

**YOGA AND SELF-ESTEEM: EXPLORING CHANGE IN  
MIDDLE-AGED WOMEN**

A Thesis Submitted to the College of  
Graduate Studies and Research in  
Partial Fulfillment of the Requirements  
for the Degree of Master of Science  
in the College of Kinesiology  
University of Saskatchewan  
Saskatoon

By

Sarah Elizabeth Junkin

© Copyright Sarah Elizabeth Junkin, August, 2007. All rights reserved.

## PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a Postgraduate degree from the University of Saskatchewan, I agree that the Libraries of this University may make it freely available for inspection. I further agree that permission for copying this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis work or, in their absence, by the Head of the Department or the Dean of the College in which my thesis work was done. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Saskatchewan in any scholarly use which may be made of any material in my thesis.

Requests for permission to copy or to make other use of material in this thesis in whole or part should be addressed to:

Dean of the College of Kinesiology

University of Saskatchewan

Saskatoon, Saskatchewan

S7N 5B2

## **ABSTRACT**

Of the numerous psychological constructs self-esteem is the most known. It is well documented that having high levels of self-esteem is associated with positive health implications. Self-esteem is theorized as a global and stable construct impacted by both academic and non-academic domains. The physical domain compartmentalized within the non-academic domain, is used to look at self-esteem related to physical self-perceptions. In the physical domain, the Exercise and Self-Esteem Model (EXSEM) (Sonstroem & Morgan, 1989) was developed to measure changes in self-esteem, physical competence, physical acceptance, and self-efficacy across an exercise intervention. Fox (2000b) suggested that middle-age marks a time where positive changes to self-esteem are possible. For women, middle-age can be accompanied by several challenges including a physical body that moves further from society's ideal (i.e., young, beautiful, and thin). Hatha yoga is an exercise practice that has become popular in North America in recent years, especially with middle-aged adults, and may represent an ideal activity to be used within the EXSEM as it emphasizes both physical competence and acceptance.

The purpose of the study was to utilize the EXSEM as a framework to examine self-esteem, physical competence, physical acceptance, and yoga self-efficacy constructs for middle-aged women participating in a 12-week Hatha yoga intervention. An additional exploratory objective of the study was to examine potential changes in mindfulness consisting of observing, describing, acting with awareness, and accepting without judgement for middle-aged women participating in a 12-week Hatha yoga intervention.

Participants in the study were 51 women ( $M$  age  $49.3 \pm 6.1$ ; yoga group,  $n = 21$ ; control group,  $n = 30$ ) of predominantly White ethnicity (92%). Descriptive information about the sample via a demographics form and an Eastern philosophy familiarity open-ended question, and the following measures, Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin, & Shephard, 1985), Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), Physical Self-Perception Profile (PSPP; Fox & Corbin, 1989), Body Esteem Scale (BES; Franzoi, & Shields, 1984), Body Image Visual Analog Scale (BIVAS), Yoga Self-Efficacy Scale (YSES), and the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004) were collected at pre-test and post-test (YSES was administered an additional time for the yoga group only). Doubly multivariate analyses using SPSS (version 14.0) examined four statistical models to answer research questions and help negotiate several dependent variables in the research design. Model 1 looked at higher order constructs in the EXSEM (i.e., RSES, physical self-worth subscale of the PSPP, BES, BIVAS, and YSES). Model 2 was identical to model 1 with the exception of including lower order domain items for physical competence (i.e., PSPP subscales of sport competence, physical strength, physical condition, attractive body). Model 3 looked at subscales of YSES (i.e., standing poses, forward bends, back bends, twists, and seated/supine poses), whereas model 4 examined subscales of KIMS only (i.e., observe, describe, act with awareness, accept without judgement).

Following the doubly multivariate analysis, PSPP subscales showed significant group by time interactions; follow-up univariate tests,  $p < .05$ , showed significance on PSW  $F(1, 49) = 12.22$ , conditioning subscale of PSPP  $F(1, 49) = 10.65$ , strength subscale on PSPP  $F(1, 49) = 13.11$ , BIVAS  $F(1, 49) = 6.45$ , YSE total score  $F(1, 49) =$

9.84, and YSE subscales of forward bends  $F(1, 49) = 17.84$ , twists  $F(1, 49) = 8.18$ , and seated/supine poses  $F(1, 49) = 6.21$ , and observation subscale of KIMS  $F(1, 49) = 12.16$ ,  $p < .05$ . In all cases, the yoga group improved more over time than the control group.

General support for the use of the EXSEM for middle-aged women participating in Hatha yoga over 12-weeks was noted with changes in yoga self-efficacy for total score, twists, forward bends, and seated/supine poses; physical competence of physical self-worth, body conditioning, and physical strength; and physical acceptance (BIVAS). A major finding was that no overall change in self-esteem was found with a sample whose means for self-esteem were similar to previous research with middle-aged women. Similarly, partial support for mindfulness with changes in observing following the 12-week Hatha yoga intervention was found. Future research should focus on further developing appropriate measurement of physical acceptance; the appropriateness of EXSEM for examining Hatha yoga should be considered; qualitative methods should be used to gain additional insight into the process of Hatha yoga participation for middle-aged women.

## ACKNOWLEDGEMENTS

A sincere thanks is due to my academic advisor Dr. Kent Kowalski for his guidance, assistance, and genuine interest with my degree program and specifically with my thesis project. I have grown a lot as a person and in my life during these past few years in the graduate program. Without his ongoing help I would not have been able to produce my research nor be inspired to look into an area relatively new to Kinesiology. Thank you for never giving up on me and encouraging me to be the best student within my capabilities. I will hold a special place in my heart for our SPACE SQUAD with its gatherings filled with fun, laughter, insight, games/trivia/artwork, and excellent food. I will look back on this time in my life I am sure with fond memories and a strong sense of gratitude for the skill set and personal growth I developed as a student, researcher, teacher, and overall as a person. I will be sure to justify, to never go beyond my research findings, and to produce quality work whenever possible. I hope to continue on the journey of life long learning and questioning that the process of the Masters degree has sparked.

I would also very much like to give thanks to my committee members Dr. Kevin Spink and Dr. Melanie Morrison from the Department of Psychology for their input and support of my research ideas and the direction of my project. Thank you for allowing me to pursue research in the area of yoga practice and its psychological implications for women that fascinated me for the majority of my degree program, and that will likely continue to fascinate me as I grow as a Hatha yoga practitioner. A special thank you to Anne Leis from Community Health and Epidemiology, College of Medicine for acting as my external examiner in the defence process.

Additionally, I would like to acknowledge the support of my sponsors Dr. Patricia Dewar from Yoga Central studio for use of the studio space in conducting the yoga classes for the study, for our ongoing discussions with regards to the yoga teaching included in the program, and for her encouragement of the importance of conducting research related to yoga in the College of Kinesiology. A sincere thanks also is due and Brett and Michelle Pawson from Lululemon Athletica in Saskatoon, for the donation of 35 yoga mats for use in the intervention program. Without your generosity my research would not have been easily accomplished. It has been great to see the supports that are available within this community for projects like mine. Thank you!

Finally but certainly not least, I need to extend a thank you to the women who agreed to participate in my research project. It was your willingness to learn and explore that made the project so very enjoyable to conduct. I hope you found joy in having an experience with movement through Hatha yoga as it gave me great joy to share the joys of yoga with you.

## DEDICATION

I would like to dedicate this thesis to the local yoga community and in particular to Patricia Dewar my teacher. In having become involved in pursuing teacher training in yoga and becoming intellectually curious about the physical and psychological impact of yoga on health and well-being I not only grew as a person, but my research questions were fostered. My aim with the current research project was to provide a quality research project that might aid in providing evidence towards claims being made in popular media about the psychological benefits of Hatha yoga. Without your soft grace and encouragement I might not have felt studying yoga in the research community was necessary or even possible. I hope that my research will do some small justice to the practice of yoga and the benefits it can have as a life philosophy of self-discovery and awareness.

A second dedication I feel is also needed. My former track and field coach Lyle Sanderson entered my life at a critical period in my athletic career as an injured and struggling student in the United States. It was his wit and quiet leadership that first attracted me to Saskatchewan and to both the university and sport communities. Since moving west 7 years ago Lyle has been a constant source of positive influence on my academic career. His subtle and wise ‘coaching’ not only in sport but also in life has not gone unnoticed. Thank you Lyle for encouraging me to pursue my degree programs at this institution in conjunction with a wonderful athletic career with the Huskies women’s track and field team. I will always be proud to have represented the University athletic program under your leadership and to have ‘succeeded in the classroom’ too. I only



hope that someday I too will be able to help encourage other ambitious young individuals in need of guidance.

Last but certainly not least I would also like to extend a big thank you to my dad, Jon Junkin for his continual encouragement with this project. Without his belief in me that I could not only be successful in completing this project but also in completing this degree regardless how long it takes. Thank you for never giving up on me or doubting in my abilities. I am grateful to have support and encouragement in my journey through life.

## TABLE OF CONTENTS

PERMISSION TO USE .....	i
ABSTRACT .....	ii
ACKNOWLEDGEMENTS .....	v
DEDICATION .....	vii
TABLE OF CONTENTS .....	ix
LIST OF TABLES .....	xii
LIST OF FIGURES .....	xiii
LIST OF APPENDICES .....	xiv
CHAPTER 1 .....	1
1.1 INTRODUCTION .....	1
1.2 REVIEW OF LITERATURE .....	3
1.2.1 Women and Middle-Age.....	3
1.2.2 Self-Esteem .....	6
1.2.3 The Exercise and Self-Esteem Model.....	8
1.2.4 Literature Review of EXSEM and PSPP .....	14
1.2.5 Yoga.....	18
1.2.6 Mindfulness.....	24
1.3 STATEMENT OF THE PURPOSE AND HYPOTHESES .....	27
1.3.1 Primary Hypothesis.....	27
1.3.2 Secondary Hypothesis.....	27
CHAPTER 2 .....	28
2.1 METHODS .....	28

2.1.1 Conceptual Models .....	28
2.1.2 Measures .....	31
2.1.2.1 Demographics Information Sheet .....	31
2.1.2.2 Eastern Philosophy Familiarity Question .....	31
2.1.2.3 Godin Leisure-Time Exercise Questionnaire (LTEQ).....	32
2.1.2.4 Rosenberg Self-Esteem Scale (RSES) .....	33
2.1.2.5 Physical Self-Perception Profile (PSPP).....	34
2.1.2.6 Body-Esteem Scale (BES) .....	36
2.1.2.7 Body Image Visual Analog Scale (BIVAS) .....	37
2.1.2.8 Yoga Self-Efficacy (YSES) .....	38
2.1.2.9 Kentucky Inventory of Mindfulness Skills (KIMS) .....	39
2.1.3 Procedure .....	41
2.1.4 Participants.....	44
2.1.5 Data Analysis .....	50
CHAPTER 3 .....	52
3.1 RESULTS .....	52
3.1.1 Descriptive Statistics and Scale Reliabilities .....	52
3.1.2 Primary Hypothesis.....	62
3.1.2.1 Model 1 (GSE, PSW, BES, BIVAS, YSET) .....	62
3.1.2.2 Model 2 (GSE, PSPP Subscales, BES, BIVAS, YSET).....	62
3.1.2.3 Model 3 (YSES Subscales).....	62
3.1.3 Secondary Hypothesis (Model 4: KIMS) .....	71
3.2 DISCUSSION .....	73
3.2.1 Primary Hypothesis.....	73

3.2.2	Secondary Hypothesis.....	85
CHAPTER 4	.....	89
4.1	SUMMARY AND CONCLUSIONS .....	80
4.2	LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH ..	91
4.2.1	SELF-REFLECTION.....	98
REFERENCES	.....	100
APPENDICES	.....	112

## LIST OF TABLES

Table 3.1 Descriptive Statistics for LTEQ1, LTEQ2, Age, Height, and Weight.....	54
Table 3.2 Descriptive Statistics for PSW, PSPPSP, PSPPCO, PSPPBO, PSPPST, BESSA, BESWC, BESPC, and BIVAS.....	55
Table 3.3 Descriptive Statistics for YSEFB, YSEBB, YSESP, YSETW, YSESS, and YSET.....	56
Table 3.4 Descriptive Statistics for KIMSOB, KIMSDE, KIMSAW, KIMSAC.....	57
Table 3.5 Pearson Correlations for LTEQ1, LTEQ2, Age, Height, and Weight.....	58
Table 3.6 Pearson Correlations for PSW, PSPPSP, PSPPCO, PSPPBO, PSPPST, BESSA, BESWC, BESPC, and BIVAS.....	59
Table 3.7 Pearson Correlations for YSEFB, YSEBB, YSESP, YSETW, YSESS, YSET .....	60
Table 3.8 Pearson Correlations for KIMSOB, KIMSDE, KIMSAW, KIMSAC.....	61

## LIST OF FIGURES

Figure 1.1 The Exercise and Self-Esteem Model for intervention studies.....	9
Figure 1.2 Adaptation of the Exercise and Self-Esteem Model for use with the Physical Self-Perception Profile.....	13
Figure 1.3 Four models tested using the doubly multivariate analysis of variance.....	29
Figure 1.4 Visual Time Line of Data Collection Procedures.....	46
Figure 1.5 Group by time interaction on the PSW subscale of the PSPP.....	63
Figure 1.6 Group by time interaction on the BIVAS.....	64
Figure 1.7 Group by time interaction on the YSET.....	65
Figure 1.8 Group by time interaction on the PSPPCO subscale of the PSPP.....	66
Figure 1.9 Group by time interaction on the PSPPST subscale of the PSPP.....	67
Figure 1.10 Group by time interaction on the YSETFB subscale of the YSES.....	68
Figure 1.11 Group by time interaction on the YSETW subscale of the YSES.....	69
Figure 1.12 Group by time interaction on the YSESS subscale of the YSES.....	70
Figure 1.13 Group by time interaction on the KIMSOB subscale of the KIMS.....	72

## LIST OF APPENDICES

APPENDIX A ETHICS APPROVAL.....	113
APPENDIX B PARTICIPANT RECRUITMENT POSTER.....	116
APPENDIX C CONSENT FORM .....	118
APPENDIX D PHYSICAL ACTIVITY READINESS QUESTIONNAIRE (PAR-Q) .....	122
APPENDIX E MEAN COMPARISONS BETWEEN EXCLUDED YOGA SAMPLE AND FINAL SAMPLE.....	124
APPENDIX F DEMOGRAPHIC INFORMATION SHEET .....	129
APPENDIX G EASTERN PHILOSOPHIES OPEN-ENDED QUESTION.....	131
APPENDIX H MEAN COMPARISONS BETWEEN PARTICIPANTS WITH AND WITHOUT EASTERN PHILOSOPHY EXPERIENCE.....	133
APPENDIX I GODIN LEISURE TIME-EXERCISE QUESTIONNAIRE (LTEQ)...	136
APPENDIX J ROSENBERG SELF-ESTEEM SCALE (RES) .....	138
APPENDIX K PHYSICAL SELF-PERCEPTION PROFILE (PSPP).....	140
APPENDIX L BODY ESTEEM SCALE (BES).....	145
APPENDIX M BODY IMAGE VISUAL ANALOG SCALE (BIVAS).....	150
APPENDIX N YOGA SELF-EFFIACY SCALE (YSES).....	152
APPENDIX O KENTUCKY INVENTORY OF MINDFULNESS SKILLS (KIMS) 159	
APPENDIX P YOGA GROUP PRELIMINARY INFORMATION LETTER .....	164
APPENDIX Q CONTROL GROUP PRELIMINARY INFORMATION LETTER ...	166
APPENDIX R BIWEEKLY LOG FORM.....	168

APPENDIX S HOME PRACTICE FORM ..... 170



## **CHAPTER 1**

### **1.1 INTRODUCTION**

During the development of my initial research ideas, I was practicing yoga regularly along with commencing a teacher-training program in Hatha yoga at a local studio. I knew from my own experience that the practice of yoga is a journey of self-development both physically and mentally. In attending the studio, it was evident that the majority of the membership was middle-aged women. I became curious as to why so many women in this age group were drawn to yoga, and what benefits especially psychologically or mentally did yoga provide them with. At this time, several articles in popular press were published, notably in the *Yoga Journal*, citing the benefits of yoga practice for women in terms of improving body satisfaction, body acceptance, and self-esteem. From my experience in learning about yoga, in observing a large number of women in their middle-ages practicing yoga, and through publications in popular press, I wondered if previous research had supported or refuted these claims about the physical self.

