

**An Exploration into Pathways,
Motivations, Barriers and Experiences of
Yoga among Middle-aged and Older Adults**

by

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ABSTRACT

The aim of this thesis was to explore potential differences in yoga practices between middle-aged (40 to 54) and older adult yoga students (55+). A social learning/health belief model was used to frame this research. A mixed methods approach was used. For the quantitative analyses, a convenience sample, of 452 participants, was collected through an on-line questionnaire. For the qualitative analyses, face-to-face interviews were conducted with 20 of the participants. Results of the mixed methods approach showed several unique differences between the age groups in terms of motivations and barriers, but not pathways. Implications for health promotion programs that target older adults were discussed.

Keywords: aging; older adult; motivations; barriers; pathways; yoga

DEDICATION

This work is dedicated
in loving memory to

JEAN LYONS,

my eternal inspiration.



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1

INTRODUCTION

Healthy aging is defined as an ongoing process of optimizing opportunities to maintain and enhance physical, mental, emotional, and social health, as well as independence and quality of life over the life course (Butler-Jones, 2010).

Research evidence suggests that regular participation in exercise is an essential component of healthy aging (Tetlow, 1995; Jimenez, 2001; Public Health Agency of Canada, 2003; Wister, 2003; Chin, 2005; National Public Health Survey 2005; Netz, Wu, Becker, & Tenenbaum, 2005; McPherson & Wister, 2008). Although rates of physical activity have risen over the last few decades, the majority of older adults (55+) in Canada are physically inactive and do not meet the recommended requirement (a minimum of 30 minutes a day of moderate intensity activity on most days of the week) for exercise (Canadian Community Health Survey [CCHS], 2003; Public Health Agency of Canada, 2003; Wister, 2005; Health Canada, 2010; Colley, Garriguet, Janssen, 2011; Statistics Canada, 2011).

Sedentary behaviour in older age is especially risky. The average Canadian adult spends 50-70% of their daily lives sitting and roughly another 30% sleeping. According to the Canadian Centre for Activity and Aging, a research and education centre within the Faculty of Health Sciences at Western University, currently less than 20% of Canadian seniors are active for 150 minutes a week. Research published by Dr. Wilmot (2012) makes it clear that sedentary behaviour is killing people by: 147% increased risk of heart attack or stroke; 112% increase in the risk of developing diabetes; 90% greater risk of dying from a cardiac event; and 49% greater risk of premature mortality.

Exacerbated by the fact that inactivity increases with age, these activity patterns have become a serious concern. This health issue is particularly important given the increasing rate of population aging as the baby boomers

(born in the population boom between 1946 and 1964) move into their later years (Canadian Fitness and Lifestyle Research Institute [CF&LRI], 2008; Butler-Jones, 2010; Canadian Council of Active Aging [CCAA], 2010). The Heart and Stroke Foundation's 2013 Report on the Health of Canadians, titled "Reality Check: Boomer Dreams for Later Life May Not Come True," warns that, without immediate action to alter their current lifestyles, Canadian baby boomers may spend their last years in sickness, disability, and immobility.

Canada's New Physical Activity Guidelines (Canadian Society for Exercise Physiology, 2011) stipulate "adults aged 18-64 should accumulate at least 150 minutes of moderate-to-vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more. It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least two days per week." For adults aged 65 years or older, new physical activity guidelines recommend the same minimums as for adults 18-64, with the added recommendation that those with poor mobility should perform physical activities to enhance balance and prevent falls.

As older adults become more susceptible to ailments that are linked to aging, the ability to remain active becomes more challenging. Appropriate forms of exercise are important due to the decline in functioning that naturally occurs during the aging process (American Geriatrics Society [AGS], 2005; Chen & Tseng, 2008). Eastern exercise modalities, such as yoga, tai chi, and qigong are becoming increasingly popular, partly due to their adaptability to an aging population. Tai chi and qigong are physical activities that consist of mobilizing the skeletal muscles and expending energy (Morris, 2008).

The focus of this thesis is yoga, which is practised as exercise, but also as a therapy, a spiritual path and/or lifestyle. Along with rising interest in, and cultural acceptance of, alternative and mind-body-soul practices, yoga has gained further popularity as a means towards developing and maintaining good mental and physical health and well-being (Raub, 2002; Morris, 2008; Penman, 2008; Field, 2009; Kraemer & Marquez, 2009).

Yoga, a multifaceted and multidimensional form of exercise, addresses many of the health concerns related to aging and a sedentary lifestyle; posture, balance, muscle strength, coordination, bone density, range of motion, flexibility, attention, as well as issues such as: isolation, depression, and loneliness (National Institute of Health Osteoporosis and Related Bone Diseases [NIHORBD], 2005; Bonura, 2007; Chen, Tseng, Ting, & Huang, 2007;

Morris, 2008; Fishman, 2009). As an exercise, yoga may have an influence on independence and aging well by maintaining functional mobility through muscle strengthening and improved flexibility (Graafmans, Ooms, Hofstee, Bezemer, Bouter, & Lips, 1996; Nannette & Hendrick, 2004; Cree, 2008; Canadian Institute for Health Research [CIHR], 2009; Goncalves, Vale, Barata, Varejao, & Dantas, 2011). Yoga, easily adapted to many different settings and populations, requires little equipment, is relatively low-cost, and due to its low-impact qualities, is an appropriate form of exercise for older adults (Nannette & Hendrick, 2004; Kolasinski et al., 2005; Waller, 2006).

To date, clinical yoga research has yielded promising findings in physical and mental health outcomes (Quilty et al., 2013). A large literature indicates that yoga is beneficial for treating a variety of chronic medical conditions (Iyengar, 2001; Kolasinski, Garfinkel, Tsai, Matz, Van Dyke, & Schumacher, 2005; Penman, 2008) and age-related health issues (Mitchel & Rutherford, 1998; Heavey, 2002; Gavalas & Davis, 2003; Iszak, 2008; Tatum, Igel, & Bradley, 2009). But yoga research in non-patient populations is limited. Despite the growing popularity of yoga with older adults and baby boomers, little or no data exist on the practice of yoga specifically with this population (Krucoff, Carson, Peterson, Shipp, & Krucoff, 2010). Questions remain unanswered, such as: What is the actual prevalence of yoga use among older adults? How do they transition into this form of exercise? What are their barriers to yoga? What are their reasons for practicing yoga?

There is a need for further exploration of how the practice of yoga is beneficial for healthy aging. According to the National Health Interview Survey (NHIS, 2007) yoga is one of the top ten modalities used in complementary and alternative medicine. Coupled with the fact that the baby boomers are now entering their retirement years, it is clear that a study of the pathways into yoga, motivations, barriers, and practice of yoga among older adults is an important and timely research topic. This line of inquiry will likely be of interest to the medical community and community service organizations since it may help to reduce health care costs associated with prescription medicine, hospitalization, rehabilitation and institutionalization, and help to promote healthier living for Canada's aging population (Birdee, Legedza, Saper, Bertisch, Eisenberg, & Phillips, 2008; Chen, Hong, Chao, Lin, & Li, 2008; Chen & Tseng, 2008; Barrett, 2010; Chaoul & Cohen, 2010).

2

PURPOSE OF RESEARCH

The main purpose of this study was to explore potential differences in yoga practices between middle-aged (40 to 54) and older adult yoga students (55+). This included the examination of individual factors, including socio-demographic and psychosocial factors as well as the contextual factors of the older adult yoga student. In addition, this study attempted to compare the experiences of middle-aged yoga students and older yoga students in order to gain an understanding of the pathways that led them to the practice of yoga, their motivations to practice yoga, and the barriers experienced

Interest in yoga is growing, especially among older adults (Roland, Jakobi, & Jones, 2011). Since the yoga community is experiencing an influx of older adult students, the present study aimed to contribute to research knowledge in the area of health promotion. The results of this study will have significance for yoga teachers, healthcare professionals, and organizations that promote healthy aging. The data will detail the current trends and characteristics of older adult yoga users, bringing a greater understanding of the pathways leading to a yoga practice and of the perceived benefits for physical, mental, emotional, and spiritual health. This research may also elucidate the potential therapeutic and preventive applications of yoga for older adults, thereby contributing to a health care system that can better meet the needs of an increasingly diverse and aging population.

To address this purpose, this study used data collected from an on-line survey-questionnaire, as well as additional data from follow-up interviews. The survey-questionnaire and the subsequent qualitative interviews are described in the Methodology chapter.

3

LITERATURE REVIEW

3.1 EXERCISE AND AGING

Exercise, a subset of physical activity, can be defined as planned and organized movement. The goal of exercise is to improve or maintain physical and emotional health (Ross & Thomas, 2010; Roland et al., 2011). Regular participation in exercise helps prevent conditions associated with later life, notably osteoporosis, osteoarthritis, non-insulin dependent diabetes mellitus, hypertension, ischaemic heart disease, obesity, depression, stroke, and some cancers, specifically colon cancer (Heath & Stuart, 2002; B.C. Women's Hospital and Health Centre, 2005; Young & Dinan, 2005; Pharmasave, 2009; Osteoporosis Canada, 2010). Exercise may also help slow the progression of certain age-related conditions such as arthritis, Parkinson's disease, sarcopenia, chronic obstructive pulmonary disease, and dementia (Jimenez, 2010; Pollack, 2010). Major physiological benefits of exercise for older adults include enhanced muscle mass, cardiovascular endurance, and bone density changes, improved blood pressure control and increased independence for functional ability (Heath & Stuart, 2002). There are also many psychological benefits of exercise. These include: improved mood, confidence, self-esteem, self-efficacy, feelings of accomplishment, increased socialization, a sense of personal control, and an over-all sense of well-being (Resnick, 1998; Jones, Wark, Cyarto, Boris, & Storry, 2004; Netz et al., 2005). Participating in exercise can also be an enjoyable social activity.

3.2 DEFINITION AND PREVALENCE OF YOGA

Yoga is an ancient Indian discipline, 4,000–8,000 years old, initially practiced by monks to relax the physical body to ready it for prayer and meditation. Yoga is designed to bring balance and health to the physical, mental, emotional, and spiritual dimensions of the individual (Ross & Thomas, 2009). The practice of yoga includes physical postures, meditation, breathing techniques, relaxation, and moral codes (Penman, 2008). It is said that these practices and philosophy provide a path to self-realization, or union between the self and universal consciousness (Iyengar, 2001). The term “yoga” originates from the Sanskrit term “yuj,” which meaning “to join” or “that which joins.” Yoga aspires to the perfect alignment between the physical, mental, and spiritual self. Yoga is balance (McCall, 2007).

One of the top modalities used in complementary and alternative medicine, [CAM] (National Health Interview Survey [NHIS], 2007) yoga, is categorized as “mind-body medicine” (Chaoul & Cohen, 2010). It is clear that yoga classes are not seen as only exercise or performance enhancing activity, but also mind-body connecting activity (Chaoul & Cohen, 2010). Yoga invites participants to move through physical postures, known as asana. Asana are held statically with the intention to increase flexibility, endurance, strength, and balance. Yoga requires controlled breathing and an internal focus to increase awareness of one’s mental and physical states (Morris, 2008). This focus on cognitive involvement is important in yoga because it encourages an awareness of the environment and an awareness of self-control ability. Most asanas are modifiable to work effectively with older adults, taking into consideration beginner status, decreased flexibility, and decreased muscle strength (American College of Sports Medicine [ACSM], 2003).

There are several different types of yoga; Hatha, Kundalini, Iyengar, Vini, Bikram, Ashtanga, Yin, and modern versions such as Yoga-Fit and Laughter Yoga. Ha (sun) tha (moon) yoga, probably the most well known, aims at bringing balance between opposing forces and energy systems within the body through the use of asana (postures), pranayama (breathing techniques), mudra (subtle hand gestures directing energy), and banda (muscular and energetic locks) (Saraswati, 2004). Hatha yoga also deals with chakras (energy centres), kundalini (movement of energy up the spine), kriyas (cleansing techniques), shakti (sacred energy), and nadis (energy flow within the body). Each style of yoga differs in the emphasis placed on the various components of

yoga such as asana, pranayama, or meditation (Ross & Thomas, 2010). For example, Bikram yoga, a popular form of hot yoga, consists of an unchanging sequence of 26 postures and two breathing exercises, ideally practiced in a room heated to 105°F ($\approx 40.6^{\circ}\text{C}$) with a humidity of 40%. Bikram classes run exactly 90 minutes and are designed as a rejuvenating exercise to strengthen the entire body head to toe. On the other hand, Iyengar yoga focuses particularly on three aspects: correct body alignment, correct sequencing, and the concept of timing. As all bodies are different and people have different weaknesses and strengths, Iyengar yoga uses props to help the body into the correct positions required. Props are objects like wooden blocks, chairs, blankets, and belts that help one adjust or support oneself in the different postures so that one can work in a range of motion that is safe and effective. Also, each branch of yoga offers a philosophy by which students come to understand who they are and what their purpose is (Penman, 2008).

The number of practitioners and the amount they spend on yoga has increased dramatically in the last four years. The Yoga in America market study, released in 2012 by the *Yoga Journal*, suggests that 20.4 million Americans practice yoga, compared to 15.8 million from the previous 2008 study, an increase of 29% and is now a \$10.3 billion dollar industry. Of yoga practitioners surveyed 82.2% are women, 17.8% are men, 62.8% fall within the age range of 18–44 years, 41% are 35–54, and 18.4% are over 55 (Macy, 2008). Of those over the age of 55, almost half (49.4%) started practising yoga to improve their health. One significant trend to emerge from the 2008 Yoga in America study is the use of yoga as medical therapy. According to the Yoga in America 2008 study, 6.1%, or approximately 14 million people in the US have had a doctor or therapist suggest yoga as a therapeutic tool and about 45% of adults surveyed believed that yoga is a beneficial adjunct therapy for traditional medical treatment (Macy, 2008).

In 2005, Statistics Canada reported that 5.5% of Canadian adults or 1.4 million people practiced yoga, an increase of 15% from the prior year. Of these practicing yoga 72.3% are women, 27.7% are men, 44.7% are 18–34, and 41.0% are 35–54. These percentages are similar to the US statistics. Of the 1.4 million Canadians now practicing yoga, the fastest growing segment is the 18–34 age group; which increased 25.7% in one year. These rates are expected to rise with the aging of the baby boomer generation and as health clubs, senior centers and rehabilitation centers offer more activity programs (NAMASTA, 2011). A recent

inquiry to Statistics Canada resulted in no current information available that reports the number of Canadians practicing yoga today.

A sizeable body of hard evidence will in due course enable yoga to become a credible part of the health care system — prescribed by doctors and paid for by health insurance — that is the prediction of Sat Bir Singh Khalsa, an assistant professor at Harvard Medical School and neuroscientist at Brigham and Women’s Hospital in Boston (Barrett, 2010). Dr. Khalsa is the Director of Research for the Kundalini Research Institute and Research Director of the Kripalu Center for Yoga and Health. Dr. Khalsa’s neuroscience research has spanned more than 25 years, focusing on the clinical effectiveness and the basic psychophysiological mechanisms underlying yoga and meditation practices. Currently he is conducting clinical research trials evaluating a yoga treatment for insomnia funded by the National Center for Complementary and Alternative Medicine of the National Institutes of Health. He has additional collaborations examining the role of yoga as a therapeutic treatment for conditions such as diabetes, stress, anxiety disorders, and cardiovascular disease. Another area of research interest is the evaluation of the benefits of yoga practice in the public schools. Himself a certified Kundalini yogi and a yoga practitioner for some 40 years, Dr. Khalsa maintains that regular practice of yoga and meditation can reduce heart rate and blood pressure, increase lung capacity, and help treat mental health conditions such as anxiety and insomnia. In *Your Brain on Yoga*, part of a new series from Harvard Medical School that will be published exclusively in ebook form, he and co-author Jodie Gould give an overview of the research on the benefits of a regular yoga practice, reporting that benefits also include reduced stress, better memory perception, and an increased feeling of calm and peace.

3.3 SYSTEMATIC REVIEWS

Evidence has accumulated establishing the role of mind-body practices in various types of medical care and treatment (Barrett, 2010; Quilty et al., 2012). A sizeable number of systematic reviews of yoga for a wide range of conditions have been published recently, implying that research interest in this area is now growing. Despite the impressive number of systematic reviews recently published (21), only positive evidence emerged for alleviating the

symptoms of depression and for reducing cardiovascular risks (Ernst & Lee, 2010).

Yoga is a widely used complementary and alternative medicine treatment for low back pain (LBP) (Diaz et al., 2013). Diaz et al. (2013) systematically reviewed the current literature for randomized controlled trials that assessed the outcomes of yoga as an intervention for individuals with chronic low back pain (cLBP). Of the 185 articles revealed, 10 met the inclusion criteria. Yoga was demonstrated to significantly improve quality of life and reduce disability, stress, depression, and medication usage associated with cLBP. The authors concluded that yoga appears to be an efficacious intervention in alleviating cLBP, but suggest that more research is necessary before recommendations can be made.

Abel et al. (2013) reviewed the research literature on yoga's effect on pulmonary function in healthy individuals. Overall, the authors concluded that pulmonary function appears to improve with a minimum of 10 weeks of regular yoga practice, but comment that greater improvements are more likely to be seen in less-fit individuals and/or those that engage in longer periods of pranayama. To gain a more comprehensive understanding of the effects of yoga techniques on pulmonary function, additional studies examining various yoga practices are warranted (Alison et al., 2013).

The demand for clinically efficacious, safe, patient acceptable, and cost-effective forms of treatment for mental illness is growing (Balasubramaniam et al., 2013). A systematic review of yoga for neuropsychiatric disorders was conducted to systematically examine the evidence for efficacy of yoga in the treatment of selected major psychiatric disorders. Balasubramaniam et al. (2013) concluded that there is emerging evidence from randomized trials to support popular beliefs about yoga for depression, sleep disorders, and as an augmentation therapy. Limitations of literature include inability to do double-blind studies, multiplicity of comparisons within small studies, and lack of replication. The authors suggest that biomarker and neuroimaging studies, those comparing yoga with standard pharmaco-psychotherapies and studies of long-term efficacy are needed to fully translate the promise of yoga for enhancing mental health.

The study by Posadzki et al. (2012) sought to identify all relevant systematic reviews of the effectiveness of CAM for Alzheimer's disease. Six systematic reviews met the inclusion criteria for this study and most reviews

were of high quality. The authors suggest that the evidence supporting the effectiveness of CAM for the treatment of Alzheimer's disease is ambiguous and future research seems justified.

Musculoskeletal conditions (MSCs) are the leading cause of disability and chronic pain in the developed world, impacting both functional ability and psychosocial health. The systematic review and meta-analysis by Ward et al. (2013) investigated the effectiveness of yoga on primary outcomes of functional ability, pain and psychosocial outcomes across a range of MSCs. Yoga interventions resulted in a clinically significant improvement in functional outcomes in mild-to-moderate low back pain (LBP) and fibromyalgia, and showed a trend to improvement in kyphosis. Yoga significantly improved pain in osteoarthritis (OA), rheumatoid arthritis (RA), and mild-to-severe LBP. Meta-analysis of good-quality studies showed a moderate treatment effect for yoga of -0.64 (95%CI -0.89 to -0.39) for functional outcomes and -0.61 (95%CI -0.97 to -0.26) for pain outcomes. Evidence suggests that yoga is an acceptable and safe intervention, which may result in clinically relevant improvements in pain and functional outcomes associated with a range of MSCs (Ward et al., 2013). Bussing et al. (2012) also suggest there are some meta-analyses which indicate beneficial effects of yoga interventions, and that there are several randomized clinical trials (RCTs) of relatively high quality indicating beneficial effects of yoga for pain-associated disability and mental health. Bussing advocates for larger-scale and more rigorous research with higher methodological quality and adequate control interventions. Yoga may have potential to be implemented as a beneficial supportive/adjunct treatment, provide a life-long behavioural skill, enhance self-efficacy and self-confidence, and may be associated with additional positive side effects (Bussing et al., 2012). In another meta-analysis (Bussing et al., 2012) the authors claim there is evidence that yoga may be useful for several pain-associated disorders, and that there are hints that even short-term interventions might be effective. This meta-analysis suggests that yoga is a useful supplementary approach with moderate effect sizes on pain and associated disability.

Research demonstrates that, over the past decade, there is a growing interest in complementary and alternative modalities designed to improve quality of life of patients with cancer (Cote & Daneault, 2012). The aim of the study by Buffart et al. (2012) was to conduct a systematic review and meta-analysis of the effects of yoga in cancer patients and survivors, focusing on both

physical and psychosocial outcomes. Results showed large reductions in distress, anxiety, and depression ($d = -0.69$ to -0.75), a moderate reduction in fatigue ($d = -0.51$), moderate increases in general quality of life, emotional function and social function ($d = 0.33$ to 0.49), and a small increase in functional well-being ($d = 0.31$). The authors concluded that yoga appeared to be a feasible intervention and beneficial effects on several physical and psychosocial symptoms were reported. Another meta-analysis of randomized controlled trials conducted by Zhang et al. (2012) supports findings that show yoga can improve quality of life (QoL) for women with breast cancer. In the six studies involving 382 patients, a statistically significant effect favouring yoga for the outcome of QoL was found. The authors suggested that further well-designed RCTs with large sample sizes are needed to clarify the utility of yoga practice for patients with cancer. The primary goal of the study by Cote and Daneault (2012) was also to determine whether therapeutic yoga improves the quality of life of patients with cancer. Analyzing randomized controlled trials, Cote and Daneault (2012) concluded that the variety of benefits derived, the absence of side effects and the cost-benefit ratio of therapeutic yoga make it an interesting alternative for family physicians to suggest to their patients.

