as general in its description, meaning that some participants may have engaged in either exclusively aerobic or anaerobic exercise, or both forms. Therefore, participants may be receiving different benefits within each activity group, depending on the variation within each group.

Furthermore, the time frame for each activity type was not clearly defined in the inclusion criteria. "Regular" physical activity was described as being at least thirty minutes per day, three times per week. However, individuals were not given an upper limit to their activity time. Because yoga is a relatively gentle activity, some individuals may practice six times per week, whereas fewer exercisers can practice as frequently, based on the nature and intensity of most exercise forms. Because previous research indicates that hope and some elements of psychological health are proportional to activity frequency, this may have influenced the overall outcome of results.

Participant health. Participants in the activity conditions were recruited on the premise that they had been engaging in a physical activity regularly for a minimum of three months. As a result, they were already relatively self-motivated to maintaining an active lifestyle. Because of this, they may be further interested to pursue other lifestyle habits that enhance their health, such as eating a healthy diet or devoting more conscious thought to improving their overall

health. In addition, health history and chronic illness were not accounted for in the current study. Because these lifestyle factors are known to contribute to mental and physical health improvements, the scores may have been affected by these uncontrolled variables.

Participant expectations. The current findings may also have been confounded by participant expectations. Given the spiritual nature of yoga, individuals may choose this practice because they believe they will receive mental health benefits. As a result, yoga practitioners may become naturally more interested in improving their psychological health. Similarly, exercise would more likely be chosen because of the physical rather than the mental health benefits. This difference in outlook may have influenced how they rated themselves on the mental health indices.

Recommendations

Further research is needed to confirm the findings in this study. A necessary recommendation is to have different inclusion criteria for each exercise category. Specifically, equal numbers of participants should be included for each type of activity, within each age category. If possible, it would also be useful to randomly select equal numbers of males and females from each activity group. This would reduce the variance found in the current data, and increase the likelihood of obtaining a normal sample population. Because of the obvious preference for women to choose yoga compared to men, however, this stringent criteria may be difficult to implement in a North American setting. Instead, a

female-only study may be more representative of a North American yoga population and may produce more conclusive results.

In addition, participant variables should be controlled to reduce variance within the sampled groups. This may include having an assessment of current and previous health, so to be sure that only healthy, non-clinical participants are included in the study. Various lifestyle factors should also be determined in this assessment, such as diet and environmental stressors. This would provide greater understanding of the influence of these factors with the benefits of physical activity. If this assessment were not possible, it would also be informative to administer the questionnaires at two time points. This would at least provide insight into potential baseline differences between activity conditions.

A clear definition of activity type should be established prior to recruiting participants. The yoga group should be sectioned into either one type of yoga (e.g., Ashtanga yoga only), or include various sub-groups within the yoga condition. If only one type of yoga can be used, Hatha yoga would be best suited, because it equally incorporates the spiritual and mental components. Similarly, a more stringent definition of exercise should be restricted to either only include aerobic or anaerobic exercise. Defining the time spent exercising would further clarify the activity conditions. While the definition of regular exercise was acceptable in the current study, an upper limit of time spent in the activity would improve the interpretation of results.

Because it was thought that the rating scales may not have adequately defined group differences in hope and the meaning of the physical activity in their

lives, future studies should aim to include a qualitative interview. This would allow participants to provide a better understanding of the hope process and psychological well-being induced by physical activity. This would also provide individuals the opportunity to define what mindfulness and/or meditation mean to them. As mentioned previously, meditation may occur in areas other than a yoga environment, and may have different significance in their lives. It would be useful to include a group that combines both physical exercise and meditation, as well as a meditation-only control group. This would help decipher whether the psychological benefits of yoga reported in the current study are received from the physical aspect of yoga or from its meditative component.

While both yoga and exercise were found to increase hopefulness, the specific aspects contributing to hope (e.g., goal-setting, emotional connection, expectation of positive change) were not explored in the current study. This is of importance for exercise, which is often goal-oriented in nature. Future studies should therefore use a broader hope rating scale, or multiple assessment measures of hope (e.g., both the Herth Hope Scale and the Snyder State Hope Scale). This would help decipher whether there are differences between the three activity conditions in spirituality, goal-setting, and other components of hope not addressed in the current study.

Finally, because of the increased rates of psychological stress and illness within North America, it would be of use to further define what attracts individuals to physical activity. The results of the current study suggest that there is clear mental health benefits received from physical activity. Future studies

should encourage participants to describe what it is about either exercise or yoga that is attractive. In particular, the following questions should be asked: “What made you start your current exercise/yoga program?”; “How does exercise/yoga help you manage feelings of stress and anxiety?”; “What does your [physical activity] mean to you in your life?”; “Was there a time in your life you didn’t pursue this physical activity, and did it affect the way you were able to manage things?” These open-ended would provide insight into why people initially seek out physical activity to improve their health and what motivates them to continue the activity. It would also help clinicians to understand if specific life events or personal needs direct a person to seek one activity over another (e.g., someone who has experienced a personal loss might be more driven to pursue yoga over exercise to help them cope).