In reviewing the literature on the physical self, numerous studies exist to measure self-esteem changes through the use of exercise interventions. One of the most commonly used models of self-esteem for the physical self seemed well suited to yoga with its emphasis on physical acceptance. The Exercise and Self-Esteem Model (EXSEM) developed by Sonstroem and Morgan (1989) has been used extensively to

measure self-esteem, physical competence, physical acceptance, and self-efficacy following exercise interventions. Furthermore, no study to my knowledge had been conducted looking at the EXSEM with yoga as the form of exercise. Hatha yoga seemed like an ideal fit within the EXSEM due to its emphasis on acceptance of the body and also the ability to provide potential changes in physical competence such as physical condition and strength. In particular, studying the effects of Hatha yoga practice for middle-aged women may prove especially beneficial since decreases in self-esteem and other aspects of the body are often common occurrences at this point in the lifespan (McQuaide, 1998; Saucier, 2004). As well, in Western culture issues of anxiety, depression, and low self-esteem can manifest for women as they age and can be influenced by societal pressures to remain young and beautiful (Chrisler & Ghiz, 1993; McQuaide, 1998; Saucier, 2004). Fox (2000b) provided optimism for middle-aged women as this may represent a time in the lifespan where positive improvements in self-esteem are possible. Thus, ongoing Hatha yoga practice may be a method to assist women to cope with the changing body and its deviation from society's ideal body by providing a method of acceptance.

The proposed study tested whether short-term participation in Hatha yoga of 12-weeks in duration, has the capability to improve self-esteem and, more specifically, physical competence, physical acceptance, and self-efficacy in a middle-aged female sample. As well, the study afforded an opportunity to gain insight into the potential role that Hatha yoga plays in the development of mindfulness. To test these research hypotheses, four statistical models were utilized to handle the large number of study variables. The first model looked at higher order domains of the EXSEM, global self-esteem, physical self-worth, physical acceptance, and total yoga self-efficacy. Model 2

was identical to model 1 with the exception of looking at the lower order items of the PSPP to measure physical competence. Models 3 and 4 looked at subdomains of yoga self-efficacy and mindfulness respectively to observe what changes might occur.

The study was expected to contribute to the body of literature examining self-esteem and the psychological health of middle-aged women. If the practice of yoga can improve the self-esteem and mindfulness of participants, this may be an activity in which middle-aged females should be encouraged to participate to assist with coping with the aging body as it deviates from the ideal image of beauty.

## **1.2 REVIEW OF LITERATURE**

### **1.2.1 Women and Middle-Age**

Although there is no current consensus on when exactly an individual enters and leaves middle-age, it can be characterized by a time that requires juggling a variety of roles along with an attempt to find life balance (Lachman, 2001; McQuaide, 1998). Normative events during this period of the lifespan may include having established a family, having a peak in career direction, and having responsibilities for children and parents and occasionally community (Staudinger & Bluck, 2001). The period of middle-age can be marked by a series of both gains and losses that differ across individuals. According to the 1996 U.S. Census, 37 million women are between the ages of 40 and 64 years, marking the period in the lifespan called middle-age (McQuaide, 1998). Similarly, the 1996 United States Census Bureau also defines middle-age to be between the ages of 40 to 64 years, and encompasses the fastest growing portion of the Canadian population (of 45 to 64; McQuaide, 1998; Statistics Canada, 2001). In Canada, the

number of adults aged 45 to 64 years has increased by 36% from 1991 to 2001 to 7.3 million; over the subsequent decade this number is expected to reach 9.5 million (Statistics Canada, 2001). However, it has been noted that an even broader period around these age ranges can still mark middle-age; thus, people from the ages of 30 to 75 may still qualify as being middle-aged (Lachman, 2001). It is interesting to note that in 2000 the National Council on Aging found one-third of Americans in their 70s consider themselves to be middle-aged (Lachman, 2001). This noticeable increase in what is considered midlife comes in part from increased life expectancy, entry of the baby boomer generation into middle-age, and the benefits of modern society such as medicine, nutrition, and lifestyle (Statistics Canada, 2001; Staudinger & Bluck, 2001).

In western culture, which celebrates and encourages youthfulness, issues ranging from low self-esteem to anxiety and depression can occur for women as they age (Chrisler & Ghiz, 1993; McQuaide, 1998; Saucier, 2004). In a recent study examining well-being in this population, women scoring lowest on well-being tended to be less self-accepting and possess lower levels of self-esteem (McQuaide, 1998). For many middle-aged women, the onset of menopause has also begun and can be connected to self-esteem change. In a study of women under the age of 65, it was found that those possessing a negative attitude towards menopause suffered greater symptoms, whereas those women who viewed menopause in a more positive light had both higher self-esteem and fewer menopausal symptoms (Bloch, 2001). For those women entering middle-age, the pressures of western society could well indeed impact self-esteem negatively.

There is evidence to suggest that late middle-adulthood represents a period of vulnerability to decreased sense of self and self-esteem in women who have placed great

emphasis on appearance and who have based their identity upon their sexual and physical attractiveness (Pearlman, 1993). The “baby boomers”, who are now reaching middle-age, have been part of a culture in which beauty and youth have been heavily valued (Whitbourne & Skultety, 2002). Middle-age *can* be a time during which individuals are more accepting of the variations in body shapes and sizes; and for women who exercise, a positive relationship has been found between body satisfaction and age and presumably to the experience of greater self-esteem (Paxton & Phytian, 1999; Wilcox, 1997). However, even when small increases in self-esteem were observed for women with increasing age, there were significantly higher levels of appearance orientation, feeling fat, body disparagement, salience of weight/shape, and health orientation in middle-age compared to male counterparts of the same age (Paxton & Phytian, 1999). Similarly, it has been noted that women generally show greater weight-related concerns (i.e., physical appearance, eating, and body weight) across the life span compared to men (Pliner, Chaiken, & Flett, 1990). As well, middle-aged women who express distress can be characterized as being disappointed with their accomplishments, self-denigrating, ashamed of their body, demoralized by their appearance, and lacking the belief they are as important as others and deserve the life they wish to have (McQuaide, 1998). This notion of becoming aware of the acceleration of aging and the stigmatization that goes hand in hand with being an aging female has recently been coined “late mid-life astonishment,” and typically occurs between the ages of 50 and 60 (Pearlman, 1993). Within this period of time comes the recognition that old age is fast approaching, which may bring a loss in health and sexuality as well as the social interest of younger people (Pearlman, 1993). Thus, the aging process itself, which

tends to become first noticeable in middle-age, can affect the way in which the body is viewed.

While positive change does appear to be occurring for some women during middle-age, the influence of cultural pressures and stereotypes continue to affect women's thoughts and feelings about aging and their bodies. Thus, there appears a need to understand how self-esteem change occurs during midlife and how to lessen these losses for women who rely heavily on appearance and attractiveness in terms of their sense of self.

### **1.2.2 Self-Esteem**

There has been a large influx of research and interest over the past 25 years with regards to the self (Leary, 1995). The term self-concept relates to the beliefs an individual holds of him or herself in terms of personal characteristics, social relationships, possessions, roles played, conscious beliefs, personal history, and the physical body (Leary, 1995). Self-concept can also be viewed as the part of the personality of which an individual is aware, and also which initiates and directs action and behaviour (Sahajpal & Ralte, 2000). It can also be representative of the cognitive dimension of personality development that entails an ongoing process influenced by the integration of environmental information into pre-existing knowledge structures (Lachman & Bertrand, 2001). Thus, throughout a lifetime an individual's self-concept is continuously changing as new experiences arise that must be evaluated in order to decide whether new information will be rejected or accepted (Lachman & Bertrand, 2001; Stokes & Frederick-Recascino, 2003). With this understanding of self-concept, it

is possible for middle-aged women to feel either negatively or positively about the self, which could, in turn, affect psychological aspects of the self such as self-esteem.

The differentiation between the evaluative component of self-esteem and that of the self-concept representing self-descriptions and affective, behavioural, and cognitive aspects of the self is not particularly clear (Bryne, 1996; Sorensen, Anderssen, Hjermer, Holme, & Ursin, 1997). Whereas the self-concept of an individual entails beliefs or thoughts about him or herself, the concept of self-esteem relates to the evaluation of those same beliefs and thoughts (Leary, 1995). In other words, self-esteem can be viewed as the evaluative component of overall self-concept and tends to be a stable trait consisting of a person's sense of both self-acceptance and competence (Ryan & Brown, 2003; Sonstroem, 1998b). For this reason, both the terms self-esteem and self-concept have tended to be used interchangeably as specific clarification has not yet prevailed (Bryne, 1996); therefore, the terms self-concept and self-esteem will be considered interchangeable, with self-esteem being utilized hereafter.

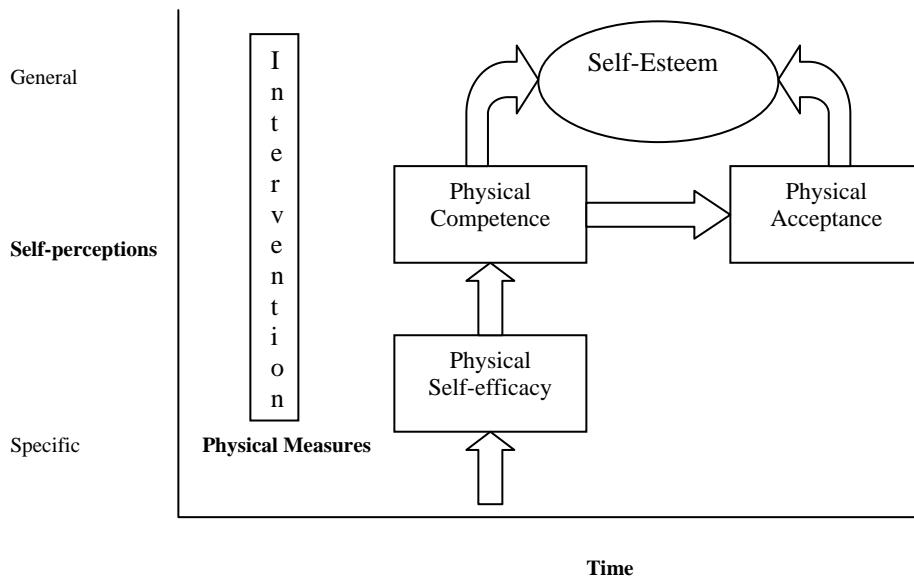
A major advancement with respect to self-esteem research has been the widespread acceptance of viewing self-esteem as being multidimensionally constructed. Feeding into each domain of self-esteem are more specific and less stable subdomains (Fox & Corbin, 1989; Shaw, Ebbeck, & Snow, 2000). It has been theorized and agreed upon by researchers that self-concept represents a complex system of multidimensional constructs that capture individuals' competencies, roles, attributes, and characteristics (Fox, 2000a). These constructs represent several sub-selves like the social self, the emotional self, the working self, the family self, and with respect to exercise, the physical self (Fox, 2000a). To understand how these constructs operate and work together, early models of the self were developed hierarchically and included both

academic and non-academic self-concept domains (Fox, 1990). Not surprisingly, models of self-esteem presently have often been designed within a hierarchical framework (Fox & Corbin, 1989). In 1989, researchers Sonstroem and Morgan introduced a three-level intervention model to explore how exercise might influence dimensions of the physical self (e.g., physical competence, physical acceptance, and physical self-efficacy) and overall self-esteem (Fox, 2000a).

### **1.2.3 The Exercise and Self-Esteem Model**

Of the many models that conceptualize self-esteem and the physical self, the Exercise and Self-Esteem Model (EXSEM) developed by Sonstroem (1984) and Sonstroem and Morgan (1989) focuses on the realm of the physical self (see Figure 1.1). The model was developed to explain how the effects of physical training may impact general self-esteem. The model is both multidimensional and hierarchical in nature and depicts self-esteem as a compilation of self-perceptions (Sonstroem, Harlow, & Josephs, 1994; Sonstroem & Morgan, 1989). Self-esteem, which is generally thought to be stable, is at the apex of the model. Physical competence and physical acceptance are lower in the hierarchy and are considered the fundamental elements of favourable self-esteem (Sonstroem, 1998a). At the lowest level of the model is physical self-efficacy, which can be viewed as the confidence one possesses about being able to successfully accomplish a task; change at the level of self-efficacies are thought to influence physical competence positioned as the next highest domain in the model.





**Figure 1.1:** The Exercise and Self-Esteem Model for intervention studies (Fox, 2000a)

The general principle governing the EXSEM is that when individuals engage in exercise they will develop a higher degree of physical self-worth and competence, which would then lead to increased global self-esteem (Alfermann & Stoll, 1997). It is believed that personal competence, composed of feeling capable of mastery and control of oneself and the external environment, is an essential domain of self-esteem in the physical realm (Sonstroem & Morgan, 1989). Physical competence can also be defined as the general self-evaluation of having physical fitness and has been shown to relate to self-esteem (Sonstroem & Morgan, 1989). Within the EXSEM it is also important to be cognizant that physical competence represents a global estimate of the physical self at the highest level in the physical domain and is thus differentiated from lower self-perceptions in the model (i.e., self-efficacy) (McAuley & Mihalko, 1998).

Within the model, it is also postulated that not only physical competence can be affected through exercising, but also physical acceptance, which is thought to be equally instrumental in influencing global self-esteem (Sonstroem & Morgan, 1989). Physical acceptance has been defined by the degree to which an individual accepts both their strengths and weaknesses and recognizes that one cannot excel at everything (Fox, 2000b). It was suggested by Sonstroem and Morgan (1989) that the act of exercising has a component of self-awareness allowing the body to experience and reflect upon changes in fitness, which may in turn lead to an increase in both acceptance and appreciation of the body (Sonstroem & Morgan, 1989). The domain of physical acceptance has been placed at the same level of generality as physical competence within the model to allow comparisons of the influence of these dimensions on overall self-esteem and to test whether a competence dimension is the best explanation of enhancing self-esteem through exercise (Sonstroem & Morgan, 1989).

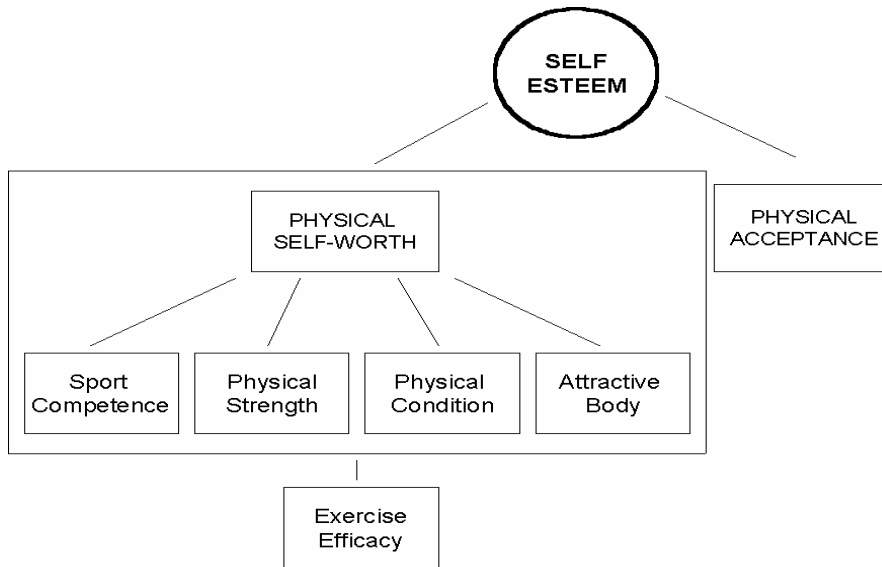
At the base of this hierarchical model, below physical competence, is the subdomain of self-efficacy. Self-efficacies are defined relative to physical tasks and represent the lowest generality level of the competence dimension (Sonstroem & Morgan, 1989). Self-efficacies can be thought of as the level and strength of a belief that an individual will be successful at performing a given task (Sonstroem & Morgan, 1989). What makes the construct of self-efficacy unique, is its focus on predictions about success on a task that are extremely situation specific and its lower level in hierarchical classifications (McAuley & Mihalko, 1998). According to the work of Bandura, self-efficacy expectations influence where, what, how much effort we will exert, and the degree to which we will persist with an activity (Sonstroem & Morgan, 1989). In the EXSEM, self-efficacies represent competence judgements and are considered the most accurate and readily influenced by the environment of all the dimensions (Sonstroem & Morgan, 1989).

During the course of a long-term exercise intervention, which was originally suggested to last between 15 and 20 weeks in duration to match ACSM guidelines, the model purports that changes in self-efficacies with regards to exercise will change and influence change in the subdomain of physical competence (Sonstroem & Morgan, 1989). However, since the original study, exercise interventions have typically been found to be effective with a minimum duration of 10 to 12 weeks and a recommended program length of 12 weeks with 6 months of continued contact with participants (Alfermann & Stoll, 1997; Fox, 2000a). It is also suggested within the model that changes in less stable domains of physical competence and physical acceptance would in turn lead to change at the general level of global self-esteem. Thus, the model makes a

case that it is possible to alter self-perceptions of the physical self through the participation in exercise.

The original self-esteem model was revised by Sonstroem, Harlow, and Josephs (1994) with the inclusion of a previously developed multidimensional model of physical competence (see Figure 1.2). In place of the unidimensional competence domain, the development of the Physical Self-Perception Profile (PSPP; Fox & Corbin, 1989) helped to assess physical competence in a more effective manner. The PSPP represents a multidimensional model to understand the complexities that occur within physical competence in individuals. The model consists of perceived general self-worth (PSW), sports competence (Sport), attractive body (Body), physical strength (Strength), and physical condition (Condition) (Fox & Corbin, 1989).