Ross and Thomas (2010) conducted a review of the literature regarding research studies comparing the effects of yoga and exercise on a variety of health outcomes and health conditions. Eighty-one studies met inclusion criteria and were classified as uncontrolled ($n = 30$), wait list controlled ($n = 16$), and comparison ($n = 35$). The most common comparison interventions ($n = 12$) involving exercise were the focus of this review article. Of these comparison intervention studies, nine focused on adults and three on seniors. Overall, the studies comparing the effects of yoga and exercise seem to indicate that, in both healthy and diseased populations, yoga may be as effective or better than exercise at improving a variety of health-related outcomes. For example, in a randomized, controlled, six-month trial study by Oken, Zajdel, Kishiyama et al. (2006) the yoga group performed significantly better than the exercise group on levels of fatigue ($p = 0.006$) and on several measures of quality of life, including pain ($p = 0.006$), and social functioning ($p = 0.015$). Only the yoga group exhibited improvements in flexibility ($p = 0.05$) and balance ($p = 0.05$). Thus, Ross and Thomas (2010) conclude that yoga might be a feasible, acceptable, and effective alternative to exercise in heart disease, diabetic, and obese

populations. Future clinical trials are needed using rigorous methodologies to examine the health benefits of the various types of yoga (Ross et al., 2010).

These systematic reviews all contribute to the growing body of research evidence attesting to the positive health benefits of yoga, for all ages. Yoga should always be practiced under the guidance of a well- trained instructor, with the knowledge and support of a health care professional. In this way, unnecessary injuries can be avoided.

3.4 BENEFITS OF YOGA: THE GENERAL POPULATION

Given the paucity of yoga research specifically on older adults, it is useful to summarize research on the general population. B.K.S. Iyengar suggests that yoga is a holistic experience that benefits the body, mind, and spirit. In the popular book *Light on Yoga*, Iyengar describes “curative asanas for various diseases.” Yogic practices such as asana (postures), pranayama (breathing techniques), kriya (cleansing practises), and dhyana (meditation) are recommended for diseases or health conditions for which yoga has traditionally been used. These include: arthritis, anxiety, asthma, back pain, high blood pressure, bronchial disorders, epilepsy, osteoarthritis, migraines, coronary artery disease, sciatica, and depression (Iyengar, 2001; Krishnamurthy & Telles, 2007).

People use yoga as part of a general health regimen to achieve physical fitness, to relax, and to reduce stress (Iyengar, 2008; Hartfiel, Havenhand, Khalsa, Clarke, & Krayner, 2010). Many studies have demonstrated numerous health benefits of yoga for the general population. Within the domain of physical health these include: improvements in pain management, diastolic blood pressure, cardio health, diabetes, upper body strength, range of motion, balance, postural control, flexibility, sleep quality, respiratory health and lessening of joint stiffness, and chronic low back pain (Schneider, Staggers, Alexander, Sheppard, Rainforth, & Kondwani, 1995; Raub, 2002; Cohen, Halpern, Kennedy, Cahan, & Baharav, 2009; Tatum et al., 2009; Chen, Chen, Lin, Fan, Lin, & Li, 2010; Hakim & Leininger, 2010). Within the domain of psychological health, yoga may improve attention and concentration, and relieves stress, depression, and fear of falling (Janakiramaiah, Gangahar, Murthy, Harish, Subbakrishna, & Vedamurthachar, 2000; Newberg, Alavi, Baime, Pourdehnad, Santanna, & d’Aquili, 2001; Gavalas & Davis, 2003;

Puymbroeck, Gleckler, Schmidt, Hsieh, Wang, & Koceja, 2009; Balasubramaniam, Telles, & Doraiswamy, 2013). Yoga studies of balance, musculoskeletal health, confidence in ability/self-efficacy and cognitive impairment have been conducted (Yellin, 1983; Uma, Nagendra, Nagarathna, Vaidehi, & Seethalakshmi, 1989; Penman, 2008; Wang, 2009), but few in the older adult population.

3.5 CORRELATIONAL AND DESCRIPTIVE STUDIES

The purpose of the study by Quitly et al. (2013) was to survey a non-clinical population to better understand yoga use in a real-world setting. Two hundred and ninety (48%) of a convenience sample of adults completed the four-week endpoint survey. The students registered for a beginner yoga program within a network of five yoga studios in Austin, Texas. Baseline demographics were similar to those in national surveys, with respondents being primarily female (86%), white (88%), and college educated (78%). The primary barrier to practice was time (55%). Respondents perceived yoga primarily as an exercise activity (92%), spiritual activity (73%), or a way to manage or treat a health condition (50%). Main reasons for taking yoga were general wellness (81%), physical exercise (80%), and stress management (73%). Ninety-eight percent believed yoga would improve their health, with 28% taking yoga to alleviate a health condition. On average, respondents practiced 3 to 4 hours/week in and out of class.

A national Australian survey of yoga students and yoga teachers included a total of 3,892 respondents (Penman, 2008). This survey covered the characteristics of people who practice yoga, the techniques, styles and traditions practiced, the frequencies and characteristics of practice, the reasons for practice, the associated dietary and lifestyle choices, the perceived benefits, and the frequency, and characteristics of yoga-related injuries. Yoga teachers and their students were identified as potential participants through yoga studios, teacher associations, the media, and word of mouth. It should be noted that this survey utilized a comprehensive web-based questionnaire with respondents self-selecting to participate. Findings showed that the typical yoga survey respondent was a 41-year-old, college educated, employed, and health-conscious female (85% ratio women to men). Summary of key findings of participation in yoga by age group were: 15–24, 1.5%; 25–34, 3.1%; 35–44, 2.1%; 45–54, 1.8%; 55–62, 2.0%. It is interesting to note that only 0.3% of the 65+ age

group and about **2% of the 50+ age group** practiced yoga, a considerably lower prevalence rate than the Yoga in America study of 18.4% for 50+ mentioned earlier. It is possible that the web-based survey reflected a bias toward the young yoga respondent.

Birdee, Legedza, Saper, Bertisch, Eisenberg, and Phillips (2008) utilized cross sectional survey data from the 2002 National Health Interview Survey (NHIS), Alternative Medicine Supplement to examine correlates of yoga use for health. The objective was to characterize yoga users, medical reasons for use, perceptions of helpfulness, and disclosure of use to medical professionals. The National Center for Health Statistics and Centers for Disease Prevention and Control conducts NHIS, which provides health information of the civilian, non-institutionalized, household population of the United States. Randomly selected respondents received the survey face-to-face in English and/or Spanish. In 2002 the NHIS included an Alternative Medicine supplement that asked a series of questions regarding mind-body practices, including yoga. Those respondents that reported yoga practice in the last 12 months ($n = 1,593$) were queried about use and helpfulness for specific medical conditions. Yoga users were predominately Caucasian (85%) and female (76%) with a mean age of 39.5 years. Several statistically significant findings emerged in the logistic regression analysis. Compared to non-yoga users, yoga users were more likely to be female (Odds Ratio, OR 3.76, 95% Confidence Interval, CI 3.11–4.33); less likely to be black than white (OR 0.65, 95% CI 0.53–0.80), and more likely college educated (OR 2.70, 95% CI 2.37–3.08). Musculoskeletal conditions (OR 1.61, 95% CI 1.42–1.83) mental health conditions (OR 1.43, 95% CI 1.22–1.67), severe sprain in the last 12 months (OR 1.49, 95% CI 1.22–1.81), and asthma (OR 1.27, 95% CI 1.05–1.54) were positively associated with yoga use, while hypertension (OR 0.78, 95% CI 0.64–0.95) and chronic obstructive lung disease (OR 0.69, 95% CI 0.48–1.00) were inversely associated. Yoga users also reported perceived benefits for musculoskeletal conditions, mental health conditions, and asthma. A majority of yoga users (61%) reported that yoga was important in maintaining health, although only 25% disclosed yoga practice to their medical professional.

Limitations of the Birdee et al. (2008) study include the fact that respondents self-reported all information, suggesting the data may be subject to recall or other biases. Also, yoga users were asked if they used yoga for health,

but there may be individuals who use yoga for personal or spiritual growth. In addition, the cross-sectional survey means that causal relationships are tenuous.

3.6 INTERVENTION STUDIES

Balance impairment is common after stroke; modified yoga may be able to improve balance and other important poststroke variables (Schmid et al. 2012). The purpose of the study by Schmid et al. (2012) was to assess the impact of a yoga-based rehabilitation intervention on balance, balance self-efficacy, fear of falling (FoF), and quality of life after stroke. Yoga group data demonstrated significant improvement in balance ($p = < 0.001$) and FoF ($p = < 0.001$). The authors suggest that group yoga may be complementary to rehabilitation, may be possible in medical-based and community-based settings, and may be cost-effective. Further testing of group yoga-based rehabilitation interventions is warranted (Schmid et al., 2012).

A growing body of evidence supports the view that yoga benefits physical and mental health via down-regulation of the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system (SNS). Research by Kiecolt-Glaser et al. (2010) has shown that women who practice Hatha yoga regularly recover from stress faster than women who are considered yoga “novices.” A sample of 50 women (average age 41.32 years, standard deviation [SD] 10.33, range 30–65 years) was recruited through online ads and notices posted in yoga studios. Twenty-five women were classified as yoga “experts” (practiced yoga regularly once or twice weekly for at least two years and at least twice weekly during the past year) and 25 women were classified as novices (participated in yoga classes or home practice with yoga videos for 6 to 12 sessions). Using a pretest-posttest mixed design, researchers assessed participants’ cardiovascular, inflammatory, and endocrine responses before, during and after they took part in three activities. Experts had lower overall IL-6 serum levels than novices, $F(1,45.7) = 4.98, p = .03$. Novices’ average serum IL-6 levels were 41% higher than those of experts ($p = .05$). IL-6 is a stress-related compound that is thought to play a role in certain conditions such as cardiovascular disease and Type 2 diabetes. In addition, novices’ levels of C-reactive protein (CRP), which serves as a general marker for inflammation, were nearly five times higher than the yoga experts ($\beta = -1.55, p = .009$). The ability to minimize inflammatory responses to stressful events influences the

burden that stressors place on an individual. This study offers insight into how regular yoga practice could have substantial health benefits by reducing inflammation below levels predicted by such key risk factors as age, abdominal adiposity, cardiorespiratory fitness, and depressive symptoms.

The practice of yoga postures is also associated with increased brain gamma-aminobutyric (GABA) levels (Streeter, Whitfield, Owen, Rein, Karri, Yakhind, Perlmutter, Prescott, & Renshaw, 2010). GABA is the chief inhibitory transmitter in the central nervous system. Results showed that, compared to the walking group ($n = 15$), yoga subjects ($n = 19$) reported significantly greater improvement in mood (1.8 ± 2.5 , $t = 3.21$, $df = 18$, $p = 0.005$) and significant decrease in anxiety (-5.2 ± 5.5 , $t = -4.05$, $df = 17$, $p < 0.001$). This study is the first to demonstrate that increased thalamic GABA levels are associated with improved mood and decreased anxiety (Streeter et al., 2010).

It is clear that, at minimum, yoga practices result in an acute relaxation response by lowering blood pressure and heart rate (Melville et al., 2012; Chauol & Cohen, 2010). Yoga and meditation have become popular in recent decades as methods of managing stress and improving health status (Melville et al., 2012). For older adults, loneliness is a major risk factor for health problems, such as cardiovascular disease and Alzheimer's (Creswell, 2012). A new study at Carnegie Mellon University offers the first evidence that mindful meditation reduces loneliness in older adults. The researchers found that meditation lowers inflammation levels; inflammation is thought to promote the development and progression of many diseases (Creswell et al., 2012). These findings provide an initial indication that meditation may be a novel treatment approach for reducing loneliness and related pro-inflammatory gene expression in older adults. A recent study by Melville et al. (2012) concludes that yoga postures and meditation performed in the office can acutely improve several physiological and psychological markers of stress. In this study, respiration rate was reduced during yoga and meditation versus control ($p < 0.05$). Many older adults become depressed and lonely as they age. If their mood could be elevated through yoga, quality of life would benefit greatly (Tummers & Hendrick, 2004).

3.7 YOGA STUDIES AND OLDER ADULTS

Although many studies have examined the benefits of yoga, there is a paucity of research on the efficacy of yoga interventions for seniors (Penman, 2008). Patel et al. (2012) conducted a systematic review and meta-analysis of the comparative effectiveness of yoga, compared with other exercise interventions, for older adults as shown on measures of health and physical functioning. Original studies from 1950 to 2010 were sought, evaluating the effects of yoga on older adults. The search was restricted to randomized controlled trials of yoga in subjects over the age of 60 and published in English. The search yielded 18 eligible studies ($N = 649$) that reported on older adults across a range of settings, intervention intensity, and outcome measures. The majority of the studies had less than 35 participants. The authors concluded that small studies with mixed methodological quality suggest that yoga may be superior to conventional physical-activity interventions in elderly people, but larger studies are necessary to better define the intersection of populations, settings, and interventions in which yoga is most beneficial.

An emerging trend is the recommendation of yoga as an alternative medical choice (Roland et al., 2011). One critical review was found that asked the question, "Does yoga engender fitness in older adults?" (Roland et al., 2010). This review critically summarized the literature to investigate whether physical fitness and function benefits are engendered through the practice of yoga in older adults. A large variability in yoga styles and measurement outcomes made the interpretation of findings challenging across the studies. But the studies reported moderate to strong improvements for gait ($ES = 0.54, 0.80$), balance ($ES = 0.25-1.61$), upper/lower body flexibility ($ES = 0.25, 0.70$), lower body strength ($ES = 0.51$), and weight loss ($ES = 0.73, 0.99$). The authors conclude that yoga may engender improvements in some components of fitness in older adults however they recommend that further investigation into yoga as an alternative exercise to promote fitness in older adults is warranted.

Community-living older adults were participants in two studies. The first study (Wang, 2010) was designed to determine the feasibility of a yoga intervention for enhancing mental well-being and physical functioning. The second study (Zettergren et al., 2011) examined the impact of an eight-week therapeutic yoga program on postural control, mobility, rising from the floor, and gait speed. Results showed that although there is inconclusive evidence to demonstrate that the yoga intervention was superior to the socialization group

in improving mental and physical health, yoga could provide benefit for older adults (Wang, 2010). The pilot study by Zettergren et al., (2011) showed improvements in postural control as measured by the Berg Balance Scale and gait as measured by the fast gait speed. These findings indicate that the research subjects benefited from the yoga intervention.

With the current challenge of rapidly aging populations, practices such as yoga may help adults stay physically active, and healthy. Vogler et al. (2011) assessed the impact of an eight-week Iyengar yoga program on the holistic health and well-being of physically inactive people aged 55 years and older. Thirty-eight older adults (mean age 73.21) engaged in either twice-weekly yoga classes or continued their usual daily routines. The results showed that muscle strength, active range of motion, physical well-being, and aspects of mental well-being (emotional well-being and self-care) improved significantly in the yoga group ($p < .05$). The authors concluded that participation in Iyengar yoga programs by older people is beneficial for health and well-being and greater availability of such programs could improve quality of life.

The number of older adults participating in yoga has increased dramatically in recent years; yet, the physical demands associated with yoga performance have not been reported (Wang et al., 2013). The primary aim of the Yoga Empowers Seniors Study (YESS) was to use biomechanical methods to quantify the physical demands associated with the performance of seven commonly-practiced standing yoga poses in older adults. Results of this study reported a significant main effect for pose, at the ankle, knee, and hip, in the frontal and sagittal planes ($p = 0.00-0.03$) and that musculoskeletal demand varied significantly across the different poses. These findings may be used to guide the design of evidence-based yoga programs; those in which poses are selected based on their known biomechanical profiles (Wang et al., 2013).

A study by Goncalves, Vale, Barata, Varejao, and Dantas (2011) assessed levels of flexibility, functional autonomy, and quality of life (QoL) in elderly yoga students. The 120 subjects were divided into a yoga group [YG] (YG; $n = 52$; $age = 66.79 \pm 3.30$ years; Body Mass Index, $BMI = 24.77 \pm 3.18$) and control group [CG] (CG; $n = 31$; $age = 69.33 \pm 4.84$ years; $BMI = 24.32 \pm 3.71$) and submitted to flexibility tests through goniometry, the LADEG autonomy protocol and QoL, using the WHOQOL-Oled questionnaire. The yoga program included two 60-minute Hatha yoga classes per week for 14 weeks. Results showed increases in articular range of motion, reduced execution time in the

activities of daily living, and consequent improvement in the functional autonomy and QoL of elderly subjects.

An important consideration raised by the growing segment of the older adult population is how aging adults can maintain independence and productive functioning. The inability to transfer from the floor in older adults can affect quality of life, self-confidence, and independent living. A 13-week Hatha Yoga program was specifically tailored to older adults and designed to strengthen the quadriceps, increase ankle flexibility and balance, and improve the ability to transfer to and from the floor (Tatum, 2009). The study used a single group interrupted time-series design with two pre- and one post-collection periods. A total of 45 older adults completed the program, aged 58 to 83 years, most of who were new to yoga. Yoga training group classes were held at a Yoga centre in Richmond, Virginia, additional practice was performed in the participants' homes. Pre- and post-assessments were performed in a physical therapy office at the Yoga centre. Participants attended one 90-minute yoga class per week and were asked to complete a 30-minute guided home practice, using a video, five days per week. Statistically significant improvement was noted in participants' ability to transfer from the floor ($t = 11.25, p < .001$) with a large effect size ($d = 1.36$). Balance and quadriceps strength were the largest contributors to transfer ability. Since there was no control group, results of this study need to be tempered.

Studies have demonstrated a relationship between yoga and balance and yoga and falls. Fear of falling, defined as a disabling symptom of impaired mobility, is common in community dwelling older adults and has been identified as one of the greatest fears experienced by the elderly (Schmidt et al., 2010). Research shows the potential of yoga as an intervention in the prevention of falls by improving fall-related risk factors such as cognitive impairment, fear and decreased confidence, balance impairment, and awareness to the environment (Brown et al., 2008; Morris, 2008). Morris (2008) found a statistically significant increase of a Steadiness Scale over time for yoga participants. In a more recent study (Schmidt et al., 2010) 14 adults, over 65 years, took part in a 12-week intervention single-armed pilot study designed to determine whether fear of falling (FoF) and balance improved in older adults. Results showed that FoF decreased by 6%, static balance increased 4% ($P = .045$), and lower-body flexibility increased by 34%. The authors suggest that

rehabilitation therapists may wish to explore yoga as a modality for balance and falls programming.

Turning to frail populations of elderly, a six-month, two-group, randomized, controlled, single-masked trial was conducted by Greendale et al. (2009). The purpose of this study was to determine whether a specifically designed yoga intervention could reduce hyperkyphosis (excessive thoracic curvature). Hyperkyphosis colloquially called “dowager’s hump,” is common among older adults and is associated a variety of impairments, including decreased upper-extremity function. One hundred eighteen women and men aged 60 and older with a kyphosis angle of 40 degrees or greater participated in this study. The active treatment group attended hour-long yoga classes three days per week for 24 weeks. Compared with control participants, participants randomized to yoga experienced a 4.4% improvement in flexicurve kyphosis angle ($P = .006$) and a 5% improvement in kyphosis index ($P = .004$). The decrease in flexicurve kyphosis angle in the yoga treatment group shows a critical first step in the treatment or prevention of this condition, namely that hyperkyphosis is remediable. Larger, more-definitive studies of yoga for hyperkyphosis should be considered. Targeting individuals with more-malleable spines and using longitudinally precise measures of kyphosis could strengthen the treatment effect.

A safe and manageable yoga program specifically tailored for frail older adults was developed and named “silver yoga” (Chen, Tseng, Ting, & Huang, 2007). A quasi-experimental, pre-post tests design was used; baseline, at 12-week and at 24-week periods. A convenience sample of 204 subjects were randomly assigned into three groups based: Experimental group 1: complete silver yoga with stretching and meditation ($n = 64$), Experimental group 2: shortened silver yoga without the guided-imagery meditation ($n = 59$), and Wait-list control ($n = 66$). Results showed that Experimental groups I and 2 had significantly improved and all had better physical fitness than the subjects in the control group (all $p < 0.05$).

“Can Yoga boost your immune system?” was the title of a recent article on www.salon.com. This article presented research results that suggest practicing yoga can produce internal changes on a genetic level, and as a result, boost your immune system. Recent years have seen study titles such as, “Yoga for Seniors with Arthritis: A Pilot Study” (Hansen, 2010), “The Psychological Benefits of Yoga Practice for Older Adults: Evidence and Guidelines” (Bonura, 2011),

“Increased Hatha yoga experience predicts lower body mass index and reduced medication use in women over 45 years” (Moliver et al., 2011), “Effects of Anusara Yoga on Older Students From Their Perspective” (Carroll, 2011), and “Managing Osteoarthritis: Comparisons of Chair Yoga, Reiki, and Education (Pilot Study)” (Park et al., 2011). These varied topics demonstrate the wide popularity and current interest in yoga’s health benefits for an aging population.

3.8 SUMMARY

The growing popularity of yoga among older adults and aging baby boomers indicates there is a need for health professionals to understand that yoga changes the traditional physical activity paradigm to one that is inclusive, non-competitive, and enjoyable (Roland et al., 2011; Krucoff et al., 2010; Birdee et al., 2008). Yoga provides a safe and feasible exercise option and is associated with numerous health improvements (Kolasinski et al., 2005; Chen, Tseng, Ting, & Huang, 2007; Tatum et al., 2009; Ross & Thomas, 2010). Participants report that yoga allows them to feel more balanced in their total fitness (Nanette & Hendrick, 2004).