Conclusion

Overall, the results support the notion that a spiritual-physical practice, such as yoga, can improve an individual’s reported psychological well - being. Both mind-body and physical exercise in general also appears to increase hopefulness compared to no activity controls. However, because there were non-random samples used and subsequent violations of the assumptions of the statistical analyses, follow-up studies are necessary to validate these findings. Furthermore, several questions were raised in the current study, including the following: (a) are there certain groups (e.g., gender, age) that are drawn to exercise more than yoga, and vice versa?; (b) is reduced anxiety the only factor that contribute to improved mental health in yoga practitioners? Or, (c) are these

differences related to something else not defined in this study, such as the attitude of acceptance, nurturing environment provided by the teacher-student relationship, and empathic attitude towards self found in the yoga classroom? In addition, (d) what specific mental health factors, other than anxiety and psychological well-being, contribute to differences in psychological well - being between yoga versus exercise practitioners? (e) Would goal-oriented questions reveal additional hope benefits for exercisers? Qualitative research that explores the how physical activity relates to an individual's experience and sense of psychological well - being would provide a more complete understanding of these hypotheses.

If future studies were to account for these questions, the results could be of use for clinicians who want to recommend activities that may help to support their client's psychological health. Based on its reported positive impact on mental health perception, physical activity is of great value to be integrated as a treatment option for individuals experiencing mental health difficulties. Future studies may focus on these findings to provide possible ways clinicians could use yoga and exercise to support current therapeutic interventions.

It is of particular interest to rethink physical activity from a mind-body perspective, as it appears to offer non-traditional options for people who want to manage their mental health in a non-traditional approach. As an increasing number of North Americans are drawn to physical exercise and mind-body activities, the research community should investigate their benefits correspondingly.

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APPENDIXES

Appendix A

Yoga and Exercise: Implications on Hope.

Information about this study:

This research study is investigating the relationship between the type of activity practiced (yoga or regular exercise) and amount of hope experienced by an individual. Both yoga and exercise have received support for inducing a sense of positive attitude towards their lives, improved mood, and better ability to cope with psychological distress compared to those who do not exercise, however it is still unclear why this occurs. Exercise and yoga seem to have a different effect on these mental health factors. This study intends to identify a potential reason for this difference seen between those who practice yoga, those who exercise, and those who do not exercise at all.

You are invited to participate in this study. All participants involved in the study will be asked to complete three questionnaires relating to your physical health, mental health, current activity/lifestyle habits, and hopeful attitude. This participation will take approximately ten to twenty minutes of your time. Although there are no foreseeable risks to participating in this study, the primary researcher will be available should you have any questions or concerns.

CONFIDENTIALITY

All information in this project will be kept confidential, and will not be presented in a way that will identify you as an individual. The information gained in this study may be used in presentations or research reports, however group data will only be used during these presentations. Individual data will NOT be used during presentations or research reports. You are, under no circumstances, required to complete the enclosed questionnaires, and may withdraw from participation at any time without penalty. Should you decide to withdraw from the study at any time, the data received from your participation will be removed from the database, and will not be included in the study. Once the study is completed, the data received from participants will be destroyed in an appropriate manner that will ensure privacy and confidentiality.

If you have any questions or concerns while completing the questionnaires, please feel free to address those with the investigator once you have completed the survey.

Please contact Jane McLeod at (780) 935-4463 or Dr. Barb Paulson (barb.paulson@ualberta.ca) with any questions regarding

this form, or any other information about this study. The plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Faculties of Education, Extension and Augustana Research Ethics Board (EEA REB) at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Chair of the EEA REB at (780) 492-3751.

1

PERMISSION GRANTED:

I agree to participate in this research study. I understand that I will be asked to complete three questionnaires regarding hope, physical health, lifestyle, and mental health, and I may withdraw from the study at any time. I understand that all information in this project will be kept confidential, and will not be presented in any way that will identify me. I also understand that information gained in this study may be used in presentations or research reports, however group data ONLY will be reported, and individual data from my participation will remain confidential.

- **I agree to participate** in this survey.
- I do **NOT** wish to participate in this survey

If you decided **NOT** to participate in the current survey, please log out now from the website. You will experience no penalty or personal consequences by choosing to withdraw from participation.

If you **AGREED TO PARTICIPATE IN THE FOLLOWING SURVEY**, please continue filling out the rest of the form.