While some researchers still hold to the concept of a top-down or bottom-up hierarchical structure within the PSPP, more recent research suggests that the model might not operate in a hierarchical manner. In their work with a group of adolescent girls over a one-year measurement period little support was found for either a top-down or bottom-up effects model; instead a horizontal-effects-only model fit the data (Kowalski, Crocker, Kowalski, Chad & Humbert, 2003). Within this type of model, the various self-concept factors at Time 2 are found to primarily be a function of Time 1 measurement or in other words, the causal influence of self-concept from the base of the hierarchy to the apex or vice versa were found to be weak (Kowalski et al., 2003). This finding provides evidence against general self-esteem as a more stable construct in relation to the situation-specific components of the model; however, they do indicate that the potential for top-down or bottom-up effects may still be possible with an intervention designed to cause flow in either direction (Kowalski et al., 2003).



**Figure 1.2:** Adaptation of the Exercise and Self-Esteem Model for use with the Physical Self-Perception Profile (Sonstroem, Harlow, & Josephs, 1994)

#### **1.2.4 Literature Review of EXSEM and PSPP**

Several research studies in recent years have used the EXSEM to examine changes to global self-esteem within exercise and sport settings. The model itself was validated for use with an adult population and has since been utilized with many populations. A consistent finding is that self-esteem can be improved via exercise interventions (Marsh, Richards, & Barnes, 1986; McAuley, Mihalko, & Bane, 1997; Shaw et al., 2000).

For example, the EXSEM and PSPP have been used extensively for research examining exercise with a variety of populations. Using the EXSEM with a group of breast cancer survivors with a mean age of 51 years, it was found that women performing aerobic exercise at strenuous levels more often had a stronger sense of overall physical competence, and that 46% of the variance in global self-esteem was due to physical acceptance, physical competence, and exercise participation (Baldwin & Courneya, 1997). The PSPP has been tested for structure and validity to be used with middle-aged and older adults; an overlap between physical self-worth and attractive body subscales were observed, but continued use of the scale was encouraged (Sonstroem, Speliotis, & Fava, 1994). In a study with a college-aged population, a significant correlation was found between physical self-worth and between attractive body, physical condition, and physical self-worth to life adjustment (Sonstroem & Potts, 1996). Conversely, studies examining a 10-week exercise program for undergraduate students found mixed results. In a first study examining aerobic and weight training activity, perceived importance of physical strength, condition, and fitness were seen to improve, whereas in the second study, which examined weight training and a control, no significant changes in body image, global self-esteem, or physical self-perceptions were

observed in strength and physical self-efficacy (Caruso & Gill, 1992). Two additional studies conducted by Asci, Kin, and Kosar (1998) focussed on the utilization of the PSPP in dance and aerobic exercise settings. The first study examined the effects of an 8-week aerobic dance and step aerobic program with female undergraduate students. There was no change in mean body image and physical self-perception scores between groups. A second study looking at a 10-week program of step dance in male and female undergraduate students found changes in physical self-perceptions between experimental and control groups, but that male and females did not develop differently with regards to the self-perceptions measured (Asci, 2002).

Recently, research examining middle-aged adults and exercise interventions has found favourable change in a variety of physical self-perceptions (Fox, 2000b). Over a 6-month home-based aerobic exercise training program with healthy sedentary middle-aged adults, changes were seen for perceived fitness and satisfaction with weight, shape, and appearance (King, Taylor, Haskell, & DeBusk, 1989). Other changes have been observed with middle-aged women in terms of body cathexis following a 12-week resistance training program. Changes were greater for the women who participated in weight training as opposed to walking, suggesting that the active participation and hard work found in the weight training group were essential for the observed improvements in fitness and body image (Tucker & Mortell, 1993). In tracking participation in a variety of endurance exercise intensity training over a one year period with middle-aged adults, reduction in stress and anxiety levels were noted and it was found that vigorous exercise and home-based exercise were both useful in producing psychological change (King, Taylor, & Haskell, 1993).

Moreover, other research has used more unconventional forms of exercise to examine changes in the physical self with middle-aged adults. Alfermann and Stoll (1997) used the 1989 Sonstroem and Morgan self-esteem model to examine self-esteem of middle-aged adults participating in aerobic and relaxation training activities. Following biweekly one hour training sessions over a six-month period, self-esteem improved for both groups, whereas only the exercise group changed with respect to physical self-concept (Alfermann & Stoll, 1997). A similar research activity found that following a 16-week exercise program with sedentary middle-aged adults women in a mindful exercise group performing a Tai Chi type activity showed improvements in mood including reduced tension, anger, confusion, and depression, whereas women in the moderate walking group had improved body acceptance (Brown, Wang, Ward, Ebbeling, Fortlage, Puleo, Benson, & Rippe, 1995). These results indicate that alternative activities such as relaxation training and Tai Chi appear to convey benefits similar to more traditional forms of exercise with middle-aged adults.

Other studies have noted changes in self-efficacy or individual beliefs about physical capabilities with respect to fitness and exercise. To examine the effects of self-efficacy perceptions in sedentary middle-aged adults, a study was conducted looking at an acute and a 20-week structured exercise program. Results indicated that both males' and females' exercise efficacy improved following acute exercise, and that women with initially low self-perceptions experienced large increases in exercise efficacy to equal or surpass those of the males (McAuley, Courneya, & Lettunich, 1991). McAuley, Bane, and Mihalko (1995) tested the findings of McAuley, Courneya, and Lettunich (1991) by examining middle-aged adults over a 20-week exercise program. They found that changes in perceptions of personal efficacy predicted decreased levels of social physique



anxiety even when controlling for gender, and reductions in body weight, circumference, and fat.

These previous studies help support that middle-age may be a time in the lifespan where self-perceptions undergo positive improvement by the use of exercise interventions (Fox, 2000b). Fox highlighted that despite the symptoms of aging becoming more prevalent, a decrease in activity level, and becoming heavier, the potential for changes to lifestyle still seem plausible for those in middle-age. Ironically, while it is known that middle-aged and older women are less likely to participate in regular physical activity, which could likely reduce the risk for disease, interventions in the public health sector have been neglected (Marcus, Dubbert, King, & Pinto, 1995). Thus, some middle-aged adults may be willing to explore methods allowing them to explore this sense of self-understanding. Moreover, in terms of well-being that can be viewed as consisting of positive relationships, having a purpose in life, self-acceptance, personal growth, environmental mastery, and autonomy (Ryff, 1995), adults are more likely to either maintain or increase well-being in terms of the above factors excluding having a purpose in life.

Thus, the use of exercise with a middle-aged population has shown itself to be a valuable medium for the promotion of change in various physical self-perceptions; however, additional research is warranted given this population is growing larger, with an estimation by the 1993 U.S. Department of Labor that 2 in 5 women in the workforce in 2005 will be middle-aged (McQuaide, 1998). It has also been a widely under-researched group due to difficulty for these individuals to find time to donate to research (Lachman, 2001).

It should also be highlighted that exercise interventions currently used within the area of the physical self have focussed heavily on the physical competence domain ever since the validation of the initial model of Exercise and Self-Esteem by Sonstroem and Morgan in 1989, despite the inclusion of physical acceptance in that model. It seems there is a decisive need to evaluate the under researched component of the EXSEM, physical acceptance. A major limitation of many of the interventions and studies that have looked at self-esteem is their heavy focus on competence and skill. Notably, Sonstroem and Morgan (1989) clearly emphasized that competence and acceptance are both of importance to self-esteem change within the EXSEM. Therefore, activities examined using the EXSEM should address both subdomains, if we hope to see optimal changes in self-esteem for participants in exercise interventions. Furthermore, it has recently been suggested that there is a need to better understand not only how the self deals with changes in appearance of the body, but also to help to identify those aspects of personality and self that can serve as the focus for interventions for enhancing functioning during midlife (Lachman & Bertrand, 2001).

It may be valuable to study middle-aged women within an exercise intervention focussed on the promotion of acceptance to improve health and well-being. Addressing the issue of self-esteem appears particularly relevant to middle-aged and older women in order to help them to feel valued as human beings and to recognize that productivity, not age nor beauty, should determine their sense of self-worth (Saucier, 2004).

### **1.2.5 Yoga**

One activity that may have great potential to address both the physical competence and physical acceptance subdomains of the EXSEM is Hatha yoga. This

prospective gains credibility when the philosophy and nature of this long standing activity are considered.

Hatha yoga, meaning to yoke, join together, or more commonly translated as a union of the mind, body, and soul along with the union of the self to the divine, is an ancient Indian life science philosophy that in recent years has grown both in popularity and practice in the western world (Ross, 2001; Taylor, 2003). This 5,000 year-old holistic practice uses body postures (asana), meditation, breathing, and mental focus to develop relaxation; a balance of physical, mental, and spiritual energies; and improved health or wholeness by rediscovering this yoked experience of mind, body, and spirit (Engelman, Clance, & Imes, 1982; Jacobs, Mehling, Goldberg, Eppel, Acree, Lasater, & Miasowski, 2004; Sahajpal & Ralte, 2000; Taylor, 2003). While yoga represents a philosophy of life and is practiced by people across the globe, it is important to note that it does not constitute a form of religion, but instead has been passed down for thousands of years from teachers to pupils without the support of any particular institution (Fishman, 2003; Ross, 2001).

The practice of yoga first began as a science of quieting the mind, and every aspect of yoga seeks to develop an unmodified consciousness and unattached evaluation of situations encountered in life (Fishman, 2003). To help to explain and achieve these states of consciousness, one needs to be familiar with the *Yoga Sutras of Pantanjali*, a classic Indian text outlining a coherent and systematic description of yoga according to an eight-fold path involving: restraints (yamas), observances (niyamas), physical postures (asana), breathing control (pranayama), withdrawal of sense organs (pratyahara), contemplation (dharana), meditation (dhyana), and attainment of super consciousness (samadhi) (Jacobs et al., 2004; Ross, 2001; Sahajpal & Ralte, 2000;

Taylor, 2003). These eight paths of yoga are thought to result in a well-rounded and healthy individual (Taylor, 2003).

In the United States, the prevalence of yoga practice has steadily increased in recent years, with Hatha yoga the most frequently used form (Saper, Eiseberg, Davis, Culpepper, & Phillips, 2004; Taylor, 2003). It has been described as a fast emerging discipline allowing for the mind and body to become harmonized (Harinath, Malhotra, Pal, Prasad, Kumar, Kain, Rai, & Sawhney, 2004). In 2003, the Yoga Research and Education Council Report on Yoga Statistics reported that over 15 million Americans practice yoga more than 3 times per week, and that more than 40% of these individuals study the most widely recognized approach called the Iyengar style of Hatha yoga based on the teachings of B.K.S. Iyengar (Jacobs et al., 2004; Taylor, 2003). Another national survey in the United States looked at the prevalence of mind-body therapies. It was found that meditation, imagery techniques, and yoga were employed most often for lifestyle use (Wolsko, Eisenberg, Davis, & Phillips, 2004). The mainstream acceptance of yoga into western culture can be seen in part as a result of a relatively recent focus on systems of integrated health and the physiological benefits of meditation, as well as Indian research beginning to adopt western research methods and standards of rigour and control into studies (Taylor, 2003). Yoga's growing popularity is expressed in today's fashions as well in various media, such as television and advertisement, helping to commercialize and raise awareness of this ancient practice (Ross, 2001; Taylor, 2003). For these reasons, it appears that many North Americans are seeking participation in various forms of yoga.

Recent research examining the prevalence of alternative medicine in the United States supports that a large number of middle-aged adults are participating in yoga. In

particular, it was found that users of yoga and related therapies are typically between the ages of 40-49, are highly educated, are single, use self-prayer in the past year, and utilize forms of alternative or complementary medicine beyond mind-body therapies (Wolsko, et al., 2004). Therefore, these statistics reveal that the practice of mind-body therapies, and most predominantly yoga, are prevalent for middle-aged adults across the United States. Due to this popular increase of mind-body practices and non-conventional therapies, research has been conducted looking at the potential benefits of such practices. Many studies examining Hatha yoga practice have noted favourable change in many physiological and psychological variables across various populations.

Claims about improved health have been made by yogis for centuries, but it is only recently that western research has been conducted and has supported the notion that regular yoga practice can produce significant benefits to health (Cameron, 2002). An overview of clinical outcomes has outlined several positive benefits associated with yoga practice including: decreased blood pressure, heart rate, sympathetic stimulation, carpal tunnel syndrome symptoms, and muscle stiffness; increased parasympathetic tone, range of motion, body strength/stamina/flexibility, and balance; better oxygenation and circulation of the blood; enhanced mental alertness, concentration, focus, and memory; and improved efficiency of breathing (Ross, 2001). It has also been found that as the power of the mind becomes both harnessed and focussed through the participation in yoga practice, physical outcomes such as flexibility, posture, strength, balance, and physical health can be improved (Taylor, 2003).

While the physiological benefits of yoga have been established through research, yoga has also been supported as a means to alter perceptions of the body. For instance, female college students participating in a short duration (3-week) progressive relaxation

and Hatha yoga program experienced increases in self-esteem and decreased perceptions of physical self-efficacy in addition to the physiological changes of reduced blood pressure and heart rate (Cusumano & Robinson, 1992). Previous research utilizing longer yoga intervention periods have noted significant increases in self-esteem and body image (Arpita, 1983). For those engaged in a one-month Induced Yogic Relaxation Training (IYRT) program, changes were observed following the program in terms of self-esteem and stress reduction (Sahajapal & Rinpari, 2000). Likewise, following an intervention period of ten weeks, body-cathexis and self-cathexis scores improved for the yoga group (*M* age of 25 years), whereas only self-cathexis scores changed in the therapy group (*M* age of 38 years), suggesting yoga to be superior as a therapeutic technique for body concept changes (Engleman et al., 1982). Similar findings have even been shown in children identified as poorly coordinated and disinterested in physical activity, whose reported and demonstrated body satisfaction increased after a four-week yoga and awareness training period (Clance, Mitchell, & Engelman, 1980). While, the body of literature on body change is rather limited, results tend to support yoga as a method for improving self-esteem.

Although some research has looked at how the practice of yoga may be beneficial to changes in measures of the physical self, such as body-cathexis and self-esteem, the use of the EXSEM does not appear to have been used with yoga. This model emphasizes equally the subdomains of physical competence and physical acceptance, both of which are relevant areas to the underlying mind-body philosophy associated with Hatha yoga. Additionally, much of the research conducted examining yoga, and for that matter the general short and long-term benefits of exercise interventions, have varied widely in scientific rigor with few randomized, controlled

trials, poor methodological designs, and small sample sizes (Marcus et al., 1995). Furthermore, these issues have not been adequately explored with a middle-aged population, and more specifically with emphasis on females.

Lastly, yoga has been researched as a method to develop and understand awareness and self-actualization, which are compatible themes within the philosophy of yoga. For individuals enrolled in a three-month Hatha yoga training program, significant differences were found between yoga and control groups in body awareness (Rani & Rao, 1994); however, it should be noted that pre-test measurement occurred at different times for the groups, making accurate conclusions about the yoga training difficult. Another study examining self-actualization in adults following a four-month yoga and yogic education program found improvements in time competence, inner directedness, and in the self-regard, self-actualizing, and self-acceptance areas of the self-actualization scale of the Personal Orientation Inventory (Malathi, Damodaran, Shah, Patil, & Marathe, 1999). Other research examining the impact of yoga practice at the Kripalu Yoga Ashram on change in self-actualization processes has noted that Hatha yoga and meditation provide students with an opportunity to focus on somatic sensations by learning to slow down symbolic processing of the mind (Wilson, 1988). These same changes could potentially allow middle-aged women to understand their physical self in a new manner; thus, creating the potential for increased awareness of the body.

In a study seeking to combine aerobics and Hatha yoga to create an empowering experience for adult women, yoga classes were designed to encourage students to become aware of their bodies by using yoga as a emotional, physical, and mental relaxation technique (Haravon, 1995). Qualitative analysis of the participants' journal

entries, reported a consensus that the yoga classes represented an empowering and positive experience.

The study of self-actualization and awareness through yoga practice marks another area that has gone relatively under-researched, and may help to better explain the change in physiological and psychological measures demonstrated in the literature. The concept of mindfulness represents this notion of self-actualization and awareness, which is made possible through the dedication to yoga practice.

### **1.2.6 Mindfulness**

Mindfulness, similar to Hatha yoga, originates from Eastern meditation traditions whereby the practitioner learns to direct attention in a non-judgemental manner (Kabat-Zinn, 2000, as cited in Baer et al., 2004). Mindfulness can be viewed as possessing an open, non-judgemental, and balanced sense of awareness allowing clear seeing and acceptance of emotional and mental phenomena as they occur (Brown & Ryan, 2003; Neff, 2003). Within the most recent measure of mindfulness, the Kentucky Inventory of Mindfulness Skills, the components of observing, describing, acting with awareness, and accepting or allowing without judgement, are deemed representative of this construct based on current literature in the area (Baer et al., 2004). Developing these mindfulness skills has long been believed to promote greater well-being.