Gaps remain in the literature with respect to the effects of the various types of yoga on a variety of outcome measures in a variety of populations, both healthy and diseased (Ross & Thomas, 2010). Future studies should compare yoga to other nonpharmacologic interventions, such as patient education, quadriceps strengthening exercises, walking or swimming (Kolasinski et al., 2005). While a rigorous intervention study of this type is beyond the scope of this thesis, there are areas of research that can be addressed in an exploratory survey. We know little about how older adults get involved in yoga, their motivations, barriers, and perceived benefits.

3.9 THEORETICAL FRAMEWORK

The current study focused on active older adults and variations in yoga practice across age groups. Two theoretical perspectives used in this study were chosen based on their applicability to both personal and social influences on health behaviours. Social Learning Theory and the Health Belief Model

(HBM) were synthesized in this study to create an over-arching theoretical framework.

According to Bandura (1977) Social Learning Theory emphasizes the importance of observational learning. This modelling process involves attention, retention, preproduction, and motivation. Bandura's notion of reciprocal determinism states that expectations, and outcome expectations, are not only influenced by an individual's behaviour, but also by verbal encouragement, physiological sensations, and exposure to role models or self-modeling. These expectations determine the individual's willingness to initiate and engage in a given activity (Resnick, Magaziner, Orwig, & Zimmerman, 2001).

Bandura also emphasized the role of intrinsic reinforcement as a form of internal reward, such as pride, satisfaction, and a sense of accomplishment. Social Learning Theory suggests a change in behaviour and could imply that postures learned and practiced in yoga can be generalized to activities of daily living. Through a Social Learning Theory lens it can be noted that the practice of yoga creates opportunities for performance mastery, vicarious experience, verbal persuasion and physiological feedback, the four sources of self efficacy (Krista, Rushton & Miller, 2011). Participating in yoga may increase physical ability and thereby increase the participant's feeling of self-efficacy (Morris, 2008).

Self-efficacy, a concept rooted in Social Learning Theory and a construct later added to the HBM, refers to an individual's belief in his or her capability to perform a particular behaviour or task (Bandura, 1997). Yoga studies have showed its effect on self efficacy (Cusumano & Robinson, 1992) but no data exists on the effect of self-efficacy on older adult yoga students. Bandura (1977) notes that self-efficacy will impact the probability that a health behaviour will be adopted. Is this the case with older adult yoga students? What is their initial level of self-efficacy? Does their level of self-confidence increase as they continue to practice yoga?

Complementing the Social Learning Theory, with a more individual-level focus, the HBM is currently one of the most commonly used health promotion and health behaviour perspectives (Sharma & Romas, 2008). The HBM is used for this current research since it has been frequently used in research with older adults (McDonald-Miszczak, Wister, & Gutman, 2001), it has been combined with social learning theory in application to exercise among seniors (Chou & Wister, 2005) and has been applied to the area of preventative health behaviours (McDonald-Miszczak et al., 2001).

The HBM, proposed by Rosenstock and Hochbaum in 1964, originally meant to predict ill patient's behavioural responses to treatment. The HBM suggests that individuals operate within a world filled with negatively, positively, and neutrally valued regions. Rosenstock (1974) hypothesized individuals evaluate factors related to their health and, based on this assessment, are motivated to take action to improve or maintain their health.

Six factors (perceived susceptibility, perceived severity, perceived benefits of taking action, barriers to taking actions, cues to action, and self-efficacy) are believed to mediate a person's perception of the possible threat of a disease and his/her actions to decrease or limit the potential threat. Perceived susceptibility describes beliefs about the likelihood of acquiring a disease or reaching a harmful state. With regard to physical activity, this might manifest as beliefs about one's chance of developing sarcopenia due to inactivity. The more susceptible an individual feels, the more likely he or she will take preventative action. Perceived severity is one's belief about the extent of negative consequences that could result from a harmful state due to a particular behaviour. For example, regardless of conclusive research evidence supporting the risks of inactivity, individuals differ in their beliefs about whether inactivity will lead to chronic disease and how severe these diseases will be. The third construct, perceived benefits, refers to one's belief about the advantages of a particular method suggested to reduce the risk or seriousness of a disease or harmful state. An individual may believe that yoga is more effective at improving flexibility than weight training, for example. Perceived barriers are beliefs concerning actual or imagined costs related to following a new behaviour. Barriers to physical activity often mentioned by older adults include lack of age-appropriate classes (Wilcox, Bopp, Oberrecht, Kammermann, & McElmurray, 2005) inclement weather, and fear of falling (Morris, 2008). The fifth construct in the HBM is cues to action, described as precipitating forces that increase a person's need to take action. These cues may be external (e.g., social interactions, media messages) or internal (e.g., perceptions of a bodily state, such as obesity). Depending on the level of perceived severity or perceived susceptibility, and intense or slightly less intense stimulus will be needed to register as a cue to action.

The Social Learning Theory and the Health Belief Model guided the research questions in this study in order to better understand the motivations, behaviours, and perspectives of older adult yoga students. For example, if an

older adult perceived to be at risk of falling, (perhaps informed by their family physician of early signs of osteoporosis) would they be motivated to become involved in the practice of yoga to improve balance? Moreover, the Health Belief Model also informs us about the pathways or cues to action by which older people may get involved in the practice of yoga. For instance, do adults discover yoga through media channels, social networks, or other means? Exploring these pathways will illuminate the factors that contribute to the decision to become a dedicated older adult yoga student. This information will have implications for health care professionals and health promotion initiatives and programs.

3.10 RESEARCH QUESTIONS

Few studies have examined the experiences of older adult yoga students. This study focused on answering the following research questions:

1. What are the pathways to yoga for older adults (i.e., social learning, including sources of information, medical recommendations, and other cues to action)?
2. What are the motivations to begin a yoga practice?
3. What are the barriers experienced?
4. What are the similarities and differences between middle-aged and older adult yoga students in the practice of yoga?

This study involved two parts.

Part One: An on-line survey questionnaire collected information identifying age, gender, demographic, and socio-economic characteristics of older adults who practice yoga, including frequency and type of classes attended, length of time practicing yoga, and so on.

Part Two: In-depth qualitative interviews were conducted with middle-aged and older adult yoga students to further explore their experiences of practicing yoga. In an attempt to determine the pathways, motivations, barriers, and experiences of adult yoga students, the interviewees were asked open-ended questions that focussed on the research questions.

4

METHODOLOGY

4.1 DESIGN OF STUDY

The present exploratory study employed a mixed-methods approach. To address the research questions (rather than hypotheses) this study utilized quantitative and qualitative data. This approach was chosen because health care research includes many studies that combine quantitative and qualitative methods, taking advantage of their complementary purposes (Sale, Lohfeld, & Brazil, 2002). The methodology outlined in the proceeding sections includes the use of quantitative and open-ended qualitative data collected from an Internet survey questionnaire (Part 1), and qualitative data obtained through face-to-face interviews (Part 2). The quantitative methods focused on providing useful information on demographics, specifics of a yoga practice, and data for correlational analysis, whereas the qualitative component focused on providing more detailed data and insight into the experiences and perceptions of older adult yoga students.

4.2 QUANTITATIVE METHODS

4.2.1 Data Source, Participant Recruitment, Screening, and Pilot Test

4.2.1.1 Data Source

Quantitative data were collected using the Internet. The Internet has been used previously to solicit survey data, and has been used in studies with older adults (e.g., Chou & O'Rourke, 2012; O'Rourke & Cappeliez, 2001). The Internet is advantageous in research by providing an inexpensive avenue for participant recruitment and data collection. Internet-based methods facilitate efficient,

reliable data collection across an array of populations and topic areas (Chuah, Drasgow, & Roberts, 2006; Gosling et al., 2004). Given the growing popularity of social networking sites, even among older adults (Pew Internet & American Life Project, 2012) an internet-based method was chosen for Part 1 of this study.

4.2.1.2 Participant Recruitment

In this study, participants were recruited through advertisements placed on Facebook, the world's largest social networking site (see Appendix 1). The Facebook advertisement comprised of a person sitting in lotus pose with the following text: SFU Yoga Study – Do you do yoga once a week or more? If so, SFU needs your help with a brief online survey! The ads were demographically targeted to adults 40+ in the Lower Mainland (the Greater Vancouver area). Interested participants were able to click on a link that directed them to the study website www.agelessyoga.ca. At this website they could click on the heading YOGA STUDENT STUDY, which led them to the consent page (see Appendix 2). The consent page outlined the study. Those willing to participate in the questionnaire were asked to click on PROCEED TO QUESTIONNAIRE. At the end of the questionnaire respondents gave their phone number and/or email if they were interested in participating in a follow-up interview. Of the total sample, 268 (59.2%) respondents provided their email addresses. This large response suggested that this topic is a popular one. Space was also available on the questionnaire for comments. Many respondents took advantage of this space to express their support for this survey and their interest in hearing the results.

A large convenience sample of 462 yoga students, aged 40 to 82 were recruited over a three-month period from July to September 2012. Computer logs indicated that 79% of participants (83.9% of middle-aged students and 71.3% of older students) accessed the study website from Facebook, either by clicking on the study advertisement or following a link to the study posted on a friend's Facebook wall. The remaining participants (21%) were recruited through information posters on community centre and yoga studio bulletin boards or by word of mouth. Participants interested in the study were greeted with the consent page explaining the general purpose of the study. Those who agreed to participate clicked on the CLICK TO PROCEED box. These yoga students were presented with the study questionnaire. The participants who chose not to participate clicked DO NOT WANT TO PROCEED and were led off the page.

Participants were informed that their responses would be collected and encrypted via Simon Fraser University's secure <https://server> to help ensure privacy and security of information.

4.2.1.3 Participant Screening

Using IP addresses, dates, and submission times, four cases were flagged as duplicate and excluded from further analysis. Six respondents submitted questionnaires with responses missing for more than 50% of the questions; therefore these surveys were also excluded. A final working sample of 452 respondents remained.

4.2.1.4 Pilot Test

The full study questionnaire was pilot-tested on a small number of yoga students who were randomly selected from a variety of yoga studios and classes. An attempt was made to have an equal number of middle-aged and older students. A paper-and-pencil version was administered to 22 students aged 40+ during the month of June 2012 (see Appendix 3). Feedback from respondents indicated that the questionnaire instructions and response options were clear and that the questionnaire was not unreasonably long. Adjustments were made to a few response categories. Based on the results of the pilot test, the full questionnaire was posted on-line on Facebook in July 2012.

4.3 DATA MANIPULATION

Data from the questionnaire were entered into a Microsoft Excel spreadsheet. Verification and data cleaning was conducted by running frequencies on all variables and examining outliers and other errors. Once verifications were conducted to determine accuracy, data was imported into the Statistical Package for Social Sciences (SPSS), Version 20. SPSS 20 was used for all data analyses.

4.4 SAMPLE CHARACTERISTICS, MEASUREMENT AND DESCRIPTIVE DATA

4.4.1 Sample Characteristics

The sample ($N = 452$), ranging from 40 to 82 years of age (Mean = 52.68, Std. Dev. = 8.617), was predominantly female (77.9%), married/partnered (65.3%), college- or university-educated (95.7%), middle class (26.3%), employed (81.2%) White/Caucasian/European (83.2%), spiritual 30.1%, and heterosexual (88.7%) (see Table 1). Most participants practiced yoga in a studio (63.5%) for 60 minutes (33.4%), 2 times a week (21.9%) to improve flexibility (88.4%) and reduce stress (83.7%). The sample was also predominately healthy, with 73.9% reporting no chronic health conditions, 32% reporting good health, and 41.3% reporting very good health.

4.4.2 Measurement and Descriptive Data

This section provides descriptive patterns and measurement of all variables, including the total sample and percentages across age, given the focus of this study. Note that the statistics and significance tests for the bivariate associations are shown in the Results section.

4.4.2.1 Age

Given that the purpose of this study was to examine age differences in the practice of yoga, age was treated two ways: first as a descriptive variable, and second, the interval measure of age and age when started a yoga practice were treated as independent variables in order to explore associations with a number of variables. The questionnaire asked participants to state their date of birth. Including age as a variable allows the study to answer questions relating to age differences in the practice of yoga. In order to test for age effects, the initial sample of 452 respondents was divided into two groups; one group comprising yoga students under 55 years of age ($n = 274$, 60.6%, average age 47.03, range = 26–54, $SD = 4.78$) and one group comprising yoga students aged 55 years and over ($n = 178$, 39.4%, average age 61.37, range 55–82, $SD = 5.36$). The age the respondent started a yoga practice was computed by subtracting their birth year from the year they started to practice. This variable was AGE STARTED 55. Of the total sample, results showed that 368 (81.4%) of respondents began their yoga practice below the age of 55 and 84 (18.6%) began their yoga practice at

age 55 or over. Given that yoga has only recently begun to be popular among persons over 65, and that it is a more common physical activity among middle-aged persons, we selected 55 as the cut-point for the age analyses.

4.5 SOCIO-DEMOGRAPHIC VARIABLES

Considering there is very little in the literature to date, this study examined the socio-demographic characteristics of the participants. Gender, marital status, education, income, employment, ethnicity, religion and sexual orientation are presented in the following section. Results for frequency and percentages of the total sample, for these characteristics, are shown in Table 1, and percentages across the age groups are shown in Table 2. Testing of significance for age differences is discussed in the next section.

4.5.1 Gender

Gender was included in the analysis to explore how gender and yoga practices across the age groups are related. Generally, it is well known that women practice yoga more than men (Birdee et al., 2008; Penman, 2008).

4.5.2 Marital Status

The questionnaire asked participants to indicate whether they were married, common-law, living with a partner, divorced, separated, single, or widowed. This variable was included to gain insight into who actually practices yoga. For analysis purposes the responses were recoded.

4.5.3 Education

The questionnaire asked participants to indicate their education level. Education was included as a variable because previous surveys (Birdee et al., 2008; Penman, 2008) have determined an association between yoga practitioners and education level. Categories included; High school, Some college/university, Associate's degrees/diploma, Bachelor's degree, Master's degree, Graduate degree (MD, LLB, etc.) and PhD/Post-doctoral. The sample, overall, is highly educated. Indeed, no one had less than a high school education, and 95.7% of the participants had at least some post-secondary education. For bivariate analyses purposes education was recoded to a dichotomous variable, undergraduate vs. graduate/post-graduate degree.

4.5.4 Income

Income was included in this exploratory study in order to provide insight into the relationship between income and yoga practice. Participants were asked to indicate their average yearly income from all sources. Categories available for selection were: \$0–\$19,999; \$20,000–\$29,999; \$30,000–\$39,999; \$40,000–\$49,999; \$50,000–\$59,999; \$60,000–\$69,999; \$70,000–\$79,999; \$80,000–\$89,999; \$90,000–\$99,999; \$100,000+. For bivariate analysis purposes, responses were recoded into three categories: 1 = \$49,999 and below, 2 = \$50,000–\$99,999, and 3 = \$100,000 plus.

4.5.5 Employment

Employment status was included as a variable because previous surveys have determined an association between yoga practitioners and working status. The questionnaire asked participants to report their current employment status. Respondents chose from the list of responses available: full-time, part-time, sick leave, semi-retired, retired, and unemployed. For bivariate analysis purposes, responses were recoded into three categories: working, unemployed, and retired.

4.5.6 Ethnicity

Ethnicity was included as a variable of interest, as with previous surveys. Due to very small numbers in some categories, ethnicity was recategorized into eight groups: Aboriginal/Native/First Nation (1.3%), African/African America/Black (.9%), East Asian/Pacific Islander (6.6%), Latino (1.5%), Middle Eastern/North African (.7%), Southeast Asian/Indian (2.9%), White/Caucasian/European (83.2%), and Mixed/Multi (2.9%). For bivariate analysis purposes, a dichotomous variable was created, WHITE/CAUCASIAN/EUROPEAN versus OTHER.

4.5.7 Religion

Due to the exploratory nature of this study, religion was included as a variable in order to gain an understanding of the attractiveness qualities of yoga for different religions. Participants were asked, “What is your religion/spiritual orientation?” Many religions were represented in the sample. These included: Agnostic (4.2%), Buddhist (8.2%), Christian (Other) (19.9%), Hindu (1.3%), Islamic (.4%), Jewish (3.5%), New Age (1.3%), Non-religious (24.6%), Sikh (.4%),

Spiritual (30.1%), and Other (6.0%). For bivariate analysis purposes, due to the small numbers for some categories, this variable was recoded to SPIRITUAL, NON-RELIGIOUS, CHRISTIAN (OTHER), and OTHER.

4.5.8 Sexual Orientation

Three categories were chosen to identify sexual orientation; heterosexual, homosexual and bisexual.

4.6 PATHWAYS TO YOGA

Participants were asked if someone suggested they to try yoga. Set responses included, HEALTH CARE PROVIDER, FAMILY MEMBER, FRIEND, NEIGHBOUR, NOBODY and OTHER. Participants were informed that they could check ALL THAT APPLY. Categories with few response selections such as NEIGHBOUR, TEACHER, and CO-WORKER were recoded to OTHER. Results for percentages selected for each category are shown in Table 3.

Participants were then asked, “If more than one person, who was the Most important?” Results showed that NO ONE was still the most popular (see Table 4).

Participants were also asked what external factors influenced their decision to try yoga. Response options included: ARTICLE IN NEWSPAPER/ MAGAZINE, READING ABOUT YOGA (BOOKS, JOURNALS), PUBLIC POSTER, ADVERTISEMENT ON RADIO, ADVERTISEMENT ON T.V., INTERNET, COMMUNITY EVENTS (WELLNESS FAIR, HEALTH WORKSHOP, CONFERENCE), and OTHER. Again, participants were informed that they could choose more than one response. (see Table 5).

Because participants chose more than one response, it was important to determine which of the many options chosen was the most important. Results are shown in Table 6.

The relationship between health and yoga practice was explored. Participants were asked, “Did any health-related event(s) help you make the decision to try yoga (i.e., losing your balance, having difficulty getting up from a chair, a friend breaking their hip, medical diagnosis, etc.) (see Table 7).

4.7 YOGA PRACTICE

The following section presents the results of questions on the survey that explored the yoga practice of the participants.

Participants were asked, “What are your reasons for practising yoga?” Participants were encouraged to CHECK ALL THAT APPLY. Most participants chose more than one option. Results are shown in Table 8.

Due to the fact that many participants declared many reasons for practising yoga, it was of interest to determine which was the most important reason. Participants were asked, “If more than one reason, which is the MOST important?” Three hundred and eighty-seven students responded to this question. Categories with small numbers were collapsed for analysis purposes. The following reasons: manage pain, meditation, improve attention/awareness, lose weight, increase range of motion, gain confidence, improve balance, improve breathing, prevent osteoporosis, and social interaction, were recategorized to OTHER (see Table 9).

In order to gain insight into the initial experiences of a yoga practice, participants were asked, “Did any barriers to practising yoga initially stand in your way? If yes, which barrier(s)? If none, leave blank.” Many participants chose more than one barrier. Categories with few responses, such as TRANSPORTATION, INSUFFICIENT SOCIAL SUPPORT, and INCOMPATIBILITY WITH RELIGIOUS BELIEFS, were recoded to OTHER (see Table 11).

Due to the fact that many participants selected many of the barriers response options, it was of interest to determine which barrier was the MOST important. Participants were asked on the survey questionnaire, “If more than one barrier, which was the BIGGEST barrier?” (see Table 12).

The next question on the survey asked, “Would you prefer to practice yoga more often that you currently do?” (see Table 13).

Participants were then asked, “If you perceive any barrier(s) to be standing in the way of you practising more yoga, which one(s)? If none, leave blank.” Again, many participants chose more than one barrier option (see Table 14).

The biggest barrier to practising yoga more often was NOT ENOUGH TIME DUE TO WORK (see Table 15).

Exploring the relationship between confidence levels and the ability to practise yoga, participants were asked, “When you first started practising yoga,

how confident were you in your abilities to practise?" (Results are shown in Table 16).

The next question was a follow-up to the previous question exploring confidence levels. Participants were asked, "Now that you have been practising regularly, how confident are you in your abilities?" (see Table 17).

In order to gain more insight into how participants practised yoga they were asked, "With whom do you practise yoga?" Response selections included: WITH OTHERS, BY MYSELF AND WITH OTHERS, BY MYSELF, and BY MYSELF ONLY, WITH A DVD, VIDEO, ETC. (see Table 18).

In an attempt to determine where yoga students practised most frequently, the question, "In which location do you practise yoga most frequently?" was asked. Response options included: YOGA STUDIO, COMMUNITY CENTRE, PRIVATE INSTRUCTOR'S STUDIO, COMMERCIAL GYM, HOME, and OTHER. (see Table 19).

Respondents were asked, "Why do you prefer to practise in this location?" Response options were: LOCATION, ACCESSIBILITY, INSTRUCTOR(S), CLASS TIMES, STYLES OF YOGA, COST, COMMUNITY FEELING, and OTHER. OTHER included reasons such as, class size, motivation, and continuation with instructor (see Table 20).

Again, since many respondents identified many reasons, it was of interest to determine the most important reason for the location of yoga practice. Therefore, the participants were asked, "If more than one reason, which is the most important?" (see Table 21).

Of interest in this exploratory study was the question of whether older yoga students would prefer to practise in a class exclusively designed for older adults. Therefore participants were asked, "If you practice yoga in a class, do you prefer to be in a class with older adults only (50+)? Why? If you do not practice in a class, skip this question." Respondents chose from the following selections; YES, ALWAYS, YES, SOMETIMES, NO, NOT REALLY, and IT DOESN'T MATTER. Due to small numbers in the YES categories, (YES, SOMETIMES was selected by 4.1% of middle-aged students and 7.4% of older students, and YES, ALWAYS by 0.4% of middle-aged students and 4.0% of older students), these options were recoded to YES (see Table 22).

Exploring the relationship between the styles of yoga practised and age groups of the yoga students, participants were asked, “What style(s) of yoga have you tried?” (see Table 23).