Recently, psychological research has begun to take an interest in mindfulness for its potential implication for health and well-being (Brown & Ryan, 2003). It has been speculated that cultivating mindfulness may help people to detach from habits, unhealthy behaviour patterns, and automatic thought, which might in turn foster self-endorsed behavioural regulation associated with enhanced well-being (Ryan & Deci,



2000). In more simple terms, developing mindfulness through the addition of vividness and clarity to experience could appear as happiness and well-being change (Brown & Ryan, 2003). As well, improvements in self-observation skills potentially leading to increased recognition of sensations, emotional states, and cognitions, along with the improved ability to respond to these phenomena as they occur in a skilled way, has been suggested (Baer et al., 2004). From an integrated discussion of social psychology and Zen tradition, the development of mindful attention and awareness was connected to better insight into present realities, greater clarity in thought and action, a stronger sense of self, and detachment to outcomes.

Interestingly, while most people are capable of being mindful, the tendency to actually be mindful varies across time and likely between individuals (Baer et al., 2004). To try to assist people in learning to be more mindful, skills of mindfulness have been incorporated into several interventions such as mindfulness-based stress reduction (MBSR) programs (Baer et al., 2004). Since the development of the MBSR by Jon Kabat-Zinn in 1979, there are now over 240 programs across North America using mindfulness meditation and yoga elements for clinical treatment and in wellness programs (Carlson, Speca, Patel, & Goodey, 2004). Moreover, there is evidence suggesting that mindfulness can be improved with practice (Brown & Ryan, 2003). Evidently, the value of the long standing eastern tradition of mindfulness is gaining interest and credibility as a method of well-being enhancement in the western world.

Some literature on well-being and psychological health seems to suggest it might not be increased self-esteem that is vital; instead the focus should be on enhancing mindfulness. Some researchers, along with Buddhist perspectives on behaviour regulation, attest that both high and low self-esteem can be problematic (Ryan & Brown,

2003). When individuals are preoccupied with their worth, they tend to appraise and compare themselves often to others, along with trying to ward off threats to maintain a positive view of the self, suggesting a sort of psychological vulnerability. From this perspective self-esteem is likely unstable and vulnerable, whereas when self-worth is not emphasized self-esteem is not salient and obtaining optimal health is more feasible (Ryan & Brown, 2003). For example, a person may pursue constant achievement as a method of feeling worthwhile, whereas the counterargument would suggest that both true security and self-esteem is in knowing one is worthwhile regardless of the result or outcome of a situation (Ryan & Brown, 2003). Within this perspective, mindfulness helps one to recognize that the “Me” is a mental construction revealing that self-esteeming processes are merely mental activities; that the self of “self-esteeming” is a constructed image leading people to become attached to possessions, achievements, and relationships (Ryan & Brown, 2003, p. 75). Mindfulness has also been suggested to represent a situation in which self-esteem maintenance begins to dissipate (Martin, 1997). A recent study supports this notion as those individuals who were less mindful tended to be influenced more by approval motives and self-esteem, and were more likely to have lower wellbeing and make poorer decisions (Brown & Ryan, 2003). Essentially, mindfulness suggests that stepping outside of the self-esteem altogether might be necessary for wellbeing to occur (Ryan & Brown, 2003).

### **1.3 STATEMENT OF THE PURPOSE AND HYPOTHESES**

The purpose of the proposed research study is to use the EXSEM as a framework to examine self-esteem, physical competence, physical acceptance, and yoga self-efficacy constructs for middle-aged women participating in a 12-week Hatha yoga intervention.

#### **1.3.1 Primary Hypothesis**

Using the EXSEM as the framework for the study, participants in the yoga group will show significant change in global self-esteem, physical competence, physical acceptance, and yoga self-efficacy as compared to the control group.

#### **1.3.2 Secondary Hypothesis**

A secondary exploratory hypothesis was used to examine the construct of mindfulness offered as an alternative to self-esteem in the literature. Participants in the yoga group are expected to show greater change in mindfulness (i.e., observing, describing, acting with awareness, and accepting without judgement) as compared to the control group following a 12-week yoga intervention.

## CHAPTER 2

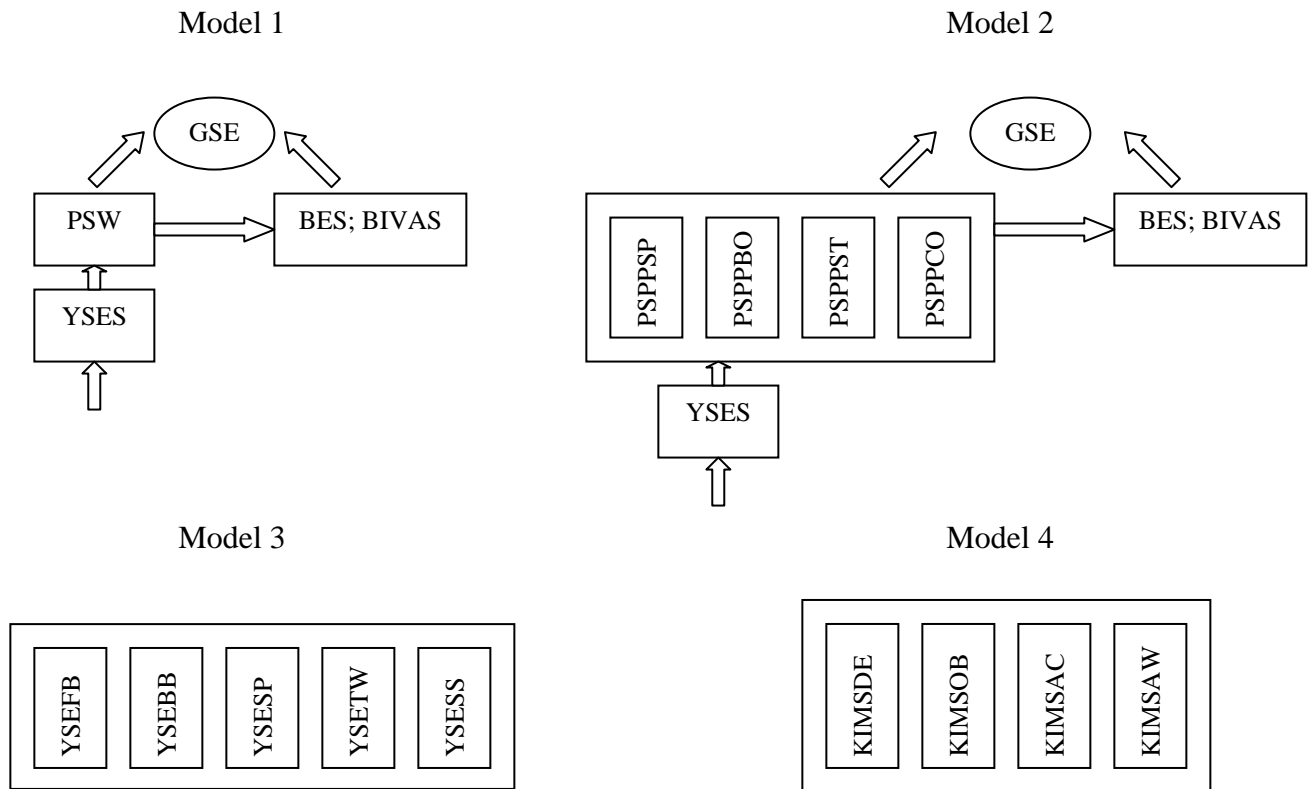
### 2.1 METHODS

#### 2.1.1 Conceptual Models

In order to examine the objectives of the study, four separate statistical models were tested primarily to limit the number of variables per analysis (see Figure 1.3).

Model 1. In the first model, global self-esteem (GSE), physical self-worth (PSW) subscale for physical competence (PSPP), body esteem (BES), body image (BIVAS,) and the yoga self-efficacy (YSES) total were included. This first model was used to test the primary hypothesis and represented the components of EXSEM with the highest order measures of physical competence (i.e., PSW) and yoga self-efficacy (i.e., YSES) in the model.

Model 2. The second model tested with the doubly multivariate design, examined global self-esteem (GSE); physical competence subscales of sports competence (PSPPSP), body attractiveness (PSPPBO), physical strength (PSPPST), physical condition (PSPPCO); physical acceptance measures (BES, BIVAS); and yoga self-efficacy (YSES total score). This second model is the same as the first; however, the lower-order domains of physical competence (i.e., PSPPSP, PSPPBO, PSPPST, PSPPCO) were included instead of physical self-worth (PSW) in the model.



**Figure 1.3:** Four models tested using the doubly multivariate analysis of variance

- GSE = Global Self-Esteem
- PSW = Physical Self-Worth
- PSPPST = Physical Strength Subscale of Physical Self-Perception Profile
- PSPPCO = Physical Condition Subscale of Physical Self-Perception Profile
- PSPPBO = Body Attractiveness Subscale of Physical Self-Perception Profile
- PSPPSP = Sports Competence Subscale of Physical Self-Perception Profile
- BESSA = Sexual Attractiveness Subscale of Body Esteem Scale
- BESWC = Weight Control Subscale of Body Esteem Scale
- BESPC = Physical Condition Subscale of Body Esteem Scale
- BIVAS = Body Image Visual Analog Scale
- YSEFB = Forward Bending Poses Subscale of the Yoga Self-Efficacy Scale
- YSEBB = Backward Bending Poses Subscale of the Yoga Self-Efficacy Scale
- YSESP = Standing Poses Subscale of the Yoga Self-Efficacy Scale
- YSETW = Twist Poses Subscale of the Yoga Self-Efficacy Scale
- YSESS = Supine/Seated Poses Subscale of the Yoga Self-Efficacy Scale
- YSET = Total Score of the Yoga Self-Efficacy Scale
- KIMSOB = Observing Subscale of the Kentucky Inventory of Mindfulness
- KIMSDE = Describing Subscale of the Kentucky Inventory of Mindfulness
- KIMSAW = Acting with Awareness Subscale of the Kentucky Inventory of Mindfulness Skills
- KIMSAC = Accepting without Judgment Subscale of the Kentucky Inventory of Mindfulness Skills

Model 3. A third model was used to look for significance across the yoga self-efficacy (YSES) subdomains of forward bends (YSEFB), back bends (YSEBB), seated poses (YSESP), twists (YSETW), and seated/supine (YSESS) poses. This third model was an attempt to look at whether there were changes in specific dimensions of yoga self-efficacy.

Model 4. In the fourth model, the dimensions of mindfulness including describing (KIMSDE), observing (KIMSOB), accepting without judgement (KIMSAC), and acting with awareness (KIMSAW) were assessed for significance. This fourth model was used to test the secondary hypothesis that mindfulness would also change throughout the course of the yoga intervention.

Prior to data analysis, the assumptions of a doubly multivariate analysis were each tested. First, the Box's M test was used to test the first assumption of homogeneity of variance-covariance matrices. Because Box's M test is highly sensitive (Tabachnick, & Fidell, 2001) a conservative alpha level of  $p < .001$  was used for testing the assumption of homogeneity, as recommended for doubly multivariate analysis of variance (Tabachnick & Fidell, 2001). None of the Box's M values were significant at  $p < .001$  (model 1, Box's M = 214.8,  $p = .007$ ; model 2, Box's M = 493.1,  $p = .013$ ; model 3, Box's M = 84.9,  $p = .164$ ; model 4, Box's M = 44.6,  $p = .451$ ), thus I accepted the assumption of equal covariance matrices of dependent variables across groups.

Second, the dependent measures were examined for skewness and kurtosis (Tabachnick & Fidell, 2001). None of the 25 dependent variables were more than 1.96 times their standard error and kurtosis allowing me to accept the assumption of normality of distribution for my data. Finally, to test whether the dependent variables

used in the research were normally distributed scatterplots were constructed. The visual depiction of the scatterplots helped demonstrate that model variables were linear.

## **2.1.2 Measures**

### **2.1.2.1 Demographics Information Sheet**

The first section of the questionnaire package was a brief checklist used to gather demographic information on the age, height, weight, and ethnicity of participants within the study (see Appendix F).

### **2.1.2.2 Eastern Philosophy Familiarity Question**

In order to better understand the participants volunteering for the study, a question was posed within the questionnaire package to assess the extent of familiarity with Eastern philosophies including activities such as tai chi, and meditation (see Appendix G). Participants were provided with ample space to describe in as much detail as desired any previous experiences with these philosophies. The information was used to gain further descriptive insight into the women who were recruited to participate in the research. From the final sample for statistical analyses ( $n=51$ ), 11 of 21 (52%) of the participants had previous experience with Eastern philosophies in the yoga group, and 12 of 30 (39%) reported having previous experience with Eastern philosophies in the control group. To compare the proportion of participants who had previous experience with Eastern philosophies in the yoga and control groups, a t-test for proportions was run to see whether 52% was significantly different than 39%. In the analysis, it was found that  $t_p(49) = .92, p < .05$ , was not significant, meaning that there was not a significant difference between the proportion of participants with previous Eastern philosophy

experience in the yoga and control groups. Additionally, In order to look for differences across the 25 mean comparisons between participants with previous Eastern philosophy experiences and participants without previous Eastern philosophy experience across groups, an ANOVA at pre-test was run. It was found that there were no significant differences,  $p < .05$ , across the 25 mean comparisons between the participants in the yoga and control groups who listed having previous Eastern philosophy experience ( $n = 23$ ), and the participants in the yoga and control groups who listed having no previous Eastern philosophy experience ( $n = 28$ ) (see Appendix H for complete results).

### **2.1.2.3 Godin Leisure-Time Exercise Questionnaire (LTEQ)**

In order to gather data on the general levels of physical activity to provide additional information about the sample of middle-age women recruited for my research, the Godin Leisure Time Exercise Questionnaire (LTEQ) was administered (Godin & Shephard, 1985; see Appendix I). The measure is separated into 2 scores used to assess habitual weekly exercise behaviour (Godin & Shephard, 1985). The first of the scores (LTEQ 1) asks individuals to report whether the exercise they engaged in the previous 7-days was strenuous, moderate, or mild in effort, which is then used to inform a total exercise score (levels of activity correspond to estimated MET values and are used to formulate the exercise score) (Copeland, Kowalski, Donen, & Tremblay, 2005). In addition, individuals are asked in a subsequent question (LTEQ 2) how frequently over the past 7-day period was the exercise strenuous enough to produce sweating as measured by a three-point scale ranging from often to never/rarely (Godin & Shephard, 1985). As well, a high response on LTEQ 2 (i.e. 3 or never/rarely) is indicative of low levels of physical activity (Copeland et al., 2005). From previous research with adults,



1-month test-retest reliability was found to be  $r = .62$  for LTEQ 1, and  $r = .69$  for LTEQ 2 (Jacobs, Ainsworth, Hartman, & Leon, 1993). Concurrent validity has been shown between the original GLTEQ research and measures of body fat,  $r = .43$ ; maximum oxygen intake,  $r = .38$ ; and muscular endurance for adults,  $r = .54$  (Godin, Jobin, & Bouillon, 1986).

#### **2.1.2.4 Rosenberg Self-Esteem Scale (RSES)**

Within the EXSEM, the construct of global self-esteem represents the overarching and stable domain and has often been measured with the Rosenberg Self-Esteem Scale (Rosenberg, 1965; see Appendix J) as a content-free scale to measure self-worth (Sonstroem & Morgan, 1989). The 10-item unidimensional measure of global self-esteem requires participants to rate their responses on a four-point Likert scale ranging from definitely agree to definitely disagree, where high scores indicate high levels of self-esteem (Keith & Bracken, 1996; Paxton & Phythian, 1999). The measure was originally developed with 5,024 high school students, but has since been used with a wide range of ages, nationalities, ethnicities, psychiatric conditions, and socioeconomic levels and represents the most widely used measure of self-esteem (Blascovich & Tomaka, 1993; Wylie, 1989).

Test-retest reliability has been shown to be  $r = .85$  over a two-week period with 28 college students,  $r = .82$  with a sample of adults (Fleming & Courtney, 1984; Silber & Tippett, 1965), and  $r = .63$  with 990 Canadian high-school students over a 7-month period with an acceptable alpha coefficient of  $r = .77$  for total self-esteem score (Bryne, 1983). Similarly internal consistencies (Cronbach's alphas) for RSES have been found

to be higher than  $r = .80$  with an adult sample and from  $r = .77$  to  $r = .88$  across several studies (Blascovich & Tomaka, 1993; Fleming & Courtney, 1984).

Encouraging validity information also exists for the RSES. Convergent validity for college aged samples between RSES and the Coopersmith's Self-Esteem Inventory of  $r = .60$  was found;  $r = .67$  for the Kelly Repertory Test, and  $r = .83$  for the Heath Self-Image Questionnaire (Crandal, 1973; Francis & Wilcox, 1995; Silbert & Tippett, 1965). Given the ease of administering the questionnaire and supported reliability and validity data it continues to be widely used (Keith & Bracken, 1996).

#### **2.1.2.5 Physical Self-Perception Profile (PSPP)**

To capture the physical competence domain of the EXSEM, the Physical Self-Perception Profile (PSPP) by Fox and Corbin (1989) was administered (see Appendix K). The multidimensional PSPP was developed to measure self-perceptions within the physical domain and uses 30-items under 5 separate subscales each containing 6 items. Responses are presented by two alternative statements presented for each item, with scores ranging from low self-perception (1) to high self-perception (4) (Kowalski et al., 2003). The subscales include general physical self-worth (PSW), sports competence (PSPPSP), body attractiveness (PSPPBO), physical strength (PSPPST), and physical condition (PSPPCO). The PSW subscale includes general feelings of pride, happiness, satisfaction, and confidence in the physical self; PSPPBO entails the ability to maintain an attractive body, confidence in appearance, and an attractive physique; PSPPCO describes conditioning, fitness, physical stamina, the ability to maintain exercise, and confidence within an exercise setting; PSPPSP includes confidence in sport, athletic ability, and the ability to learn sport; and lastly PSPPST includes confidence in

situations requiring strength, muscle development, and perceived strength (Marsh & Sonstroem, 1995).

Internal consistency values for the PSPP scales have ranged from  $r = .81$  to  $r = .92$  for males and females (Fox, 1990). Stability of responses on the PSPP have been indicated via acceptable to good test-retest reliability found to be between  $r = .74$  to  $r = .89$  after 23 days, from  $r = .74$  to  $r = .92$  over a 16-week period, and from  $r = .81$  to  $r = .88$  over a 23-day period (Fox, 1990; Fox & Corbin, 1989; Kowalski et al., 2003). In addition, research with middle-aged adults found high reliability and validity with alpha coefficients between  $r = .90$  and  $r = .91$  for females (Sonstroem, Harlow, Gemma, & Osborne, 1992).

Validity data has also been analyzed with respect to the PSPP. In particular, structural equation modelling has confirmed the PSPP structure providing internal construct validity (Sonstroem et al., 1994). Discriminant factor analysis found that PSPP subscales could correctly categorized physically active and inactive groups 70% of the time in a college sample (Fox & Corbin, 1989). With another college aged sample factor analysis for PSPP subscales, 68.9% and 63.5% of the respective variance for female and male items was explained (Fox, 1990). As well, the physical condition subscale loaded the strongest on the canonical function while the attractive body subscale was the weakest (Fox & Corbin, 1989). Further evidence of construct validity emerged in comparing PSPP mean scores between samples of obese males and females and college-aged males and females. As predicted the obese population had significantly lower scores on PSW, PSPPSP, PSPPBO, PSPPCO, but was found to have higher scores on PSPPST (Fox, 1990).

### **2.1.2.6 Body-Esteem Scale (BES)**

In measuring the subdomain of physical acceptance within the EXSEM, the Body Cathexis Scale (Secord & Jourard, 1953) has been used in previous research. Secord and Jourard (1953) defined body-cathexis and self-cathexis to be related to the degree to which an individual feels satisfied or dissatisfied with various parts and processes of the body. However, the work of Secord and Jourard assumed unidimensionality, which has since been questioned (Franzoi & Shields, 1984). Therefore, for the purposes of the present study, the Body Esteem Scale (BES) by Franzoi and Shields (1984), a 35-item scale measuring satisfaction with one's body including three dimension of body image for women (sexual attractiveness, weight concern, and physical condition), was included to assess physical acceptance (see Appendix L). The BES uses a 5-point Likert scale ranging from 1 (very disappointed) to 5 (very satisfied), and each item is summed to give an overall score. The Body Esteem Scale is comprised of three-subscales for males/females including Physical Attractiveness/Sexual Attractiveness (PC/AC); Upper Body Strength/Weight Control (UBS/WC); and Physical Condition/Physical Condition (PC) (Wylie, 1989). Since my research was focussed on changes in this construct for females, only the subscales of SA, WC, and PC were used.

The scale was originally developed with a large group of male and female undergraduate students in which acceptable to good internal consistency alpha coefficients of  $r = .81$  to  $r = .86$  were observed in males and  $r = .78$  to  $r = .87$  in females (Wylie, 1989). Additionally, in the original scale development convergent validity between BES and RSES has shown significant moderate correlations for the female BES subscales using 78 females (sexual attractiveness,  $r = .32$ ; physical condition,  $r = .35$ )

(Franzoi & Shields, 1984). A follow-up study with 193 females lends additional support for body esteem representing aspects of global self-esteem finding significant moderate correlations for all three females BES subscales (sexual attractiveness,  $r = .21$ ; physical condition,  $r = .39$ ; weight concern,  $r = .36$ ) (Franzoi & Herzog, 1986).

Further validity for the BES to be used as a measure of self-esteem was demonstrated through multiple-regression analyses where BES subscales accounted for 21.63% of the variance for female self-esteem (Franzoi & Shields, 1984). Discriminant validity has been found between anorexic and non-anorexic females on the BES subscale of weight concern,  $r = .37$ ,  $p < .001$  (Franzoi & Shields, 1984).

#### **2.1.2.7 Body Image Visual Analog Scale (BIVAS)**

In addition to the administration of the Body Esteem Scale of Franzoi and Shields (1984), the use of the Body Image Visual Analog Scale (BIVAS) was also administered (see Appendix M). There is a possibility that the body esteem scale, which measures body satisfaction, may not actually be equivalent to acceptance. In order to attempt to capture any changes in acceptance of the body, the BIVAS measure was also employed. The BIVAS is a 10 centimetre scale ranging from complete dissatisfaction, indicated as zero on the far left, to complete satisfaction, indicated as ten on the far right end side of the scale. When responding to the scale the 'X' is marked along the scale that matches to that individual's current satisfaction with how the body is in reality. The distance from zero to the marked area on the scale is then measured and recorded. Higher scores on the BIVAS reflect higher levels of satisfaction of the body. The BIVAS is an adaptation from the original visual analog scale (VAS) developed to assess unpleasant symptoms such as pain, fatigue, and nausea (Gift, 1989). The use of the

VAS helps participants avoid having to describe sensations or with the BIVAS levels of satisfaction, with the use of few words (Gift, 1989). Supportive evidence for the VAS has been found for concurrent and discriminate validity as well as test-retest reliability (Gift, 1989). Also, the BIVAS has recently been used with exercise and self-esteem research with female breast cancer survivors (Baldwin & Courneya, 1997).

#### **2.1.2.8 Yoga Self-Efficacy (YSES)**

A 28-item physical self-efficacy scale based on previous research (McAuley, 1994; McAuley & Mihalko, 1998) was developed in order to capture feelings of confidence related to the execution of Hatha yoga postures (see Appendix N). The Hatha yoga self-efficacy scale (YSES) incorporated the asana used in the research of Jacobs and colleagues (2004), from which the current study was replicated, represented by five subdomains: forward bends (6 items; YSEFB), back bends (4 items; YSEBB), standing poses (6 items; YSESP), twists (3 items; YSETW), and seated/supine poses (9 items; YSESS). They were presented in order of increasing difficulty within each subdomain, as confirmed by an experienced Hatha yoga instructor working with me to ensure quality and accuracy of posture sequencing. Beside each of the asana was a black and white stick person picture or a photograph depicting the position and movements involved for the 28-items, which were located from a handout provided from the yoga expert aiding me in the study, my own yoga text, and from online images (Lee, 2002). In filling out the YSES, participants were instructed to rate each of the 28-items on a scale from 0 to 100 percent, increasing in increments of 10 percent that matched their current confidence in replicating the posture as depicted in the image beside each posture. At the far left hand portion of the scale 0 percent corresponds to ‘no confidence

at all’, at 50 percent the corresponding label is ‘somewhat confident’ and at the far right end of the scale at 100 percent a corresponding marker of ‘completely confident.’ This method of self-efficacy measurement in the physical domain has been used often in previous research (McAuley, 1994, Appendix 2). In terms of scoring the YSES, a total or comprehensive score (YSEST) was determined by summing the percentages from all 28-items and dividing by the total number of scale items for each participant in the study. Additionally, for each of the five subdomain scales (i.e., YSEFB, YSEBB, YSESP, YSETW, and YSESS) a score was also generated using the same technique as described for determining the composite score (YSET). During the administration of the questionnaire at the three measurement times (pre-test, following one week of yoga classes only for the yoga group, and at post-test) I clarified any questions the participants had about the depicted asana (e.g., What is happening in savasana? Are the stick figure’s legs on a wall?). Current reliability and validity information is not available for the YSES but might be a direction for future research examining Hatha yoga choosing to replicate the present intervention and the work of Jacobs and colleagues (2004).

#### **2.1.2.9 Kentucky Inventory of Mindfulness Skills (KIMS)**

To assess the construct of mindfulness, The Kentucky Inventory of Mindfulness Skills (KIMS) developed by Baer and colleagues (2004) was selected (see Appendix O). This first multidimensional measure of mindfulness assesses the four areas of observing (KIMSOB), describing (KIMSDE), acting with awareness (KIMSAW), and accepting without judgment (KIMSAC). For the use of the study, the number of responses for the KIMS was modified from five to four using the same response markers; this was an error on my part in reading the original description of the scale, however, the use of even

responses has been shown to encourage respondents filling out the questionnaire to make a weak commitment in the direction of one of the other extreme and has not been shown to compromise scale integrity (DeVellis, 1991). Therefore, confidence existed that the modified KIMS was appropriate for use in the analysis. Each of the 39 items, were rated on a four-point Likert type scale ranging from 1 (never or very rarely true) to 4 (almost always or always true).

Reliability data for the KIMS shows test-retest reliability over 14 to 17 days of  $r = .65$  for observing,  $r = .81$  for describing,  $r = .86$  for acting with awareness, and  $r = .83$  for accepting without judgment, with no significant differences in overall mindfulness scores across time periods (Baer et al., 2004).

Validity information has also been collected for the KIMS. In particular, content validity was assessed by a group of expert DBT (dialectical behavior therapy) psychologists to rate the original 77-items of the KIMS. With the assistance of these experts, the KIMS was reduced to 39-items for which there was mean interrater agreement on assignment of items to skill categories ranging from 64% to 100% with a mean of 86%. This information provided confidence that the items were clear and well written in terms of representing mindfulness skills (Baer et al., 2004). Another study using a subset of 130 of student sample 1, found no differences between males and females on KIMS scales, however meditation experience was found to correlate with the observe scale,  $r = .29$  even with the majority of students reporting none of a little with respect to meditation experience. As well, many expected relationships between several constructs including personality traits, psychopathology, emotional intelligence, alexithymia, experiential avoidance, absorption, dissociative experiences, and life satisfaction were each correlated to one or more of the KIMS scales (Baer et al., 2004).



Moreover, to examine convergent validity, a final study was used to compare scores on the KIMS to Brown and Ryan's Mindfulness Attention Awareness Scale (MAAS) developed in 2003. Significant correlations were found for KIMSAW,  $r = .57$ , and for KIMSAC,  $r = .30$ , suggesting a strong relationship between KIMSAW and the MAAS (Baer et al., 2004).

### **2.1.3 Participants**

Following gaining ethical approval from the University of Saskatchewan Behavioural Ethics Research Board, 71 middle-aged women participated in the study (ranging in age from 41 to 64) (see Appendix A). The women were recruited from the Saskatoon area via posters placed in doctors' offices and University buildings (these approaches have been recommended by McQuaide, 1998), as well as through a variety of local stores and workout centres (see Appendix B). Exclusion criteria included participation in Hatha yoga more than one time per week over the past three months, similar to previous clinical research looking at ten weeks of yoga with participants with low back pain (Jacobs et al., 2004). As well, individuals were informed that they must be able to attend at least two of the six available times per week listed on the posters to be eligible to participate in the study.

In the introductory meetings (small groups or one-on-one) to obtain informed consent, participants were provided with more details regarding the study (see Appendix C). Prospective participants were first asked to confirm that they were between the ages of 40-64 years. They were then asked how much experience they had with yoga. Only women who met the research criteria of beginner, having no previous experience with yoga or practicing yoga no more than one session per week over the last three months,

were included in the research. The women were also asked whether they could commit to the study requirements of attending two 1-hour yoga classes per week and doing 1-2 30 minute sessions at home for the 12-week study duration. For the women who met the inclusion criteria it was then explained that they had a 50% chance of being selected to either the yoga group or to a control group that would not initially do yoga. It was highlighted that at the end of the 12-week study, there would be a period of time where yoga classes would be offered for the women assigned to the control group. Once the details of random assignment were explained to women who met the inclusion criteria and agreed they would like to participate in the study, the Physical Activity Readiness Questionnaire (PAR-Q; see Appendix D), for screening for health conditions that might prevent their involvement in the study, was also completed. Women with one or more "yes" answers on the screening form were required to receive physician consent to participate in the research study to ensure safety. Of the entire research sample only three participants had "yes" answers on the PAR-Q and in discussing the need to consult with their doctor about the appropriateness of participating in the study. All three informed me that their family physicians were already aware of their health status and had cleared their participation in physical activity and yoga in previous appointments. Given that participants either passed the screening or had received previous consent from their family physicians to exercise, the women were thus recruited for study participation.

From the total 71 participants recruited, 35 participants were randomly assigned to the control group and 36 to the experimental yoga group. Randomization was performed using a random number generator. My supervisor used the random number generator to assign 71 numbers into two groups of 35 (yoga group) and 36 respectively

(control group). Prior to randomization, I had assigned a number to each participant in the order that they were recruited for the study (i.e., list of names from 1 to 71). Next, the list I created with participants listed from 1 to 71 was matched to the random number generator lists, so that each number in the groups was assigned a participants' name for both the yoga and control groups. Also, to help with adherence of participants in the control group, the control group received an opportunity to engage in free yoga classes for one month following the completion of the study, based on recommendations from previous research with yoga and chronic low back pain (Jacobs et al., 2004). The final sample used for the analysis for the hypotheses was 51 participants (experimental group,  $n = 21$ ,  $M$  age = 50.38,  $sd = 6.34$ ; control group,  $n = 30$ ,  $M$  age = 48.57,  $sd = 5.95$ ). The sample was 92.16% White, 5.88% Chinese, and 1.96% other (Aboriginal; Metis). There were no significant differences between the experimental and control groups for demographic measures of age, height, weight, and time spent participating in leisure exercise. Among the research groups it was also found that 11 out of 21 (52%) participants in the yoga group, and 12 of 30 (39%) participants in the control group had previous experience with Eastern philosophies.

Dropouts ( $n = 20$ ) were compared to non-dropouts ( $n = 51$ ) across all study variables, and there were no significant mean differences on any study variables between the two groups at  $p < .05$  (see Appendix E for complete results). The criteria for being included in the final experimental group sample included participating in seventy-five percent of the yoga content of the intervention (i.e., 18 out of a possible 24 sessions) with at least 12 in-class sessions. Of the 36 participants assigned to the experimental group, 21 participants met the stipulated criteria; 6 participants completed the yoga program but did not meet the criteria of 75%, 2 participants dropped out during the

course of the 12-week program for various personal reasons, 5 participants due to not being able to fully commit to the program demands, and one participant withdrew from the study immediately following the pre-test due to other commitments that prevented participation in the study.

Those participants in the experimental group who were included in the final sample ( $n = 21$ ) were compared with those who did not meet the criteria ( $n = 15$ ). Significant differences were found on two of the 25 mean comparisons. These differences were found for the body esteem scale dimension of sexual attractiveness  $t(34) = 2.12, p < .05$  and the PSPP subscale of sport competence  $t(34) = 2.07, p < .05$ , with those not meeting the criteria scoring higher on both (sexual attractiveness final experimental group,  $M = 46.60, sd = 8.77$ ; sexual attractiveness for those not meeting the criteria,  $M = 41.52, sd = 5.58$ ; sport competence final experimental group,  $M = 10.33, sd = 3.48$ ; sport competence for those not meeting the criteria,  $M = 12.93, sd = 4.03$ ) (see Appendix E for complete results). Five participants did not return to complete the post-test from the control group.

#### **2.1.4 Procedure**

Once responses on the consent and PAR-Q forms were obtained, three evenings were selected as large group meetings to administer the first battery of self-report questionnaires (Demographics Information Sheet, Eastern Philosophies Familiarity Question, LTEQ, RSES, PSPP, BES, BIVAS, YSES, and KIMS). At the end of each session, participants picked up an envelope with their name printed on the front side that included information as to which group they had been randomly assigned (see Appendix P and Appendix Q). Participants assigned to the yoga group were re-informed of the

requirement to attend two of the six scheduled one-hour yoga sessions per week at a local studio over the course of the 12-week intervention within the enclosed letter.