To gain more insight into the styles of yoga practised most often and the age groups of the student, participants were asked, “What style of yoga do you practise most often?” (see Table 24).

The next question on the questionnaire asked participants, “On average, how many times a week have you practised over the last three months?” (see Table 25).

Continuing with a focus on individual yoga practices, participants were asked to state how long was their average yoga session. Results are shown in Table 26.

Section Two of the questionnaire asked general health questions. Participants were asked, “Do you have any chronic health conditions (high blood pressure, heart disease, arthritis, cancer, multiple sclerosis, effects of stroke, chronic pain, diabetes, depression)?” (see Table 27).

Participants were then asked if they had any physical mobility issues that hindered their movement (i.e. hip replacement) (see Table 28).

To determine the association between health before starting yoga and the age groups of the students, participants were asked, “How would you say your health was before you started yoga?” (see Table 29).

Participants were then asked, “How would you say your health is now?” Categories with small numbers were collapsed for analysis purposes. (see Table 30).

Exploring the relationship between physical activity levels and yoga and the age groups of the yoga students, participants were asked, “How would you characterize your physical activity level before you started practising yoga?” Responses available were: VERY ACTIVE, ACTIVE, SOMEWHAT ACTIVE, and SEDENTARY (see Table 31).

Then the participants were asked, “How would you characterize your current physical activity level?” Response selections included, VERY ACTIVE, ACTIVE, SOMEWHAT ACTIVE, and SEDENTARY. Categories with small numbers were collapsed for analysis purposes (see Table 32).

At the end of the questionnaire, participants were asked, “How did you hear about this survey?” Response options available were: FACEBOOK AD,

FACEBOOK PAGE (E.G., YOGA PAGE, FITNESS PAGE), FRIEND'S FACEBOOK WALL, GOOGLE AD, CRAIGSLIST, POSTER/NOTICE/EMAIL FROM FRIEND, POSTER/NOTICE/EMAIL FROM YOGA STUDIO, POSTER/NOTICE/EMAIL FROM YOGA INSTRUCTOR, OTHER (see Table 33).

4.8 QUALITATIVE METHODS

Qualitative research has been highlighted as particularly helpful for exploring the contextual aspects of human life and for gerontological studies (Denzin & Lincoln, 2011). This type of research is particularly appropriate for studying diversity, subjective experiences, and the processes by which individuals create, sustain, and discuss their own realities (Schoenberg, Shenk, & Kart, 2007). Qualitative methods allow for the recognition of the subjectivity of the lived experience (Lyons & Dionigi, 2007) or how people experience events (Willig, 2008). Hence, this style of research allowed the participants an opportunity to share details about their experiences, including how they perceived their behaviours and what contributed to their sustained, consistent yoga practice.

4.8.1 Qualitative Participant Selection

Purposeful sampling and quota sampling was administered as a selection process for the qualitative component of this study. This type of sampling is common in qualitative research and involves the selection of cases from which one can learn a great deal about issues that are of central importance to the purpose of the study. Since one of the main focuses of this study was the examination of experiences as well as age differences, the goal of sampling for qualitative analysis was to include participants of various ages, motivations, and commitment levels. While it is common to sample using theoretical saturation methods (Mason, 2010), it was decided to limit the qualitative study to 20 participants.

As a mixed-method study, the qualitative research focused on specific areas identified as important in the quantitative results, as well as gaps in the survey instrument that required further exploration. It was ensured that qualitative participants included five males and five females, representing both age groups and gender. Furthermore, selected interview participants had varying

levels of experience as indicated on their questionnaires. This was done in order to have representation in the follow-up interviews of all experience levels.

These 20 survey participants, selected from the 268 that indicated interest in the interview process, were emailed to confirm their willingness to be interviewed about their yoga practice. Once confirmation was received, an interview was set up, on a day, time and coffee shop of their choice. All 20 participants agreed to be interviewed and the interviews were conducted in March–July of 2013.

4.8.2 Qualitative Interview

The in-depth interview is a qualitative research technique that allows person-to-person discussion. Interviewing is not merely the neutral exchange of asking questions and getting answers. Two or more people are involved in this process and their exchanges lead to the creation of a collaborative effort called the interview (Holstein & Gubrium, 1995). Using a flexible interview approach, this methodology provided insight into the participants' thoughts, feelings, and experiences. By asking 'stem questions', such as, "Could you tell me more about that?" interviewees were encouraged to talk at length about their yoga practice. Responses to standardized interview guide questions provided general information on yoga practice experiences, as well as more in-depth data on participants' personal journeys.

Semi-structured in-depth interviews were conducted with the sample of 20 participants and were approximately 45 minutes in duration. Interviews were directed by an interview guide (see Appendix 5). The interview guide allowed for flexibility during data collection while ensuring that all questions were covered (Bryden & Madden, 2006). This guide included predetermined questions based on the selected topics. Open-ended questions were used as much as possible. Although questions were asked in a systematic order, respondents had the freedom to digress (Berg, 2004). The following section outlines the topics used as a basis for creating the standard interview guide.

4.8.3 Interview Topics

Topic	Associated Questions
Initial Yoga Experiences	What were the reasons for getting into it originally? Was anyone or something you read influential? Is there anything else that you can share with me about how and why you got started?
Current Yoga Practice Experiences	Do you do it alone? How often? How do you get motivated to do it? What mainly draws you to it? Do you try different types? How does this make you feel? Is it mostly physical or mental benefits that draw you to yoga? Spiritual? What do you think it does for you?
Barriers to Yoga Practice	Do any of these seem more of an issue than others? How do you get past these barriers? Have you thought about these and how they can be rectified?
Additional Comments	Lots of probes!

The interview guide was followed during all interviews. All questions and sub-questions were asked and answers were provided. Additional questions were incorporated into some interviews when deemed appropriate and in some cases the wording was modified to clarify questions for participants.

4.8.4 Qualitative Data Analysis

Interviewees were reminded about the confidentiality of their information. The researcher asked respondents for their permission to be tape-recorded. All participants verbally consented to the recording. When recording was complete, all 20 interviews were transcribed verbatim. The transcription process allowed the researcher to develop a strong familiarization with the data, and with each interviewee, and to begin considering how the data helped answer the research questions.

Thematic analysis was chosen as a technique for the interpretation of follow-up interviews. This type of qualitative analysis facilitates identification of major themes that emerge from these data. It also provides a systematic summary of research findings that are easily understood by the general public and policy makers (Howit, 2010).

Thematic analysis was conducted for all interview transcripts, beginning with line-by-line coding. These codes were selected and based on topics and concepts found in the data. Open coding was done by keeping track of possible

categories and patterns, with attention paid to both areas of similarity across cases and divergence or areas that did not fit modal patterns within the data, without attempting to interpret the data through any particular theory of framework. After coding the next step was the identification of themes and sub-themes. Themes identify major patterns in the initial coding and can be described as interpreting the text at a secondary level (Howitt, 2010).

In addition, journaling was done immediately after each interview to record overall impressions and observations that may have been lost once audio recordings had been converted into transcriptions and coded. Journals are recommended in qualitative research to make notes about emerging themes and interpretations (Taylor & Bogdan, 1998).

The researcher also engaged in reflexivity during the journaling process. Holstein and Gubrium (1995) urged researchers to be reflexive not only about what the interview accomplishes but about how the interview is accomplished. Reflexivity is deemed essential, since the researcher is the primary instrument of data collection and analysis (Glesne, 1999; Merriam, 1998; Russell & Kelly, 2002; Stake, 1995). This entailed careful consideration of assumptions, behaviours, biases, feelings, and thoughts that may have influenced the interview process and the interpretation of findings. Wasserfall (1993) noted that it is the researcher who ultimately cuts and pastes together the narrative, choosing what will become part of it and what will be left out.

4.8.5 Qualitative Sample Characteristics

Follow-up interview participants ranged in age from 40 to 69 years. See Table 36 for the distribution of age across females and males for the sub-group. The final sample of interviewees included participants from Chilliwack, Port Moody, White Rock, Burnaby, and New Westminster.

5

RESULTS

Due to our rapidly aging population and the dramatic increase in the number of older adults participating in yoga (Wang, 2013), this research was interested in developing a better understanding of the use of yoga by older adults across two age groups. Addressing the research questions, this chapter, divided into two parts, reports quantitative and qualitative findings. Part 1 reports socio-demographic differences between middle-aged (40 - 54) and older (55+) yoga students. This section also explores differences between the same age groups (students currently 40 to 54 and students 55 or older), as well as age starting yoga practice, for pathways to yoga, motivations, barriers, styles of yoga practiced, location of practice, levels of physical activity, and levels of self-confidence. Part 2 reports qualitative findings from in-depth, face-to-face interviews. Twenty interviewees (10 under 55 years of age and 10 older than 55) were chosen in order to provide a diversity of participants, given the exploratory nature of this study.

5.1 QUANTITATIVE RESULTS

5.1.1 Socio-demographic Variables

Socio-demographic information was collected in order to explore age differences in yoga practice. This information was used to determine whether there were any statistically significant demographic differences between the two age groups – older yoga students and middle-aged yoga students. This analysis is correlational only, since we examine associations between age of yoga students and other demographic characteristics. Crosstabulation analysis was used to examine these associations. The Likelihood Ratio Chi-square is used for tables with at least one nominal variable; Kendall's Tau-b is used for

those with ordinal variables. For two-by-two Chi Square tables, Fisher's exact test is reported as the test for statistical significance.

No significant statistical association was found between the age groups and gender. For instance, approximately equal proportions of males and females were middle-aged yoga students (61.0% and 60.7% respectively) (see Table 2). Percentage differences are not reported for subsequent associations that are not statistically significant.

A statistically significant association was found between age groups of the yoga students and marital status ($\chi^2 = 14.68$, $df = 3$, $p < .01$). In the middle-aged group ($N = 274$), 182 (61.7%) were MARRIED OR PARTNERED, 35 (55.6%) were either DIVORCED OR SEPARATED, 56 (67.5%) were SINGLE, and 1 (9.1%) was WIDOWED. In the older group ($N = 178$), 113 (38.3%) were MARRIED, 28 (44.4%) were DIVORCED/SEPARATED, 27 (32.5%) were SINGLE, and 10 (90.9%) were WIDOWED. As shown in Table 2, older yoga students are significantly more likely to be WIDOWED, whereas middle-aged students are significantly more likely to be SINGLE or MARRIED. This association is probably due to the fact that older people in general experience the loss of a spouse.

There was also a statistically significant association found between age groups of the yoga students and employment status ($\chi^2 = 70.65$, $df = 2$, $p < .01$). Middle-aged yoga students were significantly more likely (67.3%) to be WORKING than RETIRED (12.9%), whereas older yoga students were significantly more likely (87.1%) to be RETIRED than WORKING (32.7%) or UNEMPLOYED (17.4%). This association supports the literature concerning age and retirement (see Table 2).

Findings also supported a statistically significant association between age groups of the yoga students and ethnic origin ($\chi^2 = 11.07$, $df = 1$, $p < .01$). Due to the small number of participants in non-white groups, responses were recoded into a dichotomous variable (White/Caucasian/European vs. Other). As evident from Table 2, middle-aged yoga students were significantly more likely (77.6%) to be OTHER than WHITE/CAUCASIAN/EUROPEAN (57.2%) whereas older yoga students were significantly more likely to be WHITE/CAUCASIAN/EUROPEAN (42.8%) than OTHER (22.4%).

No significant statistical associations were found between the age groups and education, income, religion, or sexual orientation.

Findings showed that the typical yoga survey respondent was young, female, college or university-educated, employed, healthy, and white. These

results are consistent with the findings of prior yoga research studies by Birdee (2008) and Penman (2008).

5.1.2 Research Question 1: Pathways to Yoga

Bivariate analyses were also conducted to examine the relationship between age group (treated as the independent variable) and several categories of pathways to yoga (treated as dependent variables). This exploratory analysis was conducted to gain an initial understanding of whether older and middle-aged yoga students differed in how they began the practice of yoga. However, as shown in Tables 3 to 7, there were no statistically significant associations between age groups of the yoga students and pathways to yoga.

5.1.3 Research Question 2: Motivations for Practising Yoga

The association between age groups and motivations, or reasons, for practicing yoga was also examined. Participants were asked to select from a list of potential reasons for practising yoga. Since they could check any number of reasons, each reason was treated as a separate, dependent variable.

Associations were found between the age groups of the yoga students and reasons for practising yoga. Results indicated statistically significant associations between age groups and reducing stress ($\chi^2 = 5.03, df = 1, p < .05$), increasing muscle strength ($\chi^2 = 6.70, df = 1, p < .01$), losing weight ($\chi^2 = 5.40, df = 1, p < .05$) and preventing osteoporosis ($\chi^2 = 6.22, df = 1, p < .01$). As shown in Table 8, middle-aged yoga students are significantly more likely (87.6%) than older students (79.8%) to use yoga to reduce stress, as well as to increase muscle strength (78.8% vs. 68.0%) and to lose weight (25.5% vs. 16.3%), whereas older yoga students are significantly more likely (28.7%) than middle-aged yoga students (18.6%) to use yoga to prevent osteoporosis.

No associations were found between age groups of the yoga students and the following reasons for yoga practice: IMPROVE FLEXIBILITY, IMPROVE BALANCE, INCREASE RANGE OF MOTION, IMPROVE BREATHING, MEDITATION, IMPROVE ATTENTION & AWARENESS, EXPLORE SPIRITUALITY, EMBRACE YOGA PHILOSOPHY, INCREASE ENDURANCE, GAIN CONFIDENCE, SOCIAL INTERACTION, MANAGE PAIN, MANAGE MENOPAUSE, and MANAGE CHRONIC ILLNESS (see Table 8).

Due to the fact that participants selected many options for the question, “What were your reasons for practicing yoga?” it was of interest to determine

THE MOST IMPORTANT REASON for yoga practice. For analysis purposes, categories with few responses were recoded to OTHER. An association was found between the age groups of the yoga students and the MOST IMPORTANT REASON for practising yoga ($\chi^2 = 17.73, df = 6, p < .05$). Results indicated that middle-aged yoga students were significantly more likely (27.7%) than older yoga students (17.4%) to choose REDUCE STRESS AND/OR ANXIETY as their most important reason for practicing yoga. No associations were found between age groups of the yoga students and EMBRACE YOGA PHILOSOPHY, IMPROVE FLEXIBILITY, EXPLORE SPIRITUALITY, INCREASE MUSCLE STRENGTH, or MANAGE CHRONIC ILLNESS (see Table 9).

Bivariate analyses were also used to examine the association between the age the respondent started to practice yoga, AGE STARTED 55, rather than the current age of the respondents, and the reasons for starting yoga. An association was found between the age the yoga student started their practice of yoga and REDUCING STRESS, ($\chi^2 = 5.46, df = 1, p < .05$). As shown in Table 10, middle-aged yoga starters (below 55 years of age) were significantly more likely (86.4%) than older yoga starters (above 55 years of age) (76.2%) to use yoga to REDUCE STRESS. A statistically significant association was found between the age the yoga student started and MEDITATION, ($\chi^2 = 3.916, df = 1, p < .05$). Results showed middle-aged starters more likely (56.0%) than older starters (44.4%) to practise yoga for its meditative qualities. An association was also found for EXPLORE SPIRITUALITY and the age started ($\chi^2 = 6.24, df = 1, p < .05$). Middle-aged yoga starters were more likely (50.8%) than older starters (35.7%) to practise yoga for spiritual exploration. A statistically significant association was found between the age the yoga student started to practise yoga and the reason EMBRACE YOGA PHILOSOPHY, ($\chi^2 = 6.15, df = 1, p < .05$), with middle-aged yoga starters significantly more likely (40.8%) than older yoga starters (26.2%) to embrace yoga for philosophical reasons. A statistically significant association was also found between the age a yoga student started to practice and SOCIAL INTERACTION, ($\chi^2 = 3.98, df = 1, p < .05$). Older yoga student starters (35.7%) were significantly more likely than middle-aged starters (25.0%) to begin a yoga practice for social reasons (see Table 10). No statistically significant associations were found between the age the respondent started to practice yoga and the pathways or barriers experienced.

5.1.4 Research Question 3: Barriers to Yoga

In order to further explore an individual's practice of yoga, participants were asked what barriers they experienced when starting a yoga practice. An association was found between the age groups of the yoga students and NONE ($\chi^2 = 3.93, df = 1, p < .05$). Older students were more likely (47.8%) than middle-aged yoga students (38.3%) to claim they had no barriers when starting to practise yoga. An association was also supported between age groups of the yoga students and SOCIAL ANXIETY/EMBARRASSMENT ($\chi^2 = 6.16, df = 1, p < .05$). Results indicated that middle-aged students are significantly more likely (12.8%) than older students (5.6%) to experience social anxiety/embarrassment as a barrier to starting a yoga practice. No statistically significant associations were found for other barriers such as: NOT ENOUGH TIME DUE TO WORK, FINANCIAL CONSTRAINTS, CLASS TIMES/SCHEDULING, HEALTH ISSUES, or MOBILITY/DISABILITY ISSUES (see Table 11).

Many responses were chosen for the above question, therefore, participants were also asked to choose their biggest barrier to starting a yoga practice. However, no statistically significant associations were found between age groups of the yoga students and the biggest barrier to starting a yoga practice (see Table 12).

Participants were then asked if they would like to practise yoga more than they currently do. Although not statistically significant, it is of interest to note that 74.8% of middle-aged students and 69.7% of older students affirmed that they would like to practise more often than currently (see Table 13).

Participants were asked to identify barriers they had to practicing yoga more often. One association was found between age groups of the yoga students and barriers to practicing more often ($\chi^2 = 5.36, df = 1, p < .05$). As shown in Table 14, middle-aged students were significantly more likely (30.7%) than older students (20.8%) to suggest that NOT ENOUGH TIME DUE TO WORK was a barrier to practising yoga more often. No association was found between age groups of the yoga students and the biggest barrier to practising yoga more often (see Table 15).

5.1.5 Research Question 4: Yoga Practice

The following section addresses the fourth research question, “What are the similarities and differences between middle-aged and older adult yoga students in the practice of yoga?” Confidence levels (before and current), with whom do they practice, most frequent location of yoga practice, reasons for this location preference, preferences for 50+ classes, styles of yoga tried, styles of yoga practised most often, frequency of practice, length of average yoga session, chronic health conditions, physical mobility issues, self-rated health (before and current), physical activity levels (before and current) were examined.

Exploring the relationship between confidence and yoga practice, participants were asked to identify their confidence level when first starting yoga (see Table 16). No statistical association was found between age groups of the yoga students and self-confidence. Although not statistically significant, it is interesting to note that there was an increase in the confidence levels of both age groups from initial levels to current levels. For instance, 20.4% of middle-aged students selected CONFIDENT for the initial question while 51.1% identified CONFIDENT for their current confidence level. Similarly, older adults’ confidence level rose from 28.1% to 46.1%. The selection VERY CONFIDENT showed the most dramatic increase for both age groups, 8.8% to 33.6% for middle-aged yoga students and 7.9% to 32.0% for older yoga students (see Table 17).

Participants were asked to identify with whom they practiced yoga. Choices were BY MYSELF AND WITH OTHERS, WITH OTHERS, BY MYSELF ONLY, and BY MYSELF ONLY, WITH A DVD/VIDEO/ETC. No statistical association was found between age groups of the yoga students and with whom they practiced (see Table 18).

Participants were also asked to identify their most frequent location for yoga practice. An association was found between age groups of the yoga students and location of yoga practice ($\chi^2 = 10.14, df = 1, p < .01$). Middle-aged students were significantly more likely (70.8%) than older students (56.2%) to practice in a yoga studio. No statistical associations were found between age groups of the yoga students for the other location options, HOME, COMMUNITY CENTRE, or COMMERCIAL GYM (see Table 19).

In order to determine why students preferred their location of practice, they were asked to choose from the following options: INSTRUCTOR, LOCATION, STYLE OF YOGA, ACCESSIBILITY, CLASS TIMES, COMMUNITY FEELING, COST, and

OTHER. An association was found between age groups and accessibility ($\chi^2 = 9.89, df = 1, p < .01$). Older students were more likely (54.5%) than middle-aged students (39.4%) to select ACCESSIBILITY for the reason why they preferred the location of their yoga practice. An association was also found between cost and age groups of the yoga students ($\chi^2 = 5.73, df = 1, p < .05$). Older students were significantly more likely (44.4%) than middle-aged students (32.2%) to choose COST as a reason for their location of practice. No statistical associations were found for the other reasons: INSTRUCTOR, LOCATION, STYLE OF YOGA, CLASS TIMES, COMMUNITY FEELING, and OTHER (see Table 20).

In order to determine the MOST IMPORTANT REASON for their location preference, yoga students were asked to select their MOST IMPORTANT REASON from the options given. An association was found between the age groups of the yoga students and the MOST IMPORTANT REASON for the location of practice ($\chi^2 = 12.67, df = 6, p < .05$). Results indicated that older yoga students were significantly more likely (16.9%) than middle-aged yoga students (8.8%) to choose ACCESSIBILITY for their MOST IMPORTANT REASON. No statistical associations were found for the other options: INSTRUCTOR, STYLE OF YOGA, LOCATION, CLASS TIMES, COMMUNITY FEELING, or COST (see Table 21).

Of interest in this exploratory research study was the question of whether older yoga students preferred to practice yoga exclusively with other older students. An association was supported between age groups of the yoga students and preference of classes with older adults only ($\chi^2 = 8.54, df = 3, p < .05$). Older students were significantly more likely (9.6%) to want an OLDER ADULTS ONLY yoga class than middle-aged yoga students (4.0%). Middle-aged students were significantly more likely (53.3%) to state, IT DOESN'T MATTER than older students (45.5%) (see Table 22).