During the first week of the yoga intervention, biweekly exercise logs (see Appendix R) were provided to the participants to keep track of the frequency and duration of home practice as a measure of adherence (see Figure 1.4 for intervention timeline). Participants in the yoga group were provided with a booklet of the required home practice asana (see Appendix S), similar to a research study on yoga and chronic low back pain (Jacobs et al., 2004). The booklet was put together by me to provide a visual depiction of the asana (i.e., yoga postures), along with some brief written material and general recommendations for setting up a home practice, such as recommended clothing to wear, time of day to practice, and how long to wait after eating before beginning yoga (Yee, 2001). Several discussions occurred during the first two weeks of the intervention as to how the home practice program should be performed. Myself and the other instructor took time in class to address participant questions and to provide feedback surrounding the home practice requirements. The biggest concern the participants expressed was the concern that they were not doing the yoga poses correctly or being unsure how long they should stay within each pose. We explained to the participants that they were to work through the home practice sequence with the goal of doing each pose at least once during each home practice session. However, we explained that they were free to decide what their bodies needed and for how long they should stay in each pose (i.e., that they could be flexible with their home practice routine and treat it as a learning experience). We also stressed the importance in Hatha yoga that there is no wrong way to do a pose, but that the importance was to become aware of how the body

<b>Data Collection Timeline By Weeks (Control Group)</b>													
0	1	2	3	4	5	6	7	8	9	10	11	12	13
Pre-test													Post-test
<b>Data Collection Timeline By Weeks (Yoga Group)</b>													
0	1	2	3	4	5	6	7	8	9	10	11	12	13
Pre-test		Logs	YSES only	Logs		Logs		Logs		Logs		Logs	Post-test

**Figure 1.4:** Visual Time Line of Data Collection Procedures.

feels and what their breathing is like in the poses and that each time they practice the poses is a unique experience.

In line with previous research on yoga, participants in the control group were asked to refrain from participation in any form of yoga for the 12-week duration of the study (Cusumano & Robinson, 1992). In addition, they were given the dates of the second administration times, which followed the 12-week intervention period. To help minimize attrition of participants in the control group over the course of the research, following the recommendation of Jacobs and colleagues (2004), one month of complementary yoga classes were offered to these participants following the completion of the intervention period free of charge at a local studio space.

Following the completion of the first questionnaire package meetings, the 12-week yoga intervention began. Recent research utilizing Iyengar style Hatha yoga to assess clinical back pain utilized a 12-week, 60-minute semi-weekly yoga classes with an additional 3 to 5 days of 30-minute home practice (Jacobs et al., 2004). For the current research, the program was modified to 60-minute semi-weekly yoga classes, and 1 to 2 days of 30-minute home practice in order to help with participant adherence. During each of these sessions the yoga instructors, which consisted of myself and another graduate student both trained to teach from the same local yoga studio, were given the freedom to choose from these asana based on the progression and learning of the class for each of the 24 yoga sessions during the intervention. As well, the reading of yoga text, suggested by a reputable Hatha yoga instructor in the community who in addition assisted me in designing the YSE measure, included excerpts from Judith Lasater's text *Living your yoga* (1999), Krishnamurti's text *Think on these things* (1970), and *Peace is every step* the Buddhist text from the Thich Nhat Hanh Collection

(2004), along with general aspects of Hatha yoga philosophy such as a description of the 8-limbs of yoga were integrated within the classes to help the students to gain a deep awareness of yoga and to help them to direct their attention to move inward.

Each of the yoga instructors taught 50% of the weekly classes (i.e., 3 classes/week during the 12-week intervention). In order to ensure optimal consistency among weekly yoga classes offered during the intervention, weekly meetings for myself and the other yoga instructor were held to prepare a weekly lesson plan, to discuss key teaching cues and ideas and to pick a reading or component of yoga philosophy to incorporate during classes. The classes were structured in a way that helped the instructors to relay important aspects of alignment in the yoga poses both verbally and by providing gentle physical adjustments, to begin to teach participants to notice their breathing and how they are feeling (i.e. components of mindfulness), and to begin to learn about the governing philosophy of yoga as representing far more than a series of stretches or exercises for the physical body.

For the 12-week intervention period, initially six classes were offered each week at a variety of times to help accommodate the schedules of the women in the yoga group (i.e., morning, noon hour, evening, and weekend) at a local yoga studio well equipped with the typical assortment of yoga props used for Hatha yoga practice (e.g., mats, blankets, bolsters, belts, foam block). After the first 4 weeks of the study, due to very low attendance at the morning class, one class time was cancelled. Three additional class times were cancelled during the program due to holidays and other events being hosted by in the studio space, which were in conflict with the research class schedule.

At the beginning of each yoga session, participants were required to fill out an attendance sheet located at the front of the studio space in order to determine adherence



to the intervention. Additionally, the yoga mats, which were donated for the purpose of the research study by Lululemon Athletica in Saskatoon, were distributed to the participants in the yoga group during the first week of the research study along with a copy of the home practice package.

A second data collection period for the yoga group took place following the completion of each class in the third week of the intervention when the participants had been able to experience each of the asana in the program at least one time. At this time the yoga teacher instructing the class provided the participants with a copy of the yoga self-efficacy measure, which was filled out at the yoga studio space and left with the instructor before leaving the class.

At the end of the 12-week intervention period, participants returned their yoga mats to the researcher either at a class time or at another arranged time in order to have the mats available for use for the additional month of complimentary classes for the control group. A few participants that dropped out of the study kept their yoga mats because they were unable to be contacted.

In the last two weeks of the intervention period, the yoga instructors announced in class, emailed, and/or called the participants as a reminder of the three dates selected for the post-test. Alternate arrangements were made to meet with any of the participants who could not meet at the pre-arranged times. Three questionnaire packages were mailed to participants who were not able to meet in person, and they were instructed to mail in the filled out questionnaires to the Physical Activity Complex.

The post-test questionnaire package was completed the week following the end of the 12-week intervention period. Before beginning the questionnaire package, the researcher gave a brief reiteration of how to fill out the questionnaire and provided

ample time for participants to ask any questions before commencing. As the participants handed in their questionnaires they were each given an envelope with a thank you card as acknowledgement for their involvement in the research study.

Following the one-month period of complimentary yoga classes for the control group, the yoga mats donated for the research study were divided in half. One half was given as a donation to the owner of the yoga studio as a thank you for being granted the yoga studio space for the duration of the study. The other mats were distributed to participants whose names were selected in a random draw. Arrangements were made on an individual basis to distribute these gifts.

### **2.1.5 Data Analysis**

Following the data collection phase of the research project, spanning across three measurement periods (prior to randomization of groups, following the first yoga class, following the last yoga class), the data was entered and analyzed using the statistical software package SPSS (Version 11.5).

To examine the effects of change in the psychological variables associated with the intervention, a doubly multivariate analysis was performed (Schutz & Gessaroli, 1987). Specifically in order to test the research hypotheses, a 3(time) x 2(group) MANOVA with group as the between and time as within-subjects factors was performed. The statistical significance level for all statistical tests was set at  $p < .05$ . Note that the second measurement period was only performed with the yoga group participants for the YSE measure to determine if there were significant differences in yoga self-efficacy before having done Hatha yoga and after having tried all of the poses in the intervention repertoire.

In order to test the relationships among the variables within the research study, the four models previously discussed in section 2.1, was tested using the doubly multivariate analysis of variance. Model 1 analyzed higher order domains of the EXSEM; model 1 analyzed higher order domains with the exception of the lower order PSPP subscales for physical competence; model 3 analyzed the YSES subscales independently; and model 4 analyzed the KIMS subscales independently.

## CHAPTER 3

### 3.1 RESULTS

#### 3.1.1 Descriptive Statistics and Scale Reliabilities

Descriptive statistics for the physical activity measures (LTEQ1, LTEQ2) and age, height, weight are presented in Table 3.1. Descriptive statistics and scale reliabilities for GSE, PSW, PSPP, BES, and BIVAS are presented in Table 3.2, YSES in Table 3.3, and KIMS in Table 3.4. Across the 25 mean comparisons, at time 1 there were three significant group differences between the yoga and control group: PSPPCO,  $t(49) = 2.25, p < .05$ ; BESWC,  $t(49) = 2.09, p < .05$ ; BIVAS,  $t(49) = 2.61, p < .05$ . In all cases, the control group had a higher mean value than the yoga group. At time 2, there were two significant group differences between the yoga and control group: YSEFB,  $t(49) = 2.77, p < .05$ ; YSET,  $t(49) = 2.03, p < .05$ . In both cases the yoga group had a higher mean value than the control group.

The correlations among physical activity measures (LTEQ1, LTEQ2), along with age, height, and weight are presented in Table 3.5. Correlations among GSE, PSW, PSPP, BES, and BIVAS scales are presented in Table 3.6. Correlations among YSES subscales are presented in Table 3.7. Correlations among KIMS subscales are presented in Table 3.8.

A one-way repeated measures ANOVA was used to examine changes in YSES totals from the pre-test ( $M = 72.24, sd = 12.52$ ), to two-weeks following the pre-test ( $M$

= 78.45,  $sd = 11.80$ ), to the post-test ( $M = 84.66$ ,  $sd = 12.50$ ) periods for the yoga group. The results showed that there was a significant difference across these time points,  $F(2, 19) = 6.78$ ,  $p < .05$ . Follow-up analysis showed that there was a significant difference between pre-test and post-test only ( $p < .05$ ).

**Table 3.1:** Descriptive Statistics for LTEQ1, LTEQ2, Age, Height, and Weight.

Variable	Pre-test				Post-test			
	Yoga		Control		Yoga		Control	
	M	<i>sd</i>	M	<i>sd</i>	M	<i>sd</i>	M	<i>sd</i>
LTEQ1	30.33	20.76	35.80	18.28	33.10	25.42	35.00	18.66
LTEQ2	2.19	0.60	1.90	0.71	2.19	0.75	1.87	0.78
Age	50.38	6.34	48.57	5.95	50.62	6.39	48.77	6.15
Ht	1.57	0.25	1.63	0.07	1.57	0.25	1.64	0.06
Wt	67.70	11.71	65.82	8.66	67.53	12.49	64.39	8.38

(*N* = 51)

*Note:*

LTEQ1 = Leisure Time Exercise Questionnaire question #1 (scale range = 0 – no ceiling)

LTEQ2 = Leisure Time Exercise Questionnaire question #2 (scale range = 1 - 3 [with lower values representing more activity])

Ht = Height measured in meters

Wt= Weight measured in kilograms

M = Mean

*sd* = Standard Deviation

**Table 3.2:** Descriptive Statistics for GSE, PSW, PSPP, BES, and BIVAS ( $N = 51$ ).

Variable	Pre-test						Post-test					
	Yoga			Control			Yoga			Control		
	M	<i>sd</i>	$\alpha$	M	<i>sd</i>	$\alpha$	M	<i>sd</i>	$\alpha$	M	<i>sd</i>	$\alpha$
GSE	31.14	4.91	.89	31.43	5.55	.93	32.14	4.53	.91	31.73	5.48	.92
PSW	12.33	3.43	.92	14.43	4.01	.92	14.52	4.17	.92	14.33	3.57	.92
PSPPST	14.00	3.54	.87	14.97	4.07	.95	15.52	3.33	.90	15.03	3.68	.95
PSPPCO	12.19*	4.96	.95	15.17*	4.42	.91	14.29	4.12	.93	15.10	3.84	.90
PSPPBO	10.86	4.32	.93	12.90	4.02	.94	12.86	4.44	.93	14.00	3.34	.89
PSPPSP	10.33	3.48	.91	12.43	3.94	.91	11.57	3.61	.92	12.64	3.61	.91
BESSA	41.52	5.58	.70	44.03	7.99	.85	43.86	6.36	.80	44.77	8.00	.89
BESWC	25.14*	8.25	.90	30.33*	9.02	.90	26.38	9.57	.94	28.47	8.96	.92
BESPC	25.95	6.89	.88	28.87	6.99	.89	29.71	7.73	.92	29.87	7.66	.93
BIVAS	3.96*	2.05		5.62*	2.36		5.44	2.35	---	5.72	1.95	---

*Note:*

GSE = Global Self-Esteem (scale range = 10 to 40 [higher scores indicating higher self-esteem])

PSW = Physical Self-Worth (scale range = 6 to 24 [higher scores indicating higher physical self-worth])

PSPPST = Physical Strength Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher physical strength])

PSPPCO = Physical Condition Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher physical condition])

PSPPBO = Body Attractiveness Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher body attractiveness])

PSPPSP = Sports Competence Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher sports competence])

BESSA = Sexual Attractiveness Subscale of BES (scale range = 13 to 65 [higher scores indicating higher sexual attractiveness])

BESWC = Weight Control Subscale of the BES (scale range = 10 to 50 [higher scores indicating higher weight control])

BESPC = Physical Condition Subscale of BES (scale range = 9 to 45 [higher scores indicating higher physical condition])

BIVAS = Body Image Visual Analog Scale (scale range = 0 to 10 [higher scores indicating greater satisfaction of the body])

M = Mean

*sd* = Standard Deviation

$\alpha$  = Alpha

\*  $p < .05$  (two-tail significance)

**Table 3.3:** Descriptive Statistics for YSES ( $N = 51$ ).

Variable	Pre-test						Post-test					
	Yoga			Control			Yoga			Control		
	M	<i>sd</i>	$\alpha$	M	<i>sd</i>	$\alpha$	M	<i>sd</i>	$\alpha$	M	<i>sd</i>	$\alpha$
YSEFB	58.57	20.38	.81	61.50	23.87	.90	78.02*	16.28	.83	61.06*	24.54	.90
YSEBB	69.76	20.09	.86	74.00	22.52	.92	81.67	24.27	.98	71.75	26.86	.94
YSESP	79.21	13.44	.88	78.94	19.48	.93	87.94	10.72	.88	78.89	20.94	.94
YSETW	63.97	16.82	.73	67.56	26.38	.91	84.13	15.81	.90	72.00	24.32	.85
YSESS	78.45	11.91	.63	80.50	18.12	.89	88.41	10.24	.75	82.33	17.65	.91
YSET	72.24	12.52	.92	74.35	18.84	.97	84.66*	12.50	.95	74.42*	20.62	.98

*Note:*

For all subscales, scale range = 0 to 100 [higher scores indicating higher self-efficacy]

YSEFB = Forward Bending Poses Subscale of the Yoga Self-Efficacy Scale

YSEBB = Backward Bending Poses Subscale of the Yoga Self-Efficacy Scale

YSESP = Standing Poses Subscale of the Yoga Self-Efficacy Scale

YSETW = Twist Poses Subscale of the Yoga Self-Efficacy Scale

YSESS = Supine/Seated Poses Subscale of the Yoga Self-Efficacy Scale

YSET = Total Score of the Yoga Self-Efficacy Scale

M = Mean

*sd* = Standard Deviation

$\alpha$  = Alpha

\*  $p < .05$  (two-tail significance)



**Table 3.4:** Descriptive Statistics for KIMS ( $N = 51$ ).

Variable	Pre-test						Post-test					
	Yoga			Control			Yoga			Control		
	M	<i>sd</i>	$\alpha$	M	<i>sd</i>	$\alpha$	M	<i>sd</i>	$\alpha$	M	<i>sd</i>	$\alpha$
KIMSOB	32.33	6.97	.88	33.43	6.11	.84	37.81	5.26	.90	35.00	4.83	.76
KIMSDE	21.57	5.53	.88	22.80	5.12	.84	23.57	4.51	.91	23.30	5.95	.93
KIMSAW	23.67	4.93	.78	25.53	4.75	.76	24.76	4.19	.80	24.40	4.25	.79
KIMSAC	23.57	4.44	.80	25.73	4.25	.74	23.90	4.22	.77	24.48	6.02	.90

*Note:*

KIMSOB = Observing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 12 to 48 [higher scores indicate greater ability to observe])

KIMSDE = Describing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 8 to 32 [higher scores indicate greater ability to describe])

KIMSAW = Acting with Awareness Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 10 to 40 [higher scores indicate greater ability to act with awareness])

KIMSAC = Accepting without Judgment Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 9 to 36 [higher scores indicate greater ability to accept without judgment])

M = Mean

*sd* = Standard Deviation

$\alpha$  = Alpha

**Table 3.5:** Pearson Correlations Among LTEQ1, LTEQ2, Age, Height, and Weight at Pre-test (above diagonal) and Post-test (below diagonal);  $N = 51$ .

Variable	1.	2.	3.	4.	5.
1. LTEQ1	----	-.58**	.07	.11	-.24
2. LTEQ2	-.47**	----	-.06	-.08	.18
3. Age	.07	-.01	----	-.36**	-.08
4. Ht	.09	.01	-.37	----	.24
5. Wt	-.27	.29*	-.09	.24	----

*Note:*

LTEQ1 = Leisure Time Exercise Questionnaire question #1 (scale range = 0 – no ceiling)

LTEQ2 = Leisure Time Exercise Questionnaire question #2 (scale range = 1 - 3 [with lower values representing more activity])

Age = Age measured in years

Ht = Height measured in meters

Wt = Weight measured in kilograms

\*  $p < .05$  (two-tail significance)

\*\*  $p < .01$  (two-tail significance)

**Table 3.6:** Pearson Correlations for GSE, PSW, PSPP Dimensions, BES, and BIVAS at Pre-test (above the diagonal) and Post-test (below the diagonal);  $N = 51$ .