Participants were asked to identify styles of yoga that they have tried. An association was found between age groups of the yoga students and BIKRAM OR OTHER HOT YOGA ($\chi^2 = 44.50, df = 1, p < .01$). Middle-aged yoga students were significantly more likely (61.3%) than older students (29.2%) to try Bikram yoga or another hot yoga. A statistically significant association was also found between age groups of the yoga students and ASHTANGA VINYASA YOGA ($\chi^2 = 13.31, df = 1, p < .01$). Middle-aged yoga students were more likely (60.2%) to try Ashtanga vinyasa yoga than older students (42.7%). No associations were found for other yoga styles tried, such as HATHA/GENTLE/CHAIR, LAUGHTER YOGA OR YOGA THERAPY, IYENGAR/KRIPALU/YIN, or KUNDALINI (see Table 23).

Participants were also asked about the styles of yoga they practiced most often. For bivariate analyses, the styles of yoga were recoded to a dichotomous variable: HATHA, GENTLE, CHAIR, IYENGAR, KRIPALU, YIN, LAUGHTER AND YOGA THERAPY versus ASHTANGA VINYASA, KUNDALINI, BIKRAM OR OTHER HOT YOGA. An association was found between the age groups of the yoga students and styles of yoga practiced most often ($\chi^2 = 25.28, df = 1, p < .01$). The likelihood of practising HATHA, GENTLE, CHAIR, IYENGAR, KRIPALU, YIN, LAUGHTER OR YOGA THERAPY was significantly higher (77.44%) for older yoga students than middle-aged yoga students (54.0%) (see Table 24).

Participants were asked to state their frequency of practice per week. Results showed no statistically significant association between age groups of the yoga students and times per week of yoga practice (see Table 25).

Participants were also asked about the length of their average yoga session. Results showed no statistically significant association between age groups of the yoga students and length of average yoga session (see Table 26).

Section Two of the questionnaire asked general health questions. An association was found between the age groups of the yoga students and CHRONIC HEALTH CONDITIONS ($\chi^2 = 7.11, df = 1, p < .01$). Older students were significantly more likely (46.1%) than middle-aged yoga students (33.6%) to have chronic health conditions (see Table 27).

An association was also uncovered between the age groups of the yoga students and physical mobility issues ($\chi^2 = 15.73, df = 1, p < .01$). Older students were more likely (34.3%) than middle-aged yoga students (17.9%) to have physical mobility issues (see Table 28).

Participants were also asked to identify their health before they began their yoga practice. No association was found between the age groups of the yoga students and self-rated health before starting yoga (see Table 29).

For analysis purposes, response options for current self-rated health were recoded to 4 categories: EXCELLENT, VERY GOOD, GOOD, and FAIR. An association was found between age groups of the yoga students and current self-rated health ($\chi^2 = 14.77, df = 3, p < .01$). As shown in Table 30 middle-aged yoga students were more likely (50.0%) than older students (32.6%) to be in VERY GOOD health. Ordinal measure associations show a Tau-b (-.075), indicating a negative association.

Participants were also asked about their physical activity level before starting their yoga practice. No association was found between the age groups of the yoga students and their physical activity level before starting yoga (see Table 31).

However, an association was found between age groups of the yoga students and their current physical activity level ($\chi^2 = 6.90, df = 1, p < .05$). For analysis purposes, response options were recoded to three categories: VERY ACTIVE, ACTIVE, and SOMEWHAT ACTIVE. Results indicated that older yoga students were significantly more likely (28.1%) than middle-aged yoga students (17.9%) to be SOMEWHAT ACTIVE, whereas middle-aged yoga students were significantly more likely (32.1%) than older yoga students (25.8%) to be VERY ACTIVE. Ordinal measure associations show a Tau-b (-.105), indicating a negative association (see Table 32).

Participants were asked how they found out about the survey. An association was found between the age groups of the yoga students and Facebook ($\chi^2 = 10.30, df = 1, p < .01$). Middle-aged students were significantly more likely (83.9%) than older yoga students (71.3%) to have discovered the survey by way of the Facebook ad (see Table 33).

See Table 34 & Table 35 for a summary of the statistically significant associations found. A discussion of the above findings is presented in the next chapter.

5.2 QUALITATIVE FINDINGS

This chapter presents findings from the qualitative component of this study. In order to address the research questions, the qualitative interview was divided into four main sections: initial yoga experiences (pathways), current yoga practice experiences (including motivations), barriers to yoga practice and additional comments or personal stories. Responses to the standardized interview questions were analyzed. For each question significant sub themes emerged as a result of this analysis. These sub themes were categorized into main themes that provided insight and depth to the quantitative results of this study.

In the following section comments from the interviewees illustrate these thematic findings as they relate to each of the research questions.

5.2.1 Research Question 1: Pathways – Initial Yoga Experiences

Fifty percent of the interviewee responses highlighted two main pathways to their initial practice of yoga (not including the NONE category). These pathways were; a person suggesting the practice of yoga, and some form of media influencing the decision to try yoga. The following comments illustrated these two findings; *PERSON* or *MEDIA*. THE NAMES OF THE INTERVIEWEES HAVE BEEN CHANGED TO PROTECT THE ANONYMITY OF THE PARTICIPANTS.

5.2.1.1 A Person

Bob, a 67-year-old male yoga student, explained that he “blew out” his ACL running, and his friend suggested yoga as an alternative exercise. He liked the class and stated, *Yoga came into my life when I needed it!* This student went on to explain how he adapted yoga to meet his needs and that his range of motion has increased and he feels more flexible. Another interviewee, Don, 56 years old, explained that his personal trainer suggested he try yoga for help with his shoulder injury.

Micah, explained:

When I was 4 or 5 my grandfather and I would meditate in the early hours of the morning. Then we would do exercises. I did not know these exercises were yoga. He did not tell me the names of the poses. At 14, I watched a TV program on yoga with my sisters. They went to a class and showed me how to do more poses. Then, in university, a yoga class was offered. I go 4, 5, 6 times a week now.

Myriam, said:

I started in my teens at the local community center to lose weight, but later my sister took me to Semperviva Yoga School and I got interested in mindfulness and meditation.

Stefen, 44 years old, explained that he took one class when he was 17 but did not like it. Then, years later, a friend took him to an all-men’s class. He described how the class made him feel – supported and accepted. He said,

I was very overweight, I was uncomfortable, but no one judged me. I began to realize that I was more than just my body.

5.2.1.2 The Media

Suzanne, an older female yoga student, interviewee #2, described doing TV yoga in her 20s and loving it, but stopped for unknown reasons. Later, through work, she was offered a Fitness pass. She now attends fitness yoga once a week. Suzanne explained:

My first yoga experience was with a woman named Zebra. She taught yoga on television in the seventies, and I went to school with her daughter. She was the first to entice me into yoga.

Rona said she saw a poster for yoga at a local community centre back in 2001. Then a friend at work, that she admired, was going to a Bikram yoga class and asked her to come along. Rona has been going to Bikram yoga ever since. *I do not go for meditation and it really is the biggest bang for my buck!*

Lessa, 46 years of age, expressed her love of yoga as beginning with a literary interest, looking for meditation resources and yoga philosophy. She met a yoga teacher at an AL-Anon 12-step program and ended up in California for a training school.

Adella, 66, shared the following:

I saw a poster at my aerobics studio for a Hatha yoga class. I found the evening Hatha yoga classes very relaxing and yoga not so hard on my body. The more I went to yoga, the more I wanted to go! She went on to say, I liked the way it made me feel – beyond the physical feeling of being fit.

Linda, a middle-aged participant (48 years old), explained how she saw an ad for Bikram yoga and was intrigued. She practised Bikram yoga for a few months and then somehow transitioned to Hatha yoga classes and claimed she would never go back to that “sport” Bikram yoga. *I need a feeling of connection to something beyond,* was her explanation.

Phil got involved in yoga because it was offered at the YMCA Fridays after work. He stated, *I saw a poster and I thought, yoga after work seemed like a good thing to unwind with!* He continued saying, *My first experience with yoga....I never knew any of the terms....but when it came to the end of the class, I had an ‘out-of-body’ experience.*

The interviewees’ comments and stories concerning pathways provide important detail to the quantitative data obtained through the questionnaire.

5.2.2 Research Question 2: Motivations — Current Yoga Practice Experiences

The next interview question explored participants' motivations and their current yoga practice. Associated questions included, "Do you do it alone?" "How do you get motivated?" "How does this make you feel?" "Do you try different types of yoga?" A wide variety of reasons and many interesting responses were recorded. Reviewing the comments from all the interviewees, recurring themes were apparent. These themes were titled: *COMMUNITY*, *ACCEPTANCE*, *FEELINGS OF CONFIDENCE*, and *GOOD HEALTH*. The following excerpts from individual interviews illustrate these thematic findings.

5.2.2.1 Community

Bob, went on to say,

There are many bonuses with yoga – community, social support, getting out of the house, reducing isolation and having new experiences with each yoga class. Seniors especially need communities, those that may not have a job, children at home, or living with a spouse and need exercise. Yoga classes will ease the stress of growing older.

I like going to the studio and being with other people, I found it gave me energy, said Phyllis, an older adult female interviewee. She went on to say, *I felt the connectedness of like-minded people, we were all on our mats together connected – it is a beautiful thing!* This participant continued with, *I think yoga is about compassion and understanding each other... the "oneness," the divine nature within ourselves.* The interview ended with, *once you got yoga in your life, even if you aren't on your mat, you are doing it!*

5.2.2.2 Acceptance

One male interviewee, Adrienne, explained how being "queer" in a hostile world he kept everyone away and learnt how to control his own environment. He found yoga classes too expensive, and did not like crowds. He explained that he loves to do yoga by himself, with a DVD. He said that practicing this way allows and encourages introspection, self-learning, self-awareness – *all the things you struggle with as you grow up.*

Stefen, claimed that yoga has helped him adjust to a new lifestyle. He said, *I am more accepting because of yoga. I feel more at ease, more at peace, more calm.*

Another participant, Rona, supported these feelings with her comment, *I got laid off, I found a lot of comfort with yoga, and yoga helped me get through it all.*

5.2.2.3 Feelings of Confidence

Another participant, Don, who started yoga due to a sports injury claimed that, *there is a kind of electricity that flows.... a positive energy.... it is magical when people have this energy in a yoga class.* He stated, *As long as you keep it up, you will improve. You can make it what you want!*

I owe it all to yoga, said Trev. He shared with me his tale of illness, and how practicing yoga, primarily pranayama (breathing) and meditation, from his hospital bed gave him the strength to rehabilitate. This same interviewee went on to tell me how yoga has changed him from a shy, introverted person to one who can now stand in front of a large class of students and lead a yoga session. He has become a very successful and well-liked yoga teacher.

5.2.2.4 Good Health

I am an introvert, so yoga gives me permission to "go inside," said Myriam. *I like the emphasis on breathing.* This participant enjoyed the feeling of getting physically stronger and promoting her health. She went on to explain how she takes that consciousness into her daily life and is aware of her posture throughout the day, because of yoga.

An older female yoga participant, Phyllis, expressed this theme of "going inside." She explained how yoga combines her body, mind and soul together and because of this, she feels grounded. She went on to explain that because of her demanding work schedule she needs to have this "grounded" feeling to enjoy the day. She accomplishes this by practicing at a local, intimate studio 2 times a week, and the other days has a home practice.

Stanley, 62, explained that he started yoga after his wife's back operation. *I needed to be home a lot, so I couldn't go to aerobics classes. I decided to do yoga to get the stretching benefits, but the benefits are multifold.* Stanley continued, *I loved the way it made me feel. It felt like I was repairing the damage I was doing working at a computer all day. And meditation was a good time-out.* This interviewee suggested that doing yoga prevents injuries and that it really ought to be promoted by health programs. He added, *when I do hatha yoga, I feel like I am coming home, it is spiritual for me.*

I work in the film business with people with high blood pressure. I needed yoga to last on the set for 18 hours. Laura explained how yoga helped her concentrate and relax. Many interviewees explained how yoga has helped them reduce their stress and anxieties and cope with demands of an urban life.

Another participant, Nitiya, also found yoga to be helpful with emotional concerns. She explained that she was more interested in working on herself than doing exercises. This interviewee claimed that yoga has made her more in tune with other things, that yoga felt like an “opening” more than anything. She stated that the most important thing about yoga is pranayama (breathing). *If you can master that, you’ll transform.*

People are seeing the benefits, I do not think yoga is just a fad, said Bob, an older interviewee, who used yoga to help him through various heart issues.

Another participant, Rica, explained that she was drawn to yoga for its spiritual world. She now meditates daily and believes that yoga has given her the strength needed for her daily challenges. She says she lives Iyengar’s famous aphorism:

Yoga teaches us to cure what need not be endured and endure what cannot be cured.

Good health, feelings of acceptance, feelings of confidence and finding community were some of the motivating factors to begin a yoga practice and to continue to practice yoga for the participants interviewed.

5.2.3 Research Question 3: Barriers — Current Yoga Practice

The next section of the interview focused on barriers experienced. Participants were asked, “Can you tell me about the barriers you may have encountered?” “Are they more or less an issue now?” “How do you get past these barriers?” The interviewees expressed a variety of barriers that were organized into themes as follows: injury, time constraints, and financial concerns.

5.2.3.1 Injury

For those participants that came to yoga to heal an injury, the injury caused them frustration and pain. The injury was the biggest barrier, but with patience and a regular practice these participants spoke about experiencing increased

range of motion, increased strength and increased flexibility. For some participants, their physical issues (sketchy shoulder, physical wrist crap, no ACL) were barriers to practicing more fully. These participants spoke about respecting their bodies and moving within their comfort zone.

An interesting barrier expressed by a few of the interviewees was their laziness or lack of discipline. They stated that they understood that *if you just show up, the rest will follow*, but, at various times in their lives they lacked the motivation that “showing-up” required.

5.2.3.2 Time Constraints

“Not enough time” was the most popular barrier. Interviewees spoke about time constraints to practicing yoga more often. Family obligations and work constraints were the most common reasons. Rodnee said, *When I retire, I am going to do yoga every day!* Stanley said, *The deal is retire and join a gym/community centre and go 4 or 5 days a week. Do moderate exercise and then noon hour yoga with 20 other people.*

5.2.3.3 Financial Concerns

Interviewees also spoke about financial constraints. Many participants felt that yoga schools were too expensive. A few participants explained that they are offered yoga through work, or, to keep the cost down, they go to community centres or recreation centres for classes. Suzanne told me she gets a Fitness Pass (costing \$117 per year) through her library work, and she chooses weekly yoga classes with this pass. Laura explained the difficulty of supporting her daughter’s gymnastic interests and having enough money left over to pay for her yoga classes. She told me she buys the package deals! *Seems like there are some good deals out there*, said one interviewee. He explained that he goes to three or four yoga classes a week, with an unlimited monthly membership of \$112 per month.

But Stanley expressed it like this – *Cost is not a barrier....I am past that....yoga is a given.*

Participants were aware that their injuries inhibited their yoga practice, but, they all believed that with patience and disciplined practice their injuries would slowly heal. Interviewees also stated that time constraints due to work and/or caregiving interfered with yoga practice, as did the cost of yoga memberships and yoga wear.

5.2.4 Research Question 4: Experiences to Share

In an attempt to address the fourth research question concerning similarities and differences, the last question of the interview asked the interviewees if they had any comments to make, or experiences they would like to share. Many recurring themes were presented during this portion of the interviews. These sub themes were organized into thematic categories: *YOGA AS AN INTERNAL ART WITH A COMMUNITY FEELING*, *COMING HOME*, and *YOGA OFF THE MAT*. The following section presents the findings for this last question of the interviews, illustrating the thematic categories.

5.2.4.1 *Yoga as an Internal Art with a Community Feeling*

A number of interviewees shared the fact they go to yoga alone, without their respective spouses. Most participants expressed the desire to share yoga with their loved one, but it was not an issue in their relationship. They felt support from their partners, despite the fact that they did not do yoga together. This behaviour supports other participants comments that yoga is an “individual practice” with a community feeling, or better said by one interviewee, *Yoga is an internal art, I am alone (practicing Mysore style yoga) but in a room full of people.*

Don explained how surprised he was at how many people were at the first yoga class he attended. He said he was quite reluctant but decided to try the yoga ‘idea’, for his injured shoulder, that his personal trainer suggested. *I struggle with everything because I am bigger than most people.* But, he had a very good first experience. He even met a line-backer from Queen’s University who was getting ready for the Winnipeg Blue Bombers training camp. He told the guys at work, and now they go to hot yoga all together three or four times a week. He said, *I like that community feeling.*

In the quantitative section of this study, asking for reasons for practising yoga, social interaction was selected by 26.3% of middle-aged yoga students and by 28.2% of older yoga students. Many participants echoed this concept during the interviews. Key words and phrases such as “belonging,” “feeling of community,” “connectedness,” “community gathering,” “a kind of electricity that flows,” “a positive energy,” “a little bit of community,” were shared by many of the interviewees. *We are a community* was certainly a thematic thread running through the interviews. This *COMMUNITY FEELING*, expressed by the interviewees, supports the statistical outcome for social interaction found in the quantitative analyses of this study.

5.2.4.2 Coming Home

“Coming home” was a phrase that surfaced many times during the interviews. Interviewees that started yoga, and for whatever reason stopped practice for a time, and then came back to the practice, expressed a feeling of feeling safe again, of being “home” in their bodies, minds, and souls. One participant put it this way, *Yoga emphasizes the here and now, it grounds me, I feel like coming home...and I am doing something for myself. I prefer to practice in a class and share energy with people. I like the fact that my teacher encourages that.*

5.2.4.3 Yoga off the Mat

“Yoga off the mat” was another theme that surfaced during these interviews. The following comments illustrated this theme; *I needed yoga to last on the set for 18 hours, It is not just about the body, it is about the mind, It is a place you can go and do that work and there aren't many safe vehicles for that, Once you have yoga in your life, even if you aren't on your mat, you're doing it! You become more accepting of what you can and cannot change. These comments suggest that students understand that they can bring yoga into their life; that they can live the yoga that begins on the mat (or chair). One participant put it this way, I feel more balanced. Another interviewee shared this story:*

After the first few months of starting yoga, I absentmindedly lifted a murphy bed off the floor. It effortlessly flew back up the wall, something I was unable to do before yoga. Yoga trained my body to align itself to its centerline, drastically improving my posture. I used my leg muscles as a solid base instead of my back, making lifting the bed very easy to do. It wasn't necessarily the strength but the technique that surprised me. I did it without realizing it until afterwards.

In summary, the in-depth, semi-structured interviews allowed for detailed discussion about thoughts, feelings, barriers and motivations, thereby providing insight into how these individuals perceived their yoga experience. Comments by the interviewees helped to inform the research questions by supplementing quantitative results. The sheer volume of survey participants that provided their contact information demonstrated the popularity of this topic and the desire for these yoga students to be involved, supportive, and share their stories. Data from the interviews revealed that both middle-aged yoga students and older yoga students valued their yoga practice in similar

ways; with commitment and gratitude. The interviewees were all thankful for the opportunity to share their love of yoga and the personal health benefits they have experienced.

6

DISCUSSION

The purpose of this exploratory study was to investigate the yoga practice of older adults, focusing on potential differences between middle-aged (40–54) and older (55+) adult yoga students. A mixed method design was employed. The goal of the quantitative analyses was to explore the research questions presented in Chapter 3. Qualitative interviews, although not designed to test hypotheses, also helped to inform the research questions by supplementing quantitative results. Survey data were analysed using bivariate methods, which led to many statistically significant results that addressed the study’s research questions. These findings were contextualized using qualitative data derived from 20 face-to-face interviews. However, this study also showed similarities in especially the pathways to yoga across the age groups studied. Results provide unique contributions to practical knowledge and research on the topic and can be used to help direct the focus and methods for future yoga research.

This chapter begins with a summary of the quantitative data, as well as additional details, which relate to the research questions, discovered through the follow-up interviews. It follows with how this study links to the theoretical and conceptual framework that guided the research, a discussion of limitations, recommendations for yoga programs and suggestions for future research.

6.1 REVISITING THE RESEARCH QUESTIONS

6.1.1 Research Question 1

The first research question asked: “How do older adults transition into the practice of yoga?” Bivariate analyses (i.e., crosstabulations of dependent and independent variables) showed no statistical associations between pathways to yoga and age groups of the yoga students. However, results provided insight into the area of pathways to yoga for these yoga students. Middle-aged students were more likely to be influenced by a FRIEND, whereas older students were more likely to be influenced by a FAMILY MEMBER. Follow-up interviews provided further details on factors influencing the individual pathways to yoga. Interviewees, Bob, Stefen, Don and Suzanne shared stories of how friends suggested or encouraged them to try yoga, whereas the stories shared by Adella, Myriam and Micah involved different family members such as grandfathers, and sisters. These details supported the quantitative findings of FRIEND and FAMILY MEMBER, as popular links to yoga for both age groups.

Participants were also asked to provide information on external factors that might have influenced them to begin yoga practice. As mentioned above, no statistically significant associations were found for external factors and age groups of the yoga students. Again results of the bivariate analyses were similar for both age groups. READING YOGA BOOKS and COMMUNITY EVENTS were popular options selected by both middle-aged students and older students. Interviewees were also asked to share information on external factors that might have influenced them to begin yoga practice. Here the results vary slightly from the quantitative results. External events identified by the interviewees, such as Phil, Adella, Rona and Linda, highlighted posters as their external link to yoga. Suzanne and Dana both claimed the television was their important cue to yoga action.

In summary these results show similarities in pathways to yoga for both age groups. These findings have implications for yoga schools interested in increasing their membership and for healthcare providers that work with an older population. These results may also be used to guide the design of health promotion programs that target the health and well-being of older adults.