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. GSE	----	.44*	.21	.29*	.37*	.09	.46**	.42**	.52**	.41**
2. PSW	.50**	----	.52**	.44**	.42**	.54**	.53**	.78**	.76**	.79**
3. PSPPST	.16	.49**	----	.44**	.42**	.54**	.34*	.49**	.63**	.35*
4. PSPPCO	.18	.67**	.61**	----	.64**	.71**	.31*	.60**	.67**	.53**
5. PSPPBO	.42**	.81**	.40**	.52**	----	.55**	.52**	.74**	.59**	.75**
6. PSPPSP	.08	.49**	.53**	.69**	.44**	----	.23	.55**	.51**	.35*
7. BESSA	.45**	.52**	.23	.28*	.49**	.33*	----	.43**	.57**	.44**
8. BESWC	.41**	.69**	.40**	.50**	.82**	.43**	.61**	----	.74**	.75**
9. BESPC	.42**	.75**	.58**	.57**	.69**	.55**	.54**	.64**	----	.64**
10. BIVAS	.39**	.70**	.54**	.74**	.52**	.35**	.45**	.70**	.70**	----

*Note:* See previous tables for scale ranges

GSE = Global Self-Esteem

PSW = Physical Self-Worth Subscale of PSPP

PSPPST = Physical Strength Subscale of PSPP

PSPPCO = Physical Condition Subscale of PSPP

PSPPBO = Body Attractiveness Subscale of PSPP

PSPPSP = Sports Competence Subscale of PSPP

BESSA = Sexual Attractiveness Subscale of BES

BESWC = Weight Control Subscale of BES

BESPC = Physical Condition Subscale of BES

BIVAS = Body Image Visual Analog Scale

\*  $p < .05$  (two-tail significance)

\*\*  $p < .01$  (two-tail significance)

**Table 3.7:** Correlations for YSES at Pre-test (above the diagonal) and Post-test (below the diagonal);  $N = 51$ .

Variable	1.	2.	3.	4.	5.	6.
1. YSEFB	----	.69**	.58**	.72**	.78**	.88**
2. YSEBB	.83**	----	.74*	.77*	.77*	.89*
3. YSESP	.81**	.83**	----	.73*	.72*	.84**
4. YSETW	.84**	.80**	.86**	----	.79**	.89**
5. YSESS	.80**	.81**	.84**	.84**	----	.93**
6. YSET	.93**	.92**	.93**	.92**	.93**	----

*Note:*

For all subscales, scale range = 0 to 100 [with higher value indicating higher self-efficacy]

YSEFB = Forward Bending Poses Subscale of the Yoga Self-Efficacy Scale

YSEBB = Backward Bending Poses Subscale of the Yoga Self-Efficacy Scale

YSESP = Standing Poses Subscale of the Yoga Self-Efficacy Scale

YSETW = Twist Poses Subscale of the Yoga Self-Efficacy Scale

YSESS = Supine/Seated Poses Subscale of the Yoga Self-Efficacy Scale

YSET = Total Score of the Yoga Self-Efficacy Scale

\*  $p < .05$  (two-tail significance)

\*\*  $p < .01$  (two-tail significance)

**Table 3.8:** Pearson Correlations for KIMS at Pre-test (above the diagonal) and Post-test (below the diagonal);  $N = 51$ .

Variable	1.	2.	3.	4.
1. KIMSOB	----	.44**	-.00	.01
2. KIMSDE	.43**	----	.23	.22
3. KIMSAW	.14	.41**	----	.30**
4. KIMSAC	.12	.29*	.35*	----

*Note:*

KIMSOB = Observing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 12 to 48 [higher scores indicate greater ability to observe])

KIMSDE = Describing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 8 to 32 [higher scores indicate greater ability to describe])

KIMSAW = Acting with Awareness Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 10 to 40 [higher scores indicate greater ability to act with awareness])

KIMSAC = Accepting without Judgment Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 9 to 36 [higher scores indicate greater ability to accept without judgment])

\*  $p < .05$  (two-tail significance)

\*\*  $p < .01$  (two-tail significance)

### **3.1.2 Primary Hypothesis**

#### **3.1.2.1 Model 1 (GSE, PSW, BES, BIVAS, YSET)**

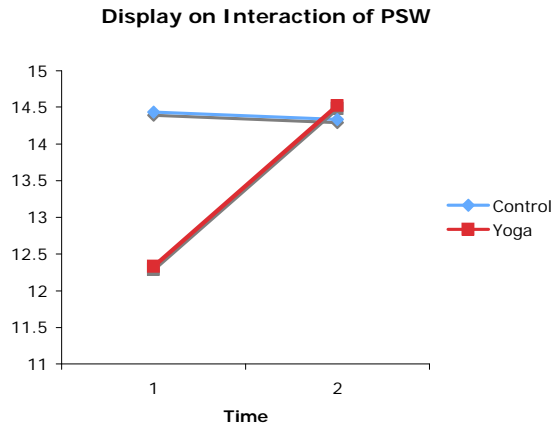
For Model 1 (see Figure 1.3), a doubly multivariate analysis of variance demonstrated a significant group by time effect, Wilks' Lambda = .61,  $F(7, 43) = 4.01$ ,  $p < .05$ . Follow-up univariate analysis was used to determine what specific variables the group by time interaction was significant for. Results showed a significance interaction on PSW,  $F(1, 49) = 12.22$ ,  $p < .05$ ; BIVAS,  $F(1, 49) = 6.45$ ,  $p < .05$ ; YSET,  $F(1, 49) = 9.84$ ,  $p < .05$ . These interactions are presented in Figures 1.4, 1.5, and 1.6.

#### **3.1.2.2 Model 2 (GSE, PSPP Subdomains, BES, BIVAS, YSET)**

For Model 2 (see Figure 1.3), a doubly multivariate analysis of variance demonstrated a significant group by time effect, Wilks' Lambda = .60,  $F(10, 40) = 2.63$ ,  $p < .05$ . Follow-up univariate analysis showed a significant interaction on PSPPCO,  $F(1, 49) = 10.65$ ,  $p < .05$ ; PSPPST,  $F(1, 49) = 13.11$ ,  $p < .05$ ; BIVAS,  $F(1, 49) = 6.45$ ,  $p < .05$ ; and YSET,  $F(1, 49) = 9.84$ ,  $p < .05$ . The interactions on PSPPCO and PSPPST are presented in Figures 1.7, and 1.8.

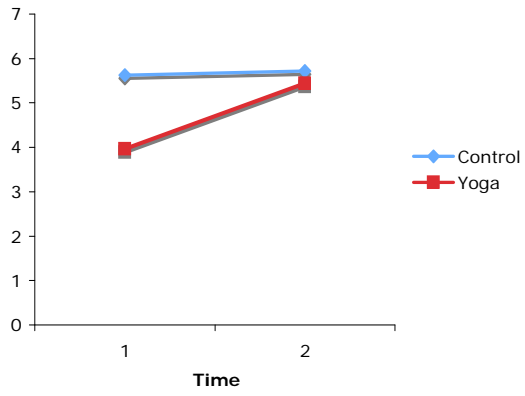
#### **3.1.2.3 Model 3 (YSES Subscales)**

For Model 3 (see Figure 1.3) a doubly multivariate analysis of variance demonstrated a significant group by time effect, Wilks' Lambda = .72,  $F(5,45) = 3.59$ ,  $p < .05$ . Follow-up univariate analysis showed a significant interaction on YSEFB,  $F(1, 49) = 17.84$ ,  $p < .05$ ; YSETW,  $F(1, 49) = 8.18$ ,  $p < .05$ ; and YSESS,  $F(1, 49) = 6.21$ ,  $p < .05$ . These interactions are presented in Figures 1.9, 1.10, and 1.11.



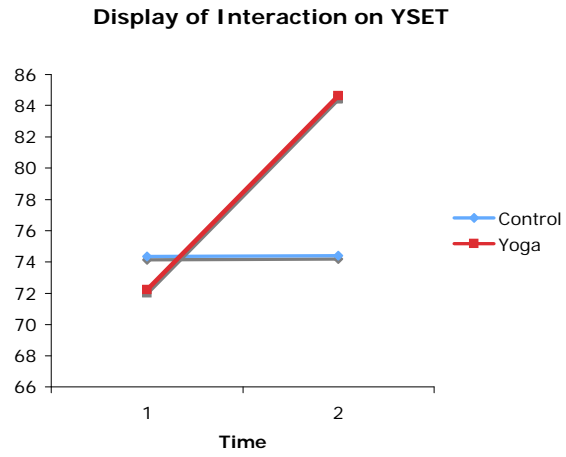
**Figure 1.5:** Group by time interaction on the PSW subscale of the PSPP

Display of Interaction on BIVAS

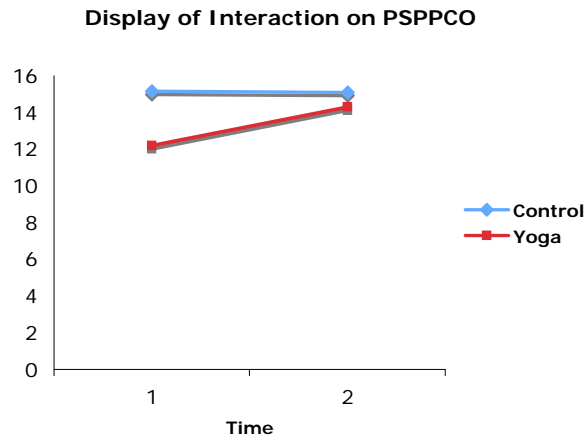


*Figure 1.6:* Group by time interaction on the BIVAS

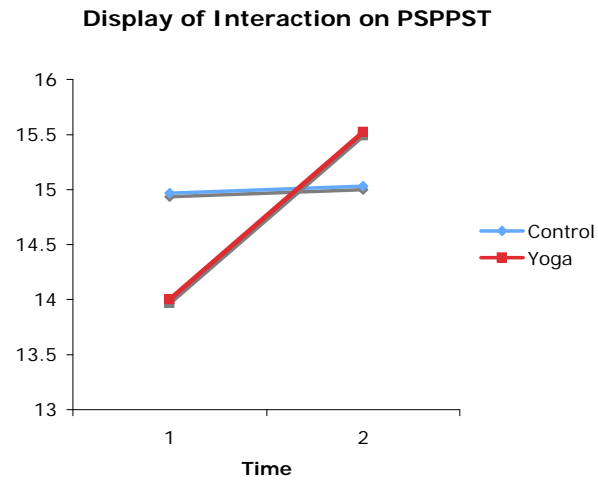




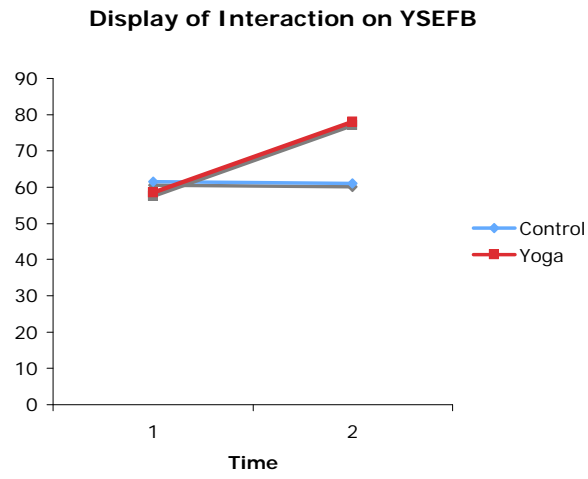
**Figure 1.7:** Group by time interaction on the YSET



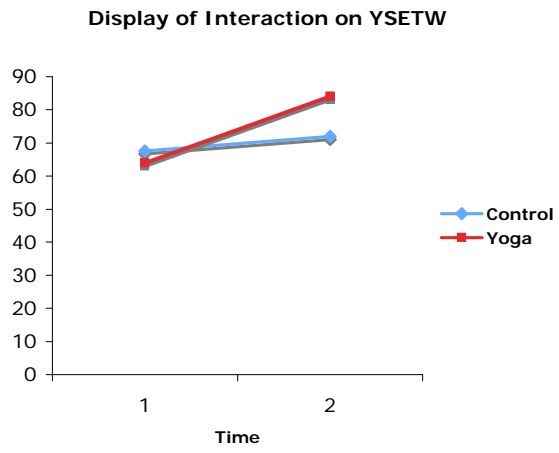
***Figure 1.8:*** Group by time interaction on the PSPPCO subscale of the PSPP



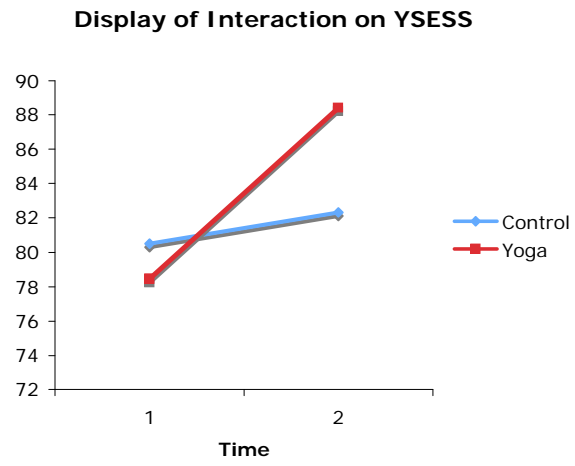
**Figure 1.9:** Group by time interaction on the PSPPST subscale of the PSPP



**Figure 1.10:** Group by time interaction on the YSETFB subscale of the YSES



***Figure 1.11:*** Group by time interaction on the YSETW subscale of the YSES



**Figure 1.12:** Group by time interaction on the YSESS subscale of the YSES

### **3.1.3 Secondary Hypothesis (Model 4: KIMS)**

It was hypothesized that participants in the yoga group would show greater change in mindfulness, as measured by the Kentucky Inventory of Mindfulness Skills, compared to a control group. The doubly multivariate analysis of variance, was significant, with Wilks' Lambda = .73,  $F(4, 46) = 4.30, p < .05$ . Follow-up univariate analysis showed a significant interaction on KIMSOB,  $F(1, 49) = 12.16, p < .05$ . This interaction is depicted in Figure 1.13.



**Figure 1.13:** Group by time interaction on the KIMSOB subscale of the KIMS



## **3.2 DISCUSSION**

### **3.2.1 Primary Hypothesis**

It was hypothesized that following a 12-week yoga intervention for middle-aged women that significant differences would be observed for the yoga group on constructs identified in the EXSEM (i.e., global self-esteem, physical competence, physical acceptance, and yoga self-efficacy). General support was found for changes in the various aspects of the physical self for the women practicing Hatha yoga in the intervention. Alternatively, global self-esteem did not change throughout the course of the yoga intervention.

Within the bottom-up hierarchical conceptualization of self-esteem in the EXSEM, Sonstroem and Morgan (1989) place physical self-efficacy at the lowest level in the hierarchy and describe it as the dimension most influenced by the environment and behaviour. Self-efficacy is also theorized to capture individuals' situation-specific self-referent predictions of success at a task, in this case of achieving success at 28 individual yoga asana (McAuley & Mihalko, 1998). Self-efficacy development at specific tasks is then believed to generalize to broader, less defined perceptions of physical abilities (i.e., physical competence). Within the context of the present study, I developed a measure of yoga self-efficacy to assess changes in participants' efficacy levels over 12 weeks of Hatha yoga participation. Significance was found on the yoga self-efficacy total score, as well as more specific dimensions of yoga self-efficacy, including forward bends, twists, and seated/supine poses. These findings support the EXSEM hypothesis that change should be observed at the self-efficacy level within an exercise intervention, because it is the dimension most easily changed. These findings

indicate the possibility of Hatha yoga providing a type of mastery experience for participants.

Likewise, other studies have found support for changes in self-efficacy following exercise interventions. For example, following a 20-week aerobic exercise program, sedentary middle-aged women showed self-efficacy gains in relation to a number of physiological test measures (e.g., sit-ups, bicycling, and walking/jogging) over the course of the program (McAuley et al., 1991). In the only study that I am aware of that examines change in self-efficacy with Hatha yoga practice, self-efficacy was found to decrease over a 3-week intervention for Japanese female undergraduate students even though self-esteem increased (Cusumano & Robinson, 1993). Although this finding seems to contradict the findings in my study and with self-esteem theory, Cusumano and Robinson suggested that their non-significant result was likely the result of the program being too short for mastery of the various yoga poses to occur. Cusumano and Robinson (1993) also did not employ the EXSEM within their research, as they were primarily interested in the effects of Hatha yoga on measures of blood pressure and resting heart rate making it difficult to compare to my research. Additionally, in their research, physical self-efficacy was measured using the Physical Self-Efficacy Scale (Ryckman and colleagues, 1982). Perhaps, the use of a very general self-efficacy measure was not sensitive enough to capture specific yoga self-efficacy changes that might have resulted during their 3-month intervention. Thus, although there is not much research on changes in self-efficacy with yoga practice, the results of my study showing changes in self-efficacy over a 12-week exercise intervention are generally supported by both the EXSEM and previous non-yoga specific self-efficacy research.