6.1.2 Research Question 2

The study's second research question was: "What are the motivations to begin a yoga practice?" Bivariate analyses resulted in several statistically significant differences between middle-aged yoga students and older yoga students. Out of 18 potential reasons listed in the survey questionnaire, four showed statistically significant associations with "reasons for practising yoga" and the age groups of the students. Compared to older students, middle-aged students were more likely to choose REDUCE STRESS as a reason for practising yoga, as well as INCREASE MUSCLE STRENGTH, and LOSE WEIGHT.

In contrast, older students were more likely than middle-aged students to select PREVENT OSTEOPOROSIS as a reason for practising yoga. This implies that older students may be experiencing more age-related health issues than middle-aged students. Perhaps the importance of preventing osteoporosis for older yoga students stems from the fear of falling and other risk factors that are associated with falling, such as osteoporosis. The statistics for falling in the later years of life are well documented in the literature. Research evidence suggests that regular physical activity can counteract age-related functional declines, preserving independence into later life. Findings of this research study suggest that older adults students are using yoga to prevent and/or reduce the risk factors associated with muscular-skeletal aging. This is a good thing and is useful information for health care professionals that work with older adults.

Data showed a statistically significant association between the most important reason chosen for yoga and the age groups of the yoga students. Middle-aged yoga students were more likely to begin a yoga practice for reasons of stress and/or anxiety than older students. At a descriptive level, the most important reason older students were more likely to begin a yoga practice was TO IMPROVE FLEXIBILITY.

Comments from interviewees supported these outcomes. For example, Lessa, 46 years of age, explained how yoga helped her cope with the stress and anxiety of working in the film business. She said yoga enabled her to last on the set for the challenging 18-hour shifts. A teacher of young children, Rona, 48 years old, claimed it was her yoga practice that helped reduce the stress of her demanding job. She went on to relate how she began to teach the school children some yoga breathing techniques and postures. Now, she said, her classroom is much calmer and the children look forward to 'silent time'. Micha,

Trev and Stefen, all young male interviewees, spoke of the attraction to yoga for building muscle strength and losing weight.

The older interviewees, such as Rica, Phyllis, Adella, Stanley, Bob and Adrienne expressed their interest in yoga for 'the stretching benefits' and the focus on balance. Don and Bob found yoga to be helpful in recovering from injuries, increasing their range of motion and improving their flexibility.

When analyzing AGE STARTED yoga (rather than current age of the students) as the independent variable, bivariate analyses resulted in several statistically significant associations between reasons for practising yoga and age started (using the same age groupings). Middle-aged yoga starters were more likely than older yoga starters, to practise yoga to REDUCE STRESS, for MEDITATION, to EXPLORE SPIRITUALITY, and to EMBRACE YOGA PHILOSOPHY.

Qualitative findings also supported these outcomes. Middle-aged interviewees, Leesa and Nitiya shared their stories of searching for something more. At an early age Leesa began reading the Bhagavad Gita, considered by eastern and western scholars alike to be among the greatest spiritual books the world has ever known. Her spiritual exploration led to the SaltSpring Yoga Centre and then Mount Madonna Yoga Teacher Training in California. Leesa now teaches yoga with the Vancouver School Board's Continuing Education Department and other venues in Metro Vancouver. Nitiya practises yoga privately here in Vancouver and travels to India for six months each year to study yoga philosophy and meditation with her guru.

Results of the bivariate analyses showed that older yoga starters were more likely than middle-aged yoga starters to practise yoga for SOCIAL INTERACTION. Social interaction, a benefit of structured activity classes, is important in the later years. Yoga classes provide the opportunity for social interaction. This concept was strongly supported by the older interviewees. Bob explained that there are many bonuses with yoga – community, social support, getting out of the house, reducing isolation and having new experiences. He suggested that seniors especially, need communities, because many may not have a job, nor a spouse, or children living at home or even nearby. Bob claimed that yoga classes could ease the stress of growing older. Adella spoke of feeling 'connected' in a room full of like-minded people. She explained that it felt like building community with everyone doing yoga together. Rica echoed the same feelings with words like 'connectedness', 'a little bit of community', and 'a kind of electricity that flows'. Rica went on to

say that the postures are such a small part of her yoga practice. She liked the 'not feeling separate' feeling. And to her, the whole idea that we are all connected is a beautiful thing. She has made many yoga friends over the years and cherishes her yoga community.

6.1.3 Research Question 3

In answer to the third research question: "What are the barriers experienced?" and based on results from this current study, there is evidence to conclude that SOCIAL ANXIETY is a concern for middle-aged yoga students. A statistically significant association was found between the barrier SOCIAL ANXIETY and the age groups of the yoga students. Middle-aged yoga students were more likely than older students to experience SOCIAL ANXIETY as a barrier to beginning to practice yoga. Perhaps this is a reflection of the self-consciousness of middle-aged adults. Although not a competitive activity, yoga is practised in a group setting, with a variety of potentially embarrassing poses that can cause anxiety for those middle-aged adults not comfortable with their level of flexibility or with their body image. This information has important implications for yoga programs and yoga classes.

Bivariate analyses also found a statistically significant association for the NONE option. Older students were more likely to chose the NONE option for barriers to starting a yoga practice than middle-aged students. Perhaps the NO BARRIERS response, for older students, stems from a greater understanding of the importance of physical activity for healthy aging, therefore successfully clearing or minimizing the barriers that might interfere with starting and sustaining a yoga practice.

The interviews provided more depth to the quantitative results found for barriers experienced. For middle-aged yoga students, such as Linda and Rona, cost was definitely a concern. Both these female participants spoke of searching for deals, promotions, and Groupon tickets for yoga classes. Time constraints was an issue for most of the interviewees, especially those still working. Both Stanley and Rodnee suggested they will have more time for yoga once they retire. Trev, Micha and Stefen expressed the barrier of social anxiety. Their stories supported the statistically significant association found for social anxiety and the age groups of the yoga students.

6.1.4 Research Question 4

The fourth research question asked, “What are the similarities and differences between middle-aged and older adult yoga students in the practice of yoga?” A variety of characteristics were examined. These included: confidence levels, location preference, frequency of practice, physical activity levels, health issues, and styles of yoga practised.

Although a statistically significant association was not found between confidence levels and age groups of the students, both age groups showed an increase in the level of confidence from when they first started yoga to current, self-reported confidence levels. These results suggest that both age groups found similar health benefits for self-efficacy in the practice of yoga.

Additional associations were found via bivariate analyses that relate to the fourth research question. A statistically significant relationship was found between the location for yoga practice and the age groups of the students. Middle-aged students were more likely than older students to practice in a yoga studio. Perhaps the statistically significant associations that were found for “Reasons why this location is preferred” can explain this finding. Older adults were more likely to identify ACCESSIBILITY and COST as reasons for location preference. These reasons suggest the YOGA STUDIO may be inaccessible and costly for older adults. When exploring the most important reason for this location preference, older adults were more likely than middle-aged students to claim ACCESSIBILITY as the most important reason. These results certainly have implications for yoga schools and yoga programs that attempt to target and service older adults.

Bivariate analyses also found statistically significant associations between the styles of yoga tried, the styles of yoga practised most often, and the age groups of the yoga students. Middle-aged students were more likely than older students to try Bikram or other hot yoga, Ashtanga vinyasa yoga and Kundalini yoga, whereas older students were more likely to practise Hatha, Gentle Chair, Iyengar, Kripalu, Yin, Laughter or Yoga Therapy. The latter types are less demanding forms of yoga that may be more accessible and appealing to older students. Again, these results have the potential to make important applied contributions to health care programming for older adults.

Exploring the frequency and length of practice did not uncover any statistically significant associations between the age groups. These findings suggest that middle-aged students and older yoga students share similar

practise patterns and are not so different in their intensity levels either. This implies that both age groups recognize the benefits of practising yoga regularly.

Statistically significant associations were uncovered for chronic health conditions and physical mobility issues and the age groups of the students. Older students were more likely than middle-aged students to have both chronic health conditions and physical mobility issues. Yoga classes targeting the older adult would benefit from this information.

Examining self-perceived health before starting yoga did not result in a statistically significant association, but bivariate analyses did support a statistically significant association for current self-perceived health. It appears that middle-aged students were more likely than older students to declare their current health to be VERY GOOD, whereas older students were more likely than middle-aged students to declare their current health to be GOOD. A longitudinal research study is needed, in order to determine if yoga could significantly improve a person's health.

A statistically significant association was also found between current physical activity level and the age group of the students. Middle-aged students were more likely than older students to declare their physical activity level to be VERY ACTIVE and ACTIVE, whereby older students were more likely than middle-aged students to declare their physical activity level to be SOMEWHAT ACTIVE. These results are reflective of reported levels of activity across the life span.

Bivariate analyses resulted in a statistically significant association between the FACEBOOK AD and the age groups of the students. Middle-aged students were more likely than older students to have heard about this yoga survey through a Facebook ad. But, it must be noted that of the total sample of older students, 71.3% did access this survey through the Facebook ad. This finding is supported by recent research. The Pew Research Center's Internet & American Life Project has shown a significant increase in online adults' social networking site use since 2005. Today, 72% of online adults (18+) use social networking sites. Although middle-aged adults continue to be the most likely social media users, one of the more striking stories about the social networking population has been the growth among older Internet users in recent years (Pewinternet.org, 2013). The fact that older adults are increasing their presence

on social networking sites, such as Facebook, lends substantial support to this exploratory research study in its choice of Facebook for recruiting participants.

I'm on the computer all the time, says 105-year-old Alice, with infectious cheer while sitting in the garden of her senior's apartment in Coquitlam, B.C. Today I looked up the difference between prawns and shrimp after someone asked about it a dinner (Ellis, 2013).

Once again, qualitative findings supported many of the results of the bivariate analyses of research question 4. Both middle-aged and older interviewees stated that their confidence in doing yoga has increased and they were feeling much more relaxed that they could 'just do it'. Accessibility was a concern for the older age group. This theme was echoed by the older interviewees with comments that suggested feelings of intimidation caused by the large classes, the fancy yoga wear and the loud, youthful music of some yoga schools. Older interviewees certainly supported the outcome of the question concerning styles of yoga tried. Phyllis, Bob, Adrienne and Adella enjoyed classes that were slower paced and gentler on the joints.

6.2 LINKS TO THEORETICAL PERSPECTIVES

Both the Health Belief Model (HBM) and Social Learning Theory were used as a theoretical framework to guide this exploratory research study. The HBM proposes that six factors, (perceived susceptibility, perceived seriousness, perceived benefits or taking actions, barriers to taking actions, cues to action, and self-efficacy) mediate a person's perception of the possible threat of a disease and his/her actions to decrease or limit the potential threat. Perceived benefits (motivators) and perceived barriers are health belief model constructs that apply directly to the aim of this study. Results showed that perceived benefits and barriers of practising yoga varied by the age groups of the yoga students. This implies that constructs inherent in age directly influence older adults' perceived barriers and motivators to practising yoga. Data from this study illustrates age-related features of the HBM. Results of this study showed that PREVENTING OSTEOPOROSIS was a motivating factor (a cue to action) for older adult students to practise yoga. On the other hand, middle-aged students were motivated by the desire to REDUCE STRESS and ANXIETY, perhaps more of a health issue for the middle-aged age group.

The HBM assumes that individuals hold a certain level of knowledge related to health behaviours, with conscious processing of all health-related decisions. This concept maps well onto the practice of yoga. Participants demonstrated an awareness of the benefits of a regular yoga practice and an appreciation for the discipline involved in reaching certain goals.

I consider it a personal and private inquiry into self-experience and consider most classes exercise/stretch programs with 'spiritual' clothes.

I use yoga to help with my arthritis and back pain.

Yoga has slowed down my head noise and now I listen to what is going on inside me, rather than just react to stimuli.

Self-efficacy, or confidence, is also a HBM construct investigated by this current study (and shared by the Social Learning Theory). Self-efficacy refers to the confidence an individual holds in his or her ability to execute a behaviour. Bandura (1977) notes that self-efficacy will impact the probability that a health behaviour will be adopted. Questions concerning self-efficacy were asked of the participants. Bivariate analyses showed that, indeed, participants of both age groups increased their levels of confidence. The majority, of both age groups, affirmed their desire to practise yoga more often than they currently do. Perhaps it is the adaptability of yoga to address both age groups, enabling initial levels of confidence to increase as the practice of yoga is experienced.

Social Learning Theory also provided a lens from which to examine the practice of yoga. Social Learning theory emphasizes the importance of observational learning. This modelling process involves attention, retention, preproduction and motivation. Yoga illustrates the social learning theory by emphasizing observational learning, resulting in motivations to practice more yoga.

I am at the point where I "have" to do yoga once or twice a week (don't feel right without it), and I am open to becoming more "yogic" as I grow older.

Bandura also emphasized the role of intrinsic reinforcement as a form of internal reward, such as pride, satisfaction and a sense of accomplishment. Social learning theory suggests a change in behaviour and could imply that postures learned and practised in yoga can be generalised to activities of daily living. Through a social learning theory lens it can be noted that the practice of yoga creates opportunities for performance mastery, vicarious experience,

verbal persuasion and physiological feedback, the four sources of self efficacy (Krisa, Ruston, & Miller, 2011). The following comments by interviewees illustrate these sources of self efficacy.

Yoga is the single most important part of my life.

Yoga for me is my main physical and mental discipline.

Yoga helped me stop smoking and drinking so much.

Bandura's notion of reciprocal determinism goes beyond the sphere of the individual. In a recent article featuring centenarians, Dr. Lynn Beattie, scientific director of Vancouver's Centre for Healthy Aging at Providence, said, "I'm struck by how people cope with these disabilities and a lot of it is related to what their social interactions are and the support they have from their family." Yoga, supporting verbal encouragement, and exposure to role models, illustrates Bandura's notion of reciprocal determinism. Bivariate analyses on data from the online survey suggested that social interaction was a motivating factor for practising yoga, particularly for older adult students. Interviewees also spoke about feelings of acceptance, non-judgment and belonging to a community.

I was not judged. I felt accepted, so I kept on going back. Now, I am hooked!

I practise mysore (individual practice), with a community of people.

6.3 LIMITATIONS

There are a number of limitations of this study. First, respondents self-reported all information, which means that the data may be subject to recall or other biases. Personal biases may also have affected the qualitative responses due to social desirability to please the researcher and the interpretations of results. In addition, the cross-sectional survey means that causal relationships are tenuous.

Second, there was also selection bias associated with the sampling method of self-selection, given that subjects were mostly recruited by responding to research advertisements rather than a random sample. They were generally healthy, white, female, relatively well-off, and a well-educated population. Study participants were also Internet users. The data for this study was collected by means of an on-line questionnaire, advertised on Facebook,

with a link to a website. As a result, this web-based survey may reflect a bias towards individuals who have access to a computer, which is associated with higher socio-economic status.

Third, the present study's sample did not include a substantial proportion of yoga students who were older than the baby boomer generation. In particular, only 17 participants were over 65 and among the 20 follow-up interview participants, only four were over that age. One challenge presented by the small sub-sample over age 65 was the difficulty in determining whether differences between middle-aged yoga students and older yoga students were due to age or generational differences. The middle-aged age group included individuals between the ages of 40 and 54, and was therefore comprised of generation Xers (1965- 1980) and baby boomers. The group of older yoga students included individuals 55 years and older, mostly comprised of older baby boomers. Therefore, teasing out cohort differences between the age groups was difficult and challenging.

Also, only including people doing yoga without a comparison group of persons not engaged in this type of exercise limited the analysis. For instance, information pertaining to barriers may have been different for non-yoga practitioners. Furthermore, not specifically questioning the subject about injuries caused by yoga may have biased the results.

For the above reasons, findings may not generalize to other populations. However, since this study is primarily focused on the exploration of associations, rather than estimating prevalence of behaviours in a population, these problems were mitigated.

6.4 RECOMMENDATIONS FOR YOGA PROGRAMS

Although the current study provides only preliminary insight into the practice of yoga by older adults, and how motivators and barriers to yoga vary by age group, results do have practical implications and can be applied to improving existing yoga programs and creating new programs at yoga schools, senior centres, community centres, cultural centres, libraries and residences for older adults.

One question asked of participants in this study was, "Would you like to practice more yoga than you currently do?" Both middle-aged adult yoga

students (74.8%) and older adult yoga students (69.7%) answered “yes”. These large percentages suggest that yoga is an activity that is not only beneficial but also enjoyable. It is now important to provide more opportunities for all older adults to experience the health benefits of yoga.

The following section makes suggestions for practical implementation of the findings of this exploratory research study.

Canada’s New Physical Activity Guidelines (CNPAG) recommend the same minimums for adults aged 65 years or older, as for adults 18 – 64, with the added recommendations for performing physical activities to enhance balance and prevent falls. As presented in Chapter 2, research literature supports the activity of yoga for fall prevention. The CNPAG document needs to specifically endorse yoga as a safe and accessible activity that can enhance balance and help prevent falls. The Ministry of Health could also support yoga in fall prevention programs such as Injury Prevention BC, BC Seniors Fall Prevention Awareness Week , Strategies & Actions for Independent Living (SAIL), Safer Healthcare Now and through facilities such as the Centre of Excellence on Mobility, Fall Prevention and Injury in Aging (The Centre for Hip Health and Mobility (CEMFIA).

Results from both the quantitative and qualitative components of this study demonstrate that pathways to yoga were similar for both middle-aged and older adults. Since FRIEND and FAMILY MEMBER were popular links to yoga, strategies to encourage and increase yoga participation could include ideas such as: bring a friend or family member for free, bring a friend or family member for half price, and family yoga classes or family yoga day. READING YOGA BOOKS and COMMUNITY EVENTS were popular selections when participants were asked about external factors that influenced their decision to try yoga. Yoga books are expensive. Perhaps yoga programs could set up libraries so interested people could borrow yoga books to learn about yoga. Another suggestion would involve free pamphlets, that clearly and simply explain about yoga. A yoga information line could be developed for adults that do not use the Internet, so their questions and concerns are appropriately answered. More community events, such as Health Fairs, could involve yoga teachers with information booths and free demonstration classes.

The results of this study highlighted social interaction as a motivating factor for older adults to practice yoga. Yoga programs could take advantage of this finding by scheduling classes with time before and after for students to

socialize. Perhaps a weekly or monthly tea/coffee time after class, or a short question and answer period, or even a discussion of related yoga philosophy to engage the students and allow them time to be together.

A question on the on-line survey asked participants, "If you practise yoga in a class, do you prefer to be in a class with older adults only (50+)? Why?" Examining the comments given from participants that answered YES to this question, two important themes emerged that provide insight into the needs of some older adult yoga students. These themes were labelled, *ATTENTION FROM THE INSTRUCTOR*, and, *A FEELING OF COMFORT PRACTISING WITH PEERS*. Respondents explained that a class, with only older adult students, allowed the teacher to design the class with age-related issues in mind. More attention was spent on balancing asanas, specific health and body concerns, proper breathing techniques, body alignment, meditation and relaxation techniques. Because the classes were usually smaller, the teacher was able to spend more time with each student. Also, the class moved at a slower pace and was more enjoyable that way. Participants wrote about feeling comfortable with students of the same age. They felt supported by their peers, especially when asanas were more challenging. Although yoga is not a competitive activity, older adults expressed ease at not feeling like they should compete with the middle-aged, yogi pretzel.

Hence, results of this study suggest that there may be areas for developing programs that target the many age-related concerns of older adults. Greater program diversity would benefit older adult yoga students. Offering different types of yoga classes (i.e., classes aimed at older adult male participants, yoga classes for the older beginner, less strenuous types of yoga, yoga for osteoporosis, yoga for arthritis, bodacious yoga for larger adults, yoga for sciatica, yoga for diabetes, yoga for lower back pain, yoga for flexibility, yoga for the active older adult, family yoga, chair yoga, yoga for the visually impaired, yoga for the hearing-impaired, yoga for depression, yoga for anxiety, etc.) may appeal to individuals who otherwise would not engage in yoga practice. Needless to say, these classes would be limited to a smaller number of students and be guided by well-trained, experienced and knowledgeable yoga teachers.

Attention to the socio-demographic findings of this study suggests that yoga programs should target potentially underrepresented groups, including males, non-white populations, individuals with less than a college education,

the unemployed or retired and persons with homosexual and bisexual orientation.

Attention to accessibility, one of the barriers identified by older adult yoga students, may also encourage an increase in participation by older adults. More research into what constitutes accessibility could provide information on class times, transportation concerns, building environments, and so on. Facilities could attend to transportation difficulties as resources allow. Volunteer drivers or a carpooling system are no-cost options that could translate into increased yoga class attendance by older adults.

Attention to cost, another barrier identified, could also facilitate increased participation in yoga by older adults. Community centres are ideal facilities to host older adult yoga classes, since they are publicly funded and memberships are usually lower than private yoga schools. But discounted fees, by both public and private facilities, are options that could be offered. For example, a well-known yoga school here in Vancouver offers a 10-class easy pay pass for \$139.00. The claim is that this pass is the best option, if you attend only one class per week. But, for many older adults on limited income, this is still an expensive option. Could community centres and yoga schools not consider a free, drop-in, one-time pass for the older adult? This would allow interested individuals a chance to experience the benefits of a yoga class without the financial concern. The Council of Senior Citizens' Organizations of British Columbia (COSCO) has been offering free Chair Yoga sessions in libraries and neighbourhood houses, throughout the Lower Mainland, for two years now, with great success and interest. When setting pricing and membership fees yoga programs need to consider the financial concerns of the older adult, so they are welcomed and able to be part of the yoga community.

6.5 SUGGESTIONS FOR FUTURE RESEARCH

Yoga research is still in its infancy. There is a need to extend analyses into the pathways, barriers and experiences of yoga students across various age categories. Future yoga research would also benefit from longitudinal studies. In addition, studies based on larger random samples may provide more accurate estimates of yoga behaviour. From the qualitative interviews, it was clear that some participants considered themselves to be life-long yogis, and others began a practice of yoga in their later years. Much of yoga research is

based on short-term trials lasting only 8 to 12 weeks, whereas the benefits of yoga are longer term. Many authors suggest that future research should employ longitudinal methods to study the effects of yoga intervention on specific populations to gain a better understanding of the benefits of yoga. In addition, longitudinal research may also help minimize the challenge of differentiating between age and generational differences discussed in the limitations section of this study.

Other recommendations include: more definitive studies with large sample sizes to examine the health benefits of various types of yoga; randomized controlled trials to examine yoga as an intervention for chronic low back pain, cancers, anxiety, depression, fatigue, heart disease, sleep disturbances, physical function and psychosocial function and future clinical trials to examine the distinctions between exercise and yoga.

Other theories could also be used in future research in order to expand the theoretical framework used to guide the examination of yoga practice of older adults. For example, socio-environmental theory, with its focus on environmental effects would encourage a more thorough exploration of the barriers highlighted in this research study. Considering that social interaction was a motivating factor for yoga practice, particularly for older adult students, social support theory could provide insight into the important theoretical perspectives on social support.

Finally, the socioecological approach to health promotion may be useful because of its underlying assumption that conditions at the broader community level shape physical and social elements of physical activity in later life, such as yoga.

7

CONCLUSION

The main goal of this thesis was to explore the pathways, motivations, barriers, and experiences of older adult yoga students, focusing on potential differences between two age groups. Results have led to insight into the role of yoga in the lives of middle-aged (40 - 54) and older (55+) adult yoga students. Findings show that there are many similarities and also some differences between the two age groups. Both age groups come to the practice of yoga in similar ways; through their own initiative, reading books about yoga and having a friend or family member suggest the practice of yoga. Findings also suggest that physical activity levels and confidence levels for both age groups increase with the practice of yoga.

Exploring motivations for practising yoga highlighted the difference between the age groups, with middle-aged yoga students motivated by reducing stress and anxiety, losing weight and building muscle strength, whereas older students were motivated to prevent osteoporosis, improve flexibility and increase social interaction. Social anxiety was a barrier to beginning a yoga practice for middle-aged students, but not for the older age group. And, not having enough time to practise more often was a barrier for middle-aged students only. Results showed that older students were more likely to practise at a community center, rather than a yoga studio, and that accessibility and cost were concerns for the older yoga student.

Both age groups were passionate and disciplined about their yoga practice and were interested to practise more. These results add to the growing body of literature recognizing the benefits of yoga and supporting a diversified yoga program that meets the needs of our rapidly increasing, aging population.

Evidence to date confirms that regular yoga practice can increase balance, flexibility, strength, physical capacity, improve emotional and spiritual

wellness, and is relatively safe and accessible to almost everyone. There is emerging evidence from randomized trials to support the benefits of yoga for depression, sleep disorders and as an augmentation therapy (Bonura, 2011; NCCAM, 2012). In recent years, the National Institutes of Health (NIH) have funded studies of Integral Yoga for managing hot flashes, Iyengar Yoga for easing recovery from breast cancer, and Tibetan Yoga for helping to overcome sleep problems and fatigue.

According to scientific literature, fitness benefits of yoga for older adults, in general, include walking, balance, flexibility (upper and lower body), lower body strength and weight loss (Roland, Jakobi, & Jones, 2011). In addition, yoga benefits mental health; improving cognition, sleep quality, quality of life, depression, and distress in older adults and dementia caregivers (Chen et al., 2009; Manjunath & Telles, 2005; Krishnamurthy & Tells, 2007).

Praise of the physical gains of yoga tells only half the story. The spiritual journey of yoga is another transformative dimension. In the present study, many interviewees spoke of the “community feeling” in yoga, the “supportive atmosphere,” the feeling of “acceptance” and “connectedness.” These comments are indicative of the yoga philosophy of “oneness.” Since loneliness and its association with diseases has been a topic of study recently (Creswell et al., 2012), these findings have implications for mental-health care professionals that serve the older adult population.

Yoga teacher, older adult, and author Beryl Bender Birch describes it this way in her book *Boomer Yoga: Energizing the Years Ahead for Men & Women*:

Yoga transforms us. How does it do that? Well, I like to say it's the mystery of the methodology. It's in the doing that the change happens. You can't explain it, you can't define it, you can only feel it – you become more aware, more conscious, and more compassionate. You start with asana, the practice of the yoga postures, and you learn at the most fundamental level to pay attention. That's the Yoga Code in a nutshell. Pay attention, make an effort to keep your mind steady, and watch what happens.

It is only in the past few decades that Western science has begun to seriously examine yoga practices to determine how they affect psychological, behavioural, physiological and biological processes (Barrett, 2010). “What is encouraging is the message of holistic health appears to becoming mainstream.

We still have a ways to go overall, but we're seeing gains ranging from yoga being taught to kids at schools, to useful holistic advice on embracing aging" (www.namasta.com).

Aging requires that we take care of ourselves in ways we didn't have to in our youth (Waller, 2012). With the current challenge of rapidly aging populations, practices such as yoga may help older adults stay physically active, healthy, and fulfilled (Volger et al., 2011). Indeed, the National Recreation and Park Association has recommended yoga as a form of "total solution" exercise for seniors (Wang et al., 2013).

COMMENTS

Comments, from participants of the Yoga Study Survey and Interviewees are listed below to demonstrate the popular support for this research study topic.

I hope the results of your survey will help to provide some basis of proof for the efficacy of yoga, for those who need such proof from academic sources. Thank you for doing this.

Good luck with your study...great topic.

Good luck with your research. Namaste.

I am very interested in seeing your results.

I am happy to participate...I love yoga and support its benefits

Look forward to hearing from you!

Thank you for this.

Please let me know of your plan.

I enjoyed this, thank you.

I think this is great you are doing this. I think proper yoga can assist proper aging.

All the best with your research. Namaste

Good luck in your research.

All the best in your studies.

I am interested to read your final paper.

Thanks for asking.

I would love to hear more about your research and I hope I can be of assistance.

Thank you for offering this survey...yoga is forever!

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APPENDICES

APPENDIX 1

FACEBOOK AD

SFU Yoga Study



Do you do yoga once a week or more? If so, SFU needs your help with a brief online survey!

APPENDIX 2 CONSENT PAGE

Yoga and the Older Adult: An Exploration into Pathways, Barriers and Experiences

Are you over the age of 55 and do you practice yoga regularly? If so, your participation in the following research would be much appreciated.

My name is [REDACTED] and I am a graduate student in SFU's Department of Gerontology and am currently conducting a study to assess the characteristics of local older adults who practice yoga. The following questionnaire asks how you practice yoga, your perceptions of yoga's health benefits, your perceptions about barriers to practicing more yoga, and general descriptive questions (e.g., age, health status).

Completion of this questionnaire will require about 10 minutes of your time; participation in this study poses no risks to you. After completion, a summary of findings will be made available (for receipt, e-mail: [REDACTED]).

We do not ask you to provide your name. No individual responses will be disclosed by the researchers; only combined findings will be reported. Please note that for added security, responses provided via this website are electronically encrypted (similar to credit card purchases). Data will be stored in a password-protected computer database and periodically downloaded onto CD-R discs that will be stored in a locked cabinet in the Department of Gerontology. Data will be accessible only by graduate students and their academic supervisor ([REDACTED]).

Participation in this study is strictly voluntary. You are not required to answer questions that make you uncomfortable and you are free to discontinue at any time. Completion of this questionnaire will be seen as agreement to take part in this study.

If you have concerns about this study, please contact [REDACTED], Director, Office of Research Ethics at [REDACTED] (refer to study # _____). If you have concerns about your rights as a research participant, contact the SFU Office of Research Ethics at [REDACTED].

Thank you for taking the time to consider participating in this study.

With many thanks,

[REDACTED], MA Student

[REDACTED]

[Click here to proceed](#)

[No, I do not wish to participate](#)

APPENDIX 3

YOGA STUDENT SURVEY

SECTION 1: YOGA PRACTISE

1. If you have been practising yoga regularly (once a week or more), in what year did you start doing so? _____
In what month? _____
2. Did someone suggest you try yoga? If yes, which person(s)? If nobody, leave blank.
 - 1. Health care professional
 - 2. Family member
 - 3. Friend
 - 4. Neighbour
 - 5. No one suggested it to me
 - 6. Other
If other, please specify _____
If more than one person, who was the **MOST** important?

3. Did any external factor(s) influence your decision to try yoga? If yes, which one(s)? If none, leave blank.
 - 1. Article in newspaper/magazine
 - 2. Reading about yoga (books, journals)
 - 3. Public poster
 - 4. Advertisement on radio
 - 5. Advertisement on T.V.
 - 6. Internet
 - 7. Community events (Wellness fair, health workshop, conference)
 - 8. Other
If other, please specify _____
If more than one external factor, which was the **MOST** important?

4. Did any health-related event(s) help you make the decision to try yoga (i.e. losing your balance, having difficulty getting up from a chair, a friend breaking their hip, medical diagnosis, etc.)
If yes, please specify? _____
5. What are your reasons for practising yoga? (check all that apply)
 - 1. Increase muscle strength
 - 2. Improve balance

- 3. Improve flexibility
- 4. Reduce stress and/or anxiety
- 5. Manage menopause symptoms
- 6. Explore spirituality
- 7. Social interaction
- 8. Increase endurance
- 9. Increase range of motion
- 10. Improve attention and awareness
- 11. Improve breathing
- 12. Gain confidence
- 13. Embrace yoga philosophy
- 14. Lose weight
- 15. Manage chronic illness
- 16. Prevent osteoporosis
- 17. Meditation
- 18. Other

If other, please specify _____

If more than one reason, which was the **MOST** important?

6. Did any barriers to practising yoga initially stand in your way? If yes, which barrier(s)? If none, leave blank.

- 1. Social anxiety/embarrassment
- 2. Health issues
- 3. Mobility/disability issues
- 4. Transportation
- 5. Financial
- 6. Availability of classes
- 7. Class times/scheduling
- 8. Not enough time because of work
- 9. Caregiving obligations
- 10. Incompatibility/interference with religious beliefs
- 11. Insufficient support (encouragement from friends, family, healthcare providers, etc.)
- Other

If other, please specify _____

If more than one barrier, which was the **BIGGEST**? _____

7. Would like to practice more yoga than you currently do?

- No
- Yes

If you perceive any barrier(s) to be standing in the way of your practising more yoga, which one(s)? If none, leave blank.

- 1. Social anxiety/embarrassment

- 2. Health issues
 - 3. Mobility/disability issues
 - 4. Transportation
 - 5. Financial
 - 6. Availability of classes
 - 7. Class times/scheduling
 - 8. Not enough time because of work
 - 9. Caregiving obligations
 - 10. Insufficient support (encouragement from friends, family, healthcare providers, etc.)
 - 11. Other
If other, please specify _____
If more than one barrier, which was the **BIGGEST**? _____
8. When you first started practising yoga, how confident were you in your abilities to practise?
- 1. Very unconfident
 - 2. Not confident
 - 3. Neither confident nor unconfident
 - 4. Confident
 - 5. Very confident
9. Now that you have been practising regularly, how confident are you in your abilities?
- 1. Very unconfident
 - 2. Not confident
 - 3. Neither confident nor unconfident
 - 4. Confident
 - 5. Very confident
10. With whom do you practise yoga?
- 1. By myself
 - 2. By myself with a DVD, video, etc.
 - 3. With others. Who? _____
 - 4. Both alone and with others. Who are these others?

11. In which location do you practise yoga MOST FREQUENTLY?
- 1. Yoga studio
 - 2. Community centre
 - 3. Private instructor's studio
 - 4. Commercial gym
 - 5. Home
 - 6. Other
If other, please specify _____

12. Why do you prefer to practise at this location? (check all that apply)

- 1. Location
- 2. Accessibility
- 3. Instructor(s)
- 4. Class times
- 5. Style of yoga
- 6. Cost
- 7. Community feeling
- 8. Other

If other, please specify _____

If more than one reason which is the MOST important?

13. If you practise yoga in a class, do you prefer to be in a class with older adults only (50+)? If you do not practise in a class, skip this question.

- 1. Yes, always. Why? _____
- 2. Yes, sometimes. Why? _____
- 3. No, not really. Why not? _____
- 4. It doesn't matter.

14. What style(s) of yoga have you tried? (check all that apply)

- 1. Ashtanga vinyasa
- 2. Bikram or other Hot Yoga
- 3. Chair yoga
- 4. Gentle
- 5. Hatha
- 6. Iyengar
- 7. Kripalu
- 8. Kundalini
- 9. Laughter Yoga
- 10. Restorative
- 11. Yin
- 12. Yoga therapy
- 13. Other

If other, please specify _____

What style of yoga do you practice MOST OFTEN? _____

15. On average, how many times a week have you practised over the last 3 months? _____
How long is your average yoga session? _____
16. What is your average monthly cost for yoga classes (excluding transportation, accessories, books, workshops, etc.)? \$ _____
17. What are your average yearly yoga expenses for accessories, retreats, books, workshops, etc.? \$ _____

SECTION 2: GENERAL HEALTH QUESTIONS

1. Do you smoke tobacco (cigarettes or cigars)?
 - No
 - Yes
2. Do you have any health conditions (high blood pressure, heart disease, arthritis, cancer, multiple sclerosis, effects of stroke, chronic pain, diabetes, depression)?
If yes, please describe _____

3. Do you have any physical mobility issues that hinder your movement (e.g., hip problem)? If yes, please describe _____

4. Do you use any devices to help you move around?
If so please list (e.g. walker, cane, wheelchair) _____

5. How would you say your health was before starting yoga?
 - 1.Poor
 - 2.Fair
 - 3.Good
 - 4.Very good
 - 5.Excellent
6. Since starting yoga, how is your health now?
 - 1.Poor
 - 2.Fair
 - 3.Good
 - 4.Very good
 - 5.Excellent

7. How would you characterize your physical activity level before you started yoga?
 - 1.Sedentary
 - 2.Somewhat active
 - 3.Active
 - 4.Very active
8. How would you describe your current physical activity level?
 - 1.Sedentary
 - 2.Somewhat active
 - 3.Active
 - 4.Very active

SECTION 3: BASIC DEMOGRAPHIC INFORMATION

1. What is your sex/how do you identify?
 - Female
 - Male
2. What is your sexual orientation?
 - 1. Heterosexual
 - 2. Homosexual
 - 3. Bisexual
 - 4. Other
3. What is your year of birth?

4. What is your ethnic origin?
 - 1. Aboriginal/Native/First Nations
 - 2. African/African-American/Black
 - 3. East Asian/Pacific islander
 - 4. Southeast Asian/Indian
 - 5. Latino
 - 6. Middle eastern/North African
 - 7. White/Caucasian/European
 - 8. Latin/Central/South American
 - 9. Mixed
 - 10. Other
 If other please specify _____
5. Which best describes your current relationship status?
 - 1. Single
 - 2. Married/Common-law
 - 3. Partnered
 - 4. Separated
 - 5. Divorced

- 6. Widowed
 - 7. Other
- If other please specify _____
6. 6. What is the highest level of education you have completed?
- 1. High School
 - 2. Some College
 - 3. Some University
 - 4. Associate's Degree/Diploma
 - 5. Bachelor's Degree
 - 6. Master's Degree
 - 7. PhD/Post-Doctoral
 - 8. Graduate Degree (MD/LLD)
 - 9. Other
- If other please specify _____
7. 7. What is your primary work or occupation (e.g., carpenter, teacher, bookkeeper). Please describe fully. If not currently working, please describe last primary work/occupation.
- _____
- _____
8. 8. What is your current employment status (e.g., full-time, part-time, unpaid, sick-leave, unemployed, retired)?
- _____
9. 9. If you are retired, what year did you leave the paid workforce?
- _____
10. 10. What is your religion/spiritual orientation, if any
- _____
11. 11. What is your *average* yearly income from all sources?
- 0 - 19,999
 - 20,000 - 29,999
 - 30,000 - 39,999
 - 40,000 - 49,999
 - 50,000 - 59,999
 - 60,000 - 69,999
 - 70,000 - 79,999
 - 80,000 - 89,999
 - 90,000 - 99,999
 - Over 100,000
12. 12. How did you hear about this survey? _____

Do you have any comments you would like to add?

Would you be interested in answering some more questions about your yoga experiences? This would greatly enhance my research. If yes, please provide an email address and/or phone number where I can reach you.

Thank you

APPENDIX 4

TABLES

Table 1: Socio-demographic characteristics for Total Sample

Socio-demographic Variable	Frequency	Valid Percent
Age		
Middle-aged students (under 55)	274	60.6
Older Students (over 55)	178	39.4
Gender		
Male	100	22.1
Female	352	77.9
Marital Status		
Married/Common-Law/Partnered	295	65.3
Divorced/Separated	63	13.9
Single	83	18.4
Widowed	11	2.4
Education		
High school	20	4.4
Some college/university	118	26.1
Associate's degree/diploma	50	11.1
Bachelor's degree	140	31.0
Master's degree	103	22.8
Graduate degree (MD, LLB, etc.)	8	1.8
PhD/Post-doctoral	13	2.9
Average Yearly Income (All Sources)		
\$ 0 – 19,999	35	7.7
\$ 20,00 – 29,999	36	8.0
\$ 30,000 – 39,999	39	8.6
\$ 40,000 – 49,999	119	26.3
\$ 50,000 – 59,999	43	9.5
\$ 60,000 – 69,999	24	5.3
\$ 70,000 – 79,999	40	8.8
\$ 80,000 – 89,999	30	6.6
\$ 90,000 – 99,999	18	4.0
\$ over 100,000	68	15.0
Employment Status		
Working	367	81.2
Unemployed	62	13.7
Retired	23	5.1
Ethnicity		
White/Caucasian/European	376	83.2
East Asian/Pacific Islander	30	6.6
Southeast Asian/Indian	13	2.9
Mixed/Multi	13	2.9
Latino	7	1.5
Aboriginal/Native/First Nation	6	1.3
African/African American/Black	4	.9
Middle Eastern/North Africa	3	.7
Religion		
Spiritual	136	30.1
Non-religious	111	24.6
Christian (Other)	90	19.9
Buddhist	37	8.2
Other	27	6.0
Agnostic	19	4.2
Jewish	16	3.5
New Age	6	1.3
Hindu	6	1.3
Islamic	2	.4
Sikh	2	.4
Sexual Orientation		
Heterosexual	401	88.7
Homosexual	42	9.3
Bisexual	9	2.0

Table 2: Bivariate Analyses: Socio-demographic variables

Age Group	Variable				Statistics
	Gender				
	Male		Female		
Middle-aged Students	61 (61.0%)		213 (60.7%)		<i>n.s.</i>
Older Students	39 (39.0%)		138 (39.3%)		
	Marital Status				
	Married/ Partner	Divorced	Single	Widowed	$\chi^2 = 14.68$ <i>df</i> = 3
Middle-aged Students	182 (61.7%)	35 (55.6%)	56 (67.5%)	1 (9.1%)	
Older Students	113 (38.3%)	28 (44.4%)	27 (32.5%)	10 (90.9%)	<i>p</i> < .05
	Education				
	Undergraduate		Graduate/Post Degree		<i>n.s.</i>
Middle-aged Students	206 (62.8%)		68 (54.8%)		
Older Students	122 (37.2%)		56 (45.2%)		
	Average Yearly Income				
	\$49,000 and below	50,000 to \$99,999	\$100,000+		<i>n.s.</i>
Middle-aged Students	130 (56.8%)	102 (65.8%)	42 (61.8%)		
Older Students	99 (43.2%)	53 (34.2%)	26 (38.2%)		
	Employment Status				
	Working	Unemployed	Retired		$\chi^2 = 70.65$ <i>df</i> = 2
Middle-aged Students	247 (67.3%)	19 (82.6%)	8 (12.9%)		
Older Students	120 (32.7%)	4 (17.4%)	54 (87.1%)		<i>p</i> < .05
	Ethnic Origin				
	White/Caucasian/European		Other		$\chi^2 = 11.07$ <i>df</i> = 1
Middle-aged Students	215 (57.2%)		59 (77.6%)		
Older Students	161 (42.8%)		17 (22.4%)		<i>p</i> < .01
	Religion				
	Spiritual	Non-religious	Christian (Other)	Other	<i>n.s.</i>
Middle-aged Students	85 (62.0%)	75 (67.6%)	50 (55.6%)	64 (56.1%)	
Older Students	52 (38.0%)	36 (32.4%)	40 (44.4%)	50 (43.9%)	
	Sexual Orientation				
	Heterosexual	Homosexual	Bisexual		<i>n.s.</i>
Middle-aged Students	238 (59.4%)	28 (66.7%)	8 (88.9%)		
Older Students	163 (40.6%)	14 (33.3%)	1 (11.1%)		

Table 3: Which person(s) first suggested yoga practise

Who first suggested	Middle-aged students	Older students	Statistics
No one	132 (48.2%)*	89 (50.0%)	n.s.
Friend	88 (32.1%)	49 (27.5%)	n.s.
Family member	32 (11.7%)	26 (14.6%)	n.s.
Healthcare provider	25 (9.1%)	15 (8.4%)	n.s.
Other	9 (3.3%)	13 (7.3%)	n.s.

* Percentages show those selecting each category

Table 4: Most important person who first suggested yoga practise

Who first suggested	Middle-aged students	Older students	Statistics
No one	131 (47.8%)	89 (50.0%)	n.s.
Friend	83 (30.3%)	42 (23.0%)	n.s.
Family member	26 (9.6%)	24 (13.5%)	n.s.
Healthcare provider	21 (7.7%)	12 (6.7%)	n.s.
Teacher	6 (2.2%)	7 (3.9%)	n.s.
Co-worker	3 (1.1%)	3 (1.7%)	n.s.
Neighbour	2 (0.7%)	2 (1.1%)	n.s.

Table 5: External factors influencing decision to try yoga

External factor	Middle-aged students	Older students	Statistics
Reading about yoga, etc.	71 (25.9%)	49 (27.5%)	n.s.
Community events	38 (13.9%)	25 (14.0%)	n.s.
Article in newspaper/mag.	27 (9.9%)	13 (7.3%)	n.s.
Internet	8 (2.9%)	9 (5.1%)	n.s.
Public poster	7 (2.6%)	3 (1.7%)	n.s.
TV advertisement	4 (1.5%)	6 (3.4%)	n.s.

Table 6: Most important external factor influencing decision to try yoga

External factor	Middle-aged students	Older students	Statistics
Reading yoga books, etc.	56 (44.4%)	40 (47.1%)	n.s.
Community events	32 (25.4%)	25 (29.4%)	n.s.
Article in newspaper/mag.	22 (17.5%)	7 (8.2%)	n.s.
Internet	6 (4.8%)	6 (7.1%)	n.s.
Public poster	6 (4.8%)	2 (2.4%)	n.s.
TV advertisement	4 (3.2%)	5 (5.9%)	n.s.

Table 7: Health related event

External factor	Middle-aged students	Older students	Statistics
No	155 (56.6%)	102 (57.3%)	n.s.
Yes	119 (43.4%)	76 (42.7%)	n.s.

Table 8: Reasons for practising yoga

Reason	Middle-aged students	Older students	Statistics
Improve flexibility	243 (88.7%)	157 (88.2%)	n.s.
Reduce stress	240 (87.6%)	142 (79.8%)	$\chi^2 = 5.03, df = 1, p < .05$
Increase muscle strength	216 (78.8%)	121 (68.0%)	$\chi^2 = 6.70, df = 1, p < .01$
Improve balance	204 (74.5%)	137 (77.0%)	n.s.
Increase range of motion	168 (61.3%)	114 (64.0%)	n.s.
Improve breathing	154 (56.2%)	113 (63.5%)	n.s.
Meditation	150 (54.7%)	93 (52.2%)	n.s.
Improve attention/awareness	145 (52.9%)	101 (56.7%)	n.s.
Explore spirituality	134 (48.9%)	83 (46.6%)	n.s.
Embrace yoga philosophy	113 (41.2%)	59 (33.1%)	n.s.
Increase endurance	90 (32.8%)	49 (27.5%)	n.s.
Gain confidence	74 (27.0%)	50 (28.1%)	n.s.
Social interaction	72 (26.3%)	50 (28.1%)	n.s.
Lose weight	70 (25.5%)	29 (16.3%)	n.s.
Manage pain	56 (20.4%)	40 (22.5%)	n.s.
Prevent osteoporosis	51 (18.6%)	51 (28.7%)	$\chi^2 = 5.40, df = 1, p < .05$
Manage menopause	29 (10.6%)	13 (7.3%)	n.s.
Manage chronic illness	22 (8.0%)	12 (6.7%)	$\chi^2 = 6.22, df = 1, p < .01$
			n.s.
			n.s.

Note: Sample size does not add up since most participants chose more than one option.

Table 9: Most important reason for practising yoga

Reason	Middle-aged students	Older students	Statistics	
Reduce stress and/or anxiety	64 (27.7%)	25 (17.4%)	$\chi^2 = 17.73, df = 6, p < .05$	
Improve flexibility	36 (15.6%)	47 (32.6%)		
Embrace yoga philosophy	42 (18.2%)	20 (13.9%)		n.s.
Explore spirituality	16 (7.4%)	10 (6.9%)		n.s.
Increase muscle strength	15 (6.5%)	12 (8.3%)		n.s.
Manage chronic illness	15 (6.5%)	7 (4.9%)		n.s.
Other	42 (18.2%)	23 (16.0%)		n.s.
				n.s.

Table 10: Age started* & Reasons for practising yoga

Reasons for practise	Started under 55	Started 55+	Statistics
Reduce stress	318 (86.4%)	64 (76.2%)	$\chi^2 = 5.46, df = 1, p < .05$
Meditation	206 (56.0%)	37 (44.0%)	$\chi^2 = 3.91, df = 1, p < .05$
Explore spirituality	187 (50.8%)	30 (35.7%)	$\chi^2 = 6.24, df = 1, p < .05$
Embrace yoga philosophy	150 (40.8%)	22 (26.2%)	$\chi^2 = 6.15, df = 1, p < .05$
Social interaction	96 (25.0%)	30 (35.7%)	$\chi^2 = 3.98, df = 1, p < .05$

Measured as below 55 and 55+

Note: Sample size does not add up since most participants chose more than one option.

Table 11: Barriers to starting yoga practise

Barrier	Middle-aged students	Older students	Statistics
None	105 (38.3%)	86 (47.8%)	$\chi^2 = 3.93, df = 1, p < .05$
Not enough time due to work	55 (20.1%)	43 (24.2%)	
Financial constraints	51 (18.6%)	25 (14.0%)	n.s.
Class times/scheduling	47 (17.2%)	28 (15.7%)	n.s.
Availability of classes	42 (15.0%)	17 (9.6%)	n.s.
Social anxiety	35 (12.8%)	10 (5.6%)	n.s.
Caregiving obligations	20 (7.3%)	8 (4.5%)	$\chi^2 = 6.16, df = 1, p < .05$
Health issues	16 (5.8%)	13 (7.3%)	
Mobility/disability issues	13 (4.7%)	15 (8.4%)	n.s.
Other	11 (4.0%)	4 (2.2%)	n.s.
			n.s.

Note: Sample size does not add up since most participants chose more than one option.

Table 12: Biggest barrier to starting yoga practise

Barrier	Middle-aged students	Older students	Statistics
None	114 (41.6%)	86 (48.3%)	n.s.
Not enough time	34 (12.4%)	26 (14.6%)	n.s.
Financial	29 (10.6%)	18 (10.1%)	n.s.
Social anxiety	25 (9.1%)	6 (3.4%)	n.s.
Class Times	23 (8.4%)	14 (7.9%)	n.s.
Availability of classes	17 (6.2%)	5 (2.8%)	n.s.
Health issues	11 (4.0%)	8 (4.5%)	n.s.
Caregiving obligations	11 (4.0%)	8 (4.5%)	n.s.
Other	10 (3.6%)	7 (3.9%)	n.s.

Table 13: Preference to practise yoga more often than currently?

More Practise Preference	Middle-aged students	Older students	Statistics
No	69 (25.2%)	54 (30.3%)	n.s.
Yes	205 (74.8%)	124 (69.7%)	n.s.

Table 14: Barriers to practising yoga more often

Barrier	Middle-aged students	Older students	Statistics
None	98 (35.8%)	72 (40.4%)	n.s.
Not enough time due to work	84 (30.7%)	37 (20.8%)	$\chi^2 = 5.36, df = 1, p < .05$
Class times/scheduling	52 (19.0%)	33 (18.5%)	n.s.
Financial constraints	42 (15.3%)	25 (14.0%)	n.s.
Availability of classes	27 (9.9%)	18 (10.1%)	n.s.
Health issues	18 (6.6%)	13 (7.3%)	n.s.
Caregiving obligations	15 (5.5%)	6 (3.4%)	n.s.
Transportation	5 (1.8%)	2 (1.1%)	n.s.
Mobility/disability issues	2 (0.7%)	3 (1.7%)	n.s.
Social anxiety/embarrassment	1 (0.4%)	1 (0.6%)	n.s.

Note: Sample size does not add up since most participants chose more than one option.

Table 15: Biggest barrier to practising yoga more often

Barrier	Middle-aged students	Older students	Statistics
None	99 (36.1%)	72 (40.4%)	n.s.
Not enough time due to work	67 (24.5%)	29 (16.3%)	n.s.
Financial constraints	38 (13.9%)	25 (14.0%)	n.s.
Class times/scheduling	27 (9.9%)	23 (12.9%)	n.s.
Health issues	18 (6.6%)	12 (6.7%)	n.s.
Availability of classes	11 (4.0%)	11 (6.2%)	n.s.
Other	14 (5.1%)	6 (3.4%)	n.s.

Table 16: Confidence when first starting yoga

Level of confidence	Middle-aged students	Older students	Statistics
Very unconfident	27 (9.9%)	15 (8.4%)	n.s.
Not confident	53 (19.3%)	41 (23.0%)	n.s.
Neither confident/unconfident	114 (41.6%)	58 (32.6%)	n.s.
Confident	56 (20.4%)	50 (28.1%)	n.s.
Very confident	24 (8.8%)	14 (7.9%)	n.s.

Table 17: Current confidence in practising yoga

Level of confidence	Middle-aged students	Older students	Statistics
Very unconfident	8 (2.9%)	7 (3.9%)	n.s.
Not confident	2 (0.7%)	0 (0.0%)	n.s.
Neither confident/unconfident	32 (11.7%)	32 (18.0%)	n.s.
Confident	140 (51.1%)	82 (46.1%)	n.s.
Very confident	92 (33.6%)	57 (32.0%)	n.s.

Table 18: With whom currently practising yoga

Person	Middle-aged students	Older students	Statistics
By myself and with others	121 (44.2%)	66 (37.1%)	n.s.
With others	118 (43.1%)	82 (46.1%)	n.s.
By myself only	25 (9.1%)	24 (13.5%)	n.s.
By myself only, with a DVD, video, etc.	10 (3.6%)	6 (3.4%)	n.s.

Table 19: Most frequent locations for yoga practise

Location	Middle-aged students	Older students	Statistics
Yoga studio	194 (70.8%)	100 (56.2%)	$\chi^2 = 10.14, df = 1, p < .01$
Home	69 (25.2%)	50 (28.1%)	
Community centre	29 (10.6%)	23 (12.9%)	
Commercial gym	13 (4.7%)	12 (6.7%)	
			n.s.
			n.s.

Note: Sample size does not add up since most participants chose more than one option.

Table 20: Reasons why this location preferred

Reason why	Middle-aged students	Older students	Statistics
Instructor	172 (62.8%)	109 (61.2%)	n.s.
Location	157 (57.3%)	118 (66.3%)	n.s.
Style of yoga	151 (55.1%)	89 (50.0%)	n.s.
Accessibility	108 (39.4%)	97 (54.5%)	$\chi^2 = 9.89, df = 1, p < .05$
Class times	106 (38.7%)	80 (44.9%)	
Community feeling	104 (38.0%)	60 (33.7%)	n.s.
Cost	91 (33.2%)	79 (44.4%)	n.s.
Other	8 (2.9%)	10 (5.6%)	$\chi^2 = 5.73, df = 1, p < .05$
			n.s.

Note: Sample size does not add up since most participants chose more than one option.

Table 21: Most important reason why this location preferred

Reason	Middle-aged students	Older students	Statistics
Instructor	88 (32.1%)	52 (29.2%)	n.s.
Location	47 (17.2%)	36 (20.2%)	n.s.
Style of yoga	48 (17.5%)	19 (10.7%)	n.s.
Accessibility	24 (8.8%)	30 (16.9%)	$\chi^2 = 12.67, df = 6, p < .05$
Cost	25 (9.1%)	18 (10.1%)	
Community feeling	26 (9.5%)	10 (5.6%)	n.s.
Class times	16 (5.8%)	13 (7.3%)	n.s.

Table 22: Preference for classes with older adults

Preference	Middle-aged students	Older students	Statistics
It doesn't matter	146 (53.3%)	81 (45.5%)	$\chi^2 = 8.54, df = 3, p < .05$
No, not really	85 (31.0%)	51 (28.7%)	
Yes	11 (4.0%)	17 (9.6%)	
Not applicable	32 (11.7%)	29 (16.3%)	

Table 23: Styles of yoga tried

Style of Yoga tried	Middle-aged students	Older students	Statistics
Hatha, gentle, chair	236 (86.1%)	155 (87.1%)	n.s.
Iyengar, kripalu, yin	177 (64.6%)	106 (59.6%)	n.s.
Bikram or other hot yoga	168 (61.3%)	52 (29.2%)	$\chi^2 = 44.50, df = 1, p < .01$
Ashtanga vinyasa	165 (60.2%)	76 (42.7%)	
Kundalini	117 (42.7%)	67 (37.6%)	$\chi^2 = 13.31, df = 1, p < .01$
Laughter, yoga therapy	46 (16.8%)	28 (15.7%)	
			n.s.
			n.s.

Note: Sample size does not add up since most participants chose more than one option.

Table 24: Style of yoga practised most often

Style of yoga most often	Middle-aged students	Older students	Statistics
Hatha, gentle, chair, Iyengar, kripalu, yin, Laughter, yoga therapy	148 (54.0%)	137 (77.4%)	$\chi^2 = 25.28, df = 1, p < .01$
Ashtanga vinyasa, Kundalini, Bikram or other hot yoga	126 (46.0%)	40 (22.6%)	

Table 25: Times per week

Times per week	Middle-aged students	Older students	Statistics
1	47 (17.2%)	40 (22.5%)	n.s.
2	54 (19.7%)	43 (24.2%)	n.s.
3	64 (23.4%)	34 (19.1%)	n.s.
4	37 (13.5%)	16 (9.0%)	n.s.
5	32 (11.7%)	20 (11.2%)	n.s.
6	16 (5.8%)	9 (5.1%)	n.s.
7+	24 (8.8%)	16 (9.0%)	n.s.

Table 26: Length of average yoga session

Length of average session	Middle-aged students	Older students	Statistics
30 minutes	17 (6.2%)	17 (9.6%)	n.s.
45 minutes	17 (6.2%)	12 (6.7%)	n.s.
60 minutes	89 (32.5%)	61 (34.3%)	n.s.
75 minutes	79 (28.8%)	48 (27.0%)	n.s.
90 minutes	72 (26.3%)	40 (22.4%)	n.s.

Table 27: Chronic health conditions

Chronic health conditions	Middle-aged students	Older students	Statistics
No	182 (66.4%)	96 (53.9%)	$\chi^2 = 7.11, df = 1, p < .01$
Yes	92 (33.6%)	82 (46.1%)	

Table 28: Physical mobility issues

Physical mobility issues	Middle-aged students	Older students	Statistics
No	225 (82.1%)	117 (65.7%)	$\chi^2 = 15.73, df = 1, p < .01$
Yes	49 (17.9%)	61 (34.3%)	

Table 29: Self-rated health before starting yoga

Self-rated health before	Middle-aged students	Older students	Statistics
Excellent	23 (8.4%)	26 (14.6%)	n.s.
Very good	67 (24.5%)	44 (24.7%)	
Good	110 (40.1%)	67 (37.6%)	
Fair	62 (22.6%)	35 (19.7%)	
Poor	12 (4.4%)	6 (3.4%)	

Table 30: Current self-rated health

Self-rated health now	Middle-aged students	Older students	Statistics
Excellent	61 (22.3%)	45 (25.3%)	$\chi^2 = 14.77, df = 3, p < .01$ Tau-b = -.075
Very good	137 (50.0%)	58 (32.6%)	
Good	69 (25.2%)	69 (38.8%)	
Fair	7 (2.6%)	6 (3.4%)	

Table 31: Physical activity level before starting yoga

Physical activity level before	Middle-aged students	Older students	Statistics
Very active	51 (18.6%)	36 (20.2%)	n.s.
Active	82 (29.9%)	67 (37.6%)	
Somewhat active	100 (36.5%)	51 (28.7%)	
Sedentary	41 (15.0%)	24 (13.5%)	

Table 32: Current physical activity level

Physical activity level now	Middle-aged students	Older students	Statistics
Very active	88 (32.1%)	46 (25.8%)	$\chi^2 = 6.90, df = 2, p < .05$ Tau-b = -.105
Active	137 (50.0%)	82 (46.1%)	
Somewhat active	49 (17.9%)	50 (28.1%)	

Table 33: Facebook ad

Facebook ad	Middle-aged students	Older students	Statistics
No	44 (16.1%)	51 (28.7%)	$\chi^2 = 10.30, df = 1, p < .01$
Yes	230 (83.9%)	127 (71.3%)	

Table 34: Statistically Significant Associations – age groups

Variables	Middle-aged students	Older students	Statistics
Reasons			
Reduce stress	87.6	79.8	$\chi^2 = 5.03, df = 1, p < .05$
Increase muscle strength	78.8	68.0	$\chi^2 = 6.70, df = 1, p < .01$
Lose weight	25.5	16.3	$\chi^2 = 5.40, df = 1, p < .05$
Prevent osteoporosis	18.6	28.7	$\chi^2 = 6.22, df = 1, p < .01$
Most Important reason			
Reduce stress and/or anxiety	27.7	17.4	$\chi^2 = 17.73, df = 6, p < .05$
Barriers			
None	38.3	47.8	$\chi^2 = 3.93, df = 1, p < .05$
Social anxiety	12.8	5.6	$\chi^2 = 6.16, df = 1, p < .05$
Barriers to more often			
Not enough time	30.7	20.8	$\chi^2 = 5.36, df = 1, p < .05$
Most frequent practice location			
Yoga studio	70.8	56.2	$\chi^2 = 10.14, df = 1, p < .01$
Reasons why location			
Accessibility	39.4	54.5	$\chi^2 = 9.89, df = 1, p < .05$
Cost	33.2	44.4	$\chi^2 = 5.73, df = 1, p < .05$
Most important reasons			
Accessibility	8.8	16.9	$\chi^2 = 12.67, df = 6, p < .05$
Preference for 50+ classes			
Yes	4.0	9.6	$\chi^2 = 8.54, df = 3, p < .05$
Styles of yoga tried			
Bikram or hot	61.3	29.2	$\chi^2 = 44.50, df = 1, p < .01$
Ashtanga vinyasa	60.2	42.7	$\chi^2 = 13.31, df = 1, p < .01$
Styles of yoga practiced most often			

Variables	Middle-aged students	Older students	Statistics
Hatha	54.0	77.4	$\chi^2 = 25.28, df = 1, p < .01$
Ashtanga	46.0	22.6	
Chronic Health Yes	33.6	46.1	$\chi^2 = 7.11, df = 1, p < .01$
Physical mobility issues Yes	17.9	34.3	$\chi^2 = 15.73, df = 1, p < .01$
Current self-rated health Very good	50.0	32.6	$\chi^2 = 14.77, df = 3, p < .01$ Tau-b = -.075
Physical activity level now Somewhat active	17.9	28.1	$\chi^2 = 6.90, df = 2, p < .05$ Tau-b = -.105
Facebook ad Yes	83.9	71.3	$\chi^2 = 10.30, df = 1, p < .01$

Table 35: Statistically Significant Associations – age started

Variable	Under 55	55+	Statistics
Reduce stress	86.4	76.2	$\chi^2 = 5.46, df = 1, p < .05$
Meditation	56.0	44.0	$\chi^2 = 3.91, df = 1, p < .05$
Explore spirituality	50.8	35.7	$\chi^2 = 6.24, df = 1, p < .05$
Embrace yoga philosophy	40.8	26.2	$\chi^2 = 6.15, df = 1, p < .05$
Social interaction	25.0	35.7	$\chi^2 = 3.98, df = 1, p < .05$

APPENDIX 5

QUALITATIVE INTERVIEW GUIDE

General Introduction
Thank the individual for participating in the initial portion of the study (Facebook questionnaire), build rapport.
Explain purpose of follow-up qualitative interview.
Explain how the qualitative interview will work (predetermined questions, casual format, participant can end the interview at any time if they wish to do so).
Ask permission to record conversation (ensure maintenance of confidentiality, no affiliation with any yoga schools, etc.)
Ask participant if they have any questions before questions begin.

Introductory Question
Can you please confirm your date of birth?
Can you start by telling me how you heard about the yoga study?

Topic	Associated Questions
Please share how you got into yoga	What were the reasons for getting into it originally? Was anyone or something you read or say influential? Is there anything else that you can share with me about how and why you got started?
Tell me your reasons for having a regular yoga practice?	Do you do it alone? How often? How do you get motivated to do it? What mainly draws you to it? Do you try different types? How does this make you feel? Is it mostly physical or mental benefits that draw you to yoga? Spiritual? What do you think it does for you?
Can you tell me about the barriers you may have encountered?	Do any of these seem more of an issue? How do you bet past these barriers? Have you thought about these and how they can be rectified?
Any comment or experiences you would like to share?	Lots of probes!

Concluding Questions/comments
Is there anything else you would like to tell me about your yoga practice?
Do you have any questions about this research study?
Thank individual for their participation, express appreciation for their time.
Write down overall impressions immediately after interview is complete.

APPENDIX 6

FOLLOW-UP INTERVIEW PARTICIPANTS

Table 36: Follow-up interview participants: Gender, age, year yoga began

Participant #	Interviewee #	Gender	Age	Yoga Year
344	1 Bob	Male	67	2010
135	2 Suzanne	Female	57	2007
5	3 Don	Male	56	2010
246	4 Micha	Male	43	2009
17	5 Lessa	Female	46	1994
378	6 Adrienne	Male	69	2002
162	7 Adella	Female	66	2004
95	8 Linda	Female	48	1996
154	9 Rodnee	Male	53	1996
129	10 Myriam	Female	60	2005
351	11 Dana	Female	51	1978
380	12 Stefen	Male	44	2010
149	13 Nitiya	Female	50	2004
157	14 Stanley	Male	62	2008
87	15 Phil	Male	53	2011
277	16 Phyllis	Female	67	1995
90	17 Trev	Male	40	2004
146	18 Rona	Female	48	2001
23	19 Rica	Female	59	2007
274	20 Aza	Male	57	2009