Given the significant change in self-efficacy for the Hatha yoga postures, it would then follow according to self-esteem theory that change would also be expected in physical competence, the next highest level of the EXSEM model. Again, according to the EXSEM, physical competence refers to general self-evaluation of overall physical fitness (Sonstroom & Morgan, 1989). The hypothesis of change in physical competence, as measured by the PSPP, including physical self-worth, physical condition, body attractiveness, sports competence, and physical strength, was partially supported over the course of the 12-week Hatha yoga intervention. More specifically, there were significant group by time interactions for the dimensions of physical self-worth, physical condition, and physical strength, such that the yoga group increased in physical competence to a greater degree than the control group. These findings are consistent with a wide variety of studies showing changes in physical competence can occur with exercise (Fox, 1997). Fox and Corbin (1989) in the development of the PSPP found means for college aged females on physical self-worth, physical condition, and physical strength subscales of 12.24 (*sd* 2.99), 14.85 (*sd* 4.06), and 15.18 (*sd* 3.47), compared to 14.52 (*sd* 4.17), 14.29 (*sd* 4.12), and 15.52 (*sd* 3.33) for the yoga group in the present study.

It seems logical that physical condition and strength could be enhanced with the practice of Hatha yoga asana (i.e., yoga postures), primarily due to the adaptation and muscular endurance, balance, and agility requirements of the exercise. This rationale is supported by studies, such as Tran, Holly, Lashbrook, and Amsterdam (2001), who found significant changes in muscular strength, endurance, and flexibility following an 8-week Hatha yoga intervention, including isokinetic muscular strength in elbow extension and flexion, as well as knee extension and flexion; muscular endurance in

knee flexion; and muscular flexibility in ankle flexibility, shoulder elevation, and trunk extension and flexion. Hence, it is not a surprise that perceptions of competence in these domains also change.

Despite the changes in physical self-worth, strength, and conditioning, there was no change in body attractiveness and sports competence. Research has shown that body attractiveness is an important aspect of both physical self-worth and global levels of self-esteem for university-aged women (Hayes, Crocker, & Kowalski, 1999). There is considerable overlap between the physical self-worth and body attractiveness subdomains of the PSPP, as noted numerous times in the literature (e.g., Hayes et al., 1999; Sonstroem et al., 1992), suggesting that if there is a change in physical self-worth, body attractiveness would also likely change. Thus, this is a somewhat surprising result. However, the emphasis in Hatha yoga is on alignment and movement of the body and in noticing breathing while doing the postures, as opposed to emphasizing aerobic fitness. Also, within Hatha yoga, the philosophical premise is based on accepting where one is at in each pose, rather than pushing beyond one's current ability (i.e., one wants to let go of the ego and listen to the body's cues). Therefore, in terms of body appearance, physical changes experienced during Hatha yoga might not be the same as with other aerobic (e.g., walking/jogging) and anaerobic (e.g., weight training) activities that are more strenuous, and hence more likely to change appearance through increased caloric expenditure or muscle mass. Also, as stated by Martin and Lichtenberger (2002), "Ironically, it is virtually impossible for most women to achieve today's ultrathin, aesthetic body image ideal through exercise" (p. 416); thus, body attractiveness by itself is going to be very difficult to change regardless of the mode of exercise.

Additionally, the finding of sport competence not having changed is not surprising, given that Hatha yoga does not emphasize the development of sport specific skills. Perhaps this is evidence for the PSPP in its original format not being best suited to measure physical competence for the activity of Hatha yoga given its non-competitive nature. Other activities which have been used with middle-aged adults using the PSPP such as aerobics, walking, and strength training seem better suited to using the original PSPP since these activities are more sport related than yoga. However, to help negotiate this issue, Levy and Ebbeck (2005) revised the PSPP subscale of sport competence in with a sample of middle-aged women exercisers. For the 6-item subscale each time the word 'sport' appeared it was replaced with the work 'exercise'. This modification has also been performed by Li (1999) and found adequate reliability for the modified measure ( $\alpha = .87$ ); whereas Levy and Ebbeck (2005) found acceptable internal consistency with the revised items ( $\alpha = .87$ ). If we are to use the EXSEM as a method of measurement of Hatha yoga it might be useful to also use the wording of exercise as opposed to sport for the sport competence subscale.

The dimension of physical acceptance, unique to the EXSEM, sits at the same level of generality as physical competence, and is hypothesized according to Sonstroem and Morgan to mediate the relationship between physical competence and global self-esteem (Levy & Ebbeck, 2005). Furthermore, the postulated flow within the EXSEM begins at the specific and changeable base of the model with the self-efficacy subdomain; the direction of change then moves upwards to the subdomain of physical competence; and then finally to the stable and general apex of the model of global self-esteem (Sonstroem & Morgan, 1989). Given the popularity of Hatha yoga in North

America and its focus on union of mind, body, and spirit, and in the development of greater awareness, this activity seemed particularly appropriate to test using the EXSEM. It was hypothesized that change in the measures of physical acceptance would be significant. However, although a significant change was observed with the BIVAS measure for the yoga group over time, there were no significant changes on any of the dimensions of the BES (i.e., weight control, sexual attractiveness, and physical condition). Mean values on BIVAS changed from 3.96 (*sd* 2.05) at the pre-test and 5.44 (*sd* 2.35) post-test for the yoga group.

Ever since the creation of the EXSEM, the importance of the physical acceptance dimension of the model has been emphasized (Sonstroem & Morgan, 1989). However, few studies have looked at the physical acceptance dimension of self-esteem. Among these studies, significant relationships have been found between physical acceptance, global self-esteem, and physical ability perceptions for female breast cancer survivors, with physical acceptance explaining slightly more of variance in self-esteem than physical competence (Baldwin & Courneya, 1997). Also, recent research with adult women highlighted the importance of the inclusion of physical acceptance, as it demonstrated the strongest relationship to self-esteem and made the largest contribution to overall the variance of global self-esteem compared physical competence (Levy & Ebbeck, 2005). Taken together these studies seem to suggest that satisfaction with the body, more than physical competence, might best explain the connection between exercise self-efficacies and global self-esteem (Levy & Ebbeck, 2005).

However, despite the suggested influence of physical acceptance on self-esteem and exercise for women (Marcus et al., 1995), physical acceptance has often been excluded from research studies and remains relatively underdeveloped. Within research

using the EXSEM, physical acceptance is often operationally defined using the BES (e.g., Levy & Ebbeck, 2005), including my research. A concern with this approach is that in assessing physical acceptance using the BES, one might not be directly assessing body "acceptance"; instead it likely assesses satisfaction with various body parts, processes, and functions (e.g., body scent, appetite, nose, physical stamina, etc...). To help uncover more of the variability of global self-esteem, it has also been urged that the development of measures extending beyond body satisfaction is required (Levy & Ebbeck, 2005). This, along with the focus on very specific body parts, processes, and functions, is the reason why I used the BIVAS in the present study as a secondary measure of physical acceptance. The result showing a change in BIVAS, but not BES supports that acceptance might be better assessed using more global measures of physical acceptance.

Global self-esteem sits at the apex of the EXSEM, and is thought to represent the most stable dimension of the physical self, and thus, the hardest to modify through behaviour and the environment (Sonstroem & Morgan, 1989). Also, there are many domains that are thought to influence global self-esteem with the physical self, representing only one of many (e.g., academics, social domains). One focus of my research sought to determine whether middle-aged women practicing Hatha yoga postures as a form of exercise, would experience changes in self-esteem. Following the 12-week yoga intervention, no significant changes in global self-esteem were found between the yoga and control groups (post-test values of  $M = 22.14$ ,  $sd 4.53$ ), yoga group;  $M = 21.73$ ,  $sd 5.48$ ), control group. This finding might not be surprising, since other research has also found little or no difference in global self-esteem following an exercise intervention; and this lack of support might also reflect the large number of

potential influences on a person's global self-esteem, aside from the potential influences from the physical self. For example, in a study with healthy, sedentary, older adults participating in a 16-week exercise intervention of low to moderate intensity, no significant change in self-esteem was found (Brown et al., 1995). Although one study by Cusumano and Robinson, (1993) examining yoga practice with college aged students, showed significant improvements in self-esteem, the study has methodological limitations, such as a small sample size and an intervention length less than what is recommended for self-esteem research by Fox (1990). Of the dimensions of EXSEM, it appears that global self-esteem might be the most difficult dimension to change through exercise, even in an exercise such as Hatha yoga that produces changes in both physical competence and acceptance dimensions.

Within my research study, it was interesting to find that despite both the yoga and control groups having been randomly assigned, that initially the yoga group was at or below the level of the control at time one on the condition subscale of the PSPP, the weight control subscale of the BES, and BIVAS. Of these variables, the group by time interaction was significant for the condition subscale of the PSPP and BIVAS, such that by the end of the program the yoga group had improved to the level of the control group. Previous research has shown that although there are generally positive associations between exercise and self-esteem, improvements are typically greatest for those initially lower in self-esteem (Buckworth & Dishman, 2002). The finding relating to physical acceptance (i.e., BIVAS) is consistent with previous research showing that women with low preliminary body cathexis scores (another indicator of body acceptance) improved the most following a weight lifting program across an exercise intervention (Tucker & Mortell, 1993). Similarly, another study with sedentary older adults found women in a



moderate intensity walking group experienced improved body cathexis or satisfaction following 16-weeks (Brown et al., 1995). However, these two studies were not specifically in yoga. Daubenmier (2005) compared females assigned to yoga, aerobics, and control groups for body awareness, body dissatisfaction, self-objectification, and disordered eating symptoms. The women in the yoga group were found to have lower scores on each of these measures compared to the aerobic practitioners. More interesting was that the longer the women had engaged in yoga practice, the less self-objective they were; and the more experienced, the greater was their level of body satisfaction. Conversely, for the female aerobic practitioners, the more often they practiced aerobics, the higher the reported disordered eating attitudes. Thus, given that women who engage in yoga regularly and over a long period of time seem to have the potential to acquire enhanced self-perceptions and healthier eating attitudes compared to women performing other physical exercise (i.e. aerobics). The results of my study might suggest that yoga plays an important role in helping women with initially lower body acceptance and perceptions of conditioning to improve to levels of many other women through long-term yoga practice. If these women were to become practitioners of Hatha yoga for an extended period of time and especially to gain expertise, changes in body constructs might also continue to be strengthened.

Alternatively, only for yoga self-efficacy (total score and forward bends specifically) were pre-test levels similar between the two groups and the post-test means higher for women in the yoga group compared to the control group. Thus, while yoga self-efficacy levels were similar between the groups at the start of the study, the yoga group improved in self-efficacy beyond that of the control. Within the context of the EXSEM this finding is not surprising because self-efficacy is at the base of the hierarchy

of self-esteem and is the most task specific dimension and easily changed. Plus, the control group was asked to refrain from participation in yoga during the course of the study; therefore, they would not have developed any task mastery in yoga throughout the three-month duration of the program. Not seeing a difference at the post-test on other dimensions of self-esteem, might not be as surprising because they are located higher in the self-esteem hierarchy, and therefore more difficult to change over time. Thus, while changes in physical competence and physical acceptance were changeable due to yoga, improvements beyond levels of control group, as a result of participation in yoga, was restricted to self-efficacy.

In comparison to previous research, the current sample means on global self-esteem and physical self-worth are generally in the ranges found in previous research. The mean levels of global self-esteem in the current study (yoga group,  $M = 31.14$  to  $32.14$ ; control group,  $M = 31.43$  to  $31.73$ ) are slightly higher than those in Cusumano and Robinson (1992). Cusumano and Robinson is the only study to examine global self-esteem and a Hatha yoga intervention. It involved 95 Japanese undergraduate students and showed mean ranges in global self-esteem from 28.22 to 29.53 for a progressive relaxation group and from 27.22 to 27.80 for a yoga group. Compared to other samples with adult women, the means were slightly lower. In a sample of 149 adult women, mean global self-esteem was found to be 33.44 following an on-site data collection procedure (Sonstroem et al., 1992). Women with breast cancer involved in an exercise program ( $M = 51$  years) had a mean global self-esteem value of 33.91 (Baldwin & Courneya, 1997). Given that all of these studies used the Rosenberg Self-Esteem Scale, it seems that the participants in this study were similar on self-esteem compared to other samples of middle-aged women and adults.

With respect to physical competence (as assessed by the PSPP), similar to global self-esteem, my study means were similar to previous research. More specifically, the mean values on physical self-worth for both the yoga group ( $M = 12.33$  to  $14.52$ ) and the control group ( $M = 14.43$  to  $14.33$ ) were similar to the means on physical self-worth found in Fox and Corbin's (1989) original PSPP development study. In that study, Fox and Corbin (1989) found, with 106 and 175 college-aged females, a range of mean values on physical self-worth from 12.24 to 14.79. The mean values on physical self-worth are lower than the mean of physical self-worth ( $M = 15.75$ ) found in Sonstroem, Speliotis, and Fava's (1992) study with adults (mean age of 44.1 years); however, in that study there were both males and females, and separate means were not provided.

For physical acceptance (as assessed by the BES), mean values for the middle-aged women in the present study appear to be lower than previous research with younger adult women. On subdomains of body esteem, the yoga group had mean values of 41.52 to 43.86 for sexual attractiveness, 25.14 to 26.38 for weight control, and 25.95 to 29.71 physical condition and the control group had means of 44.03 to 44.77 for sexual attractiveness, 30.33 to 28.47 for weight concern, and 28.87 to 29.87 for physical condition. In a college-aged female population, mean values on the BES were 46.9 for sexual attractiveness, 29.9 for weight concern, and 33.3 for physical condition (Franzoi & Shields, 1984). In a second sample, Franzoi and Shields (1984) compared anorexic and non-anorexic young women finding means for the BES to be higher in the non-anorexic female population with 46.1 for sexual attractiveness, 29.2 for weight concern, and 31.6 for physical condition. In a study with 193 college-aged women ( $M = 18.4$  years), means for BES subscales were 45.3 for sexual attractiveness, 26.4 for weight concern, and 31.6 for physical condition (Franzoi & Herzog, 1986). These results show

that younger women, in general, appear to have higher satisfaction with various body parts and functions than do the middle-aged women involved in my study. However, Levy and Ebbeck (2005) did utilize the BES (physical condition subscale only) to represent the physical acceptance component of the EXSEM with 122 middle-aged women ( $M = 45.9$  years). They found significant relationship between physical acceptance (physical condition subscale) and physical competence (physical self-worth subscale) to be  $r = .45$  ( $p < .01$ ). In the present study, the relationship was also significant between for weight control and physical self-worth ( $r = .69$ ,  $p < .01$ ). However, a limitation in comparing these results with the current study is that no mean values on body esteem were provided by Levy and Ebbeck. It appears that more research on middle-aged adults and the use of the PSPP and BES are required in order to make adequate comparisons to my current sample of middle-age women engaged in exercise (i.e., Hatha yoga).

Across the duration of the Hatha yoga intervention as previously discussed, several significant group by time interactions were reported. In general, for these significant interactions the yoga group approaches the level of the control group over time. This observation might actually be explained by regression to the mean for the yoga group. In other words, the groups used for the research might represent asymmetrically sampled subgroups, with the yoga group being considerably lower than the population mean at pre-test. It is generally understood that the more extreme the sample group, the greater the regression to the mean will be observed. So considering that the yoga group did start below the level of the control group means on several of the significant interactions (e.g., PSW, PSPPCO, PSPPST, BIVAS), it may be that variable means for the yoga groups regress toward the population mean from pre-test to post-test.

Finally, there is value in addressing the potential for other factors influencing the research findings. The compliance level of the control group in abstaining from yoga practice during the 12-week intervention is cause for concern in reporting significant group difference attributable to the treatment alone. Compliance of yoga group participants to meet the requirement to be included into the data analysis could also be viewed as problematic with 6 women being excluded from the analysis. While the final sample sizes were large enough to run the doubly multivariate analysis, the results might have differed had sample sizes been larger through better compliance, and in having better confidence in participants compliance with control group expectations would make the findings more credible. Additionally, we did not control for physical activity levels for either research group making it difficult to have full confidence that significant results might be attributable to changes in physical fitness. Perhaps the improvements observed over time for the yoga group could have been related to increases in physical activity and potentially physical fitness outside of the research project. Increases in strength and condition might have been attributed for other reasons than the yoga practice alone. Study findings do need to be considered against potential moderators that were not evaluated.

### **3.2.2 Secondary Hypothesis**

The second research hypothesis predicted the yoga group to show significant changes on all KIMS subscales of the mindfulness construct (i.e., observe, describe, act with awareness, accept without judgement). Mindfulness has recently been promoted as an alternative to self-esteem due to its de-emphasis on self-evaluation and because high levels of mindfulness are theorized to provide evidence of well-being (Ryan & Brown,

2003). Following a doubly multivariate analysis of variance, it was found that only the observation component of the KIMS changed for the yoga group. Baer and colleagues (2004), who developed the KIMS, consider the observing subscale to involve attention to stimuli and internal phenomena such as sounds, smells, and bodily sensations. The change in the observing subscale following 12-weeks of yoga practice makes sense given the program's focus on experiencing and learning the detailed complexity of the various asana (i.e., yoga postures). Participants were asked to pay attention to the present moment and to continually recognize how the asana felt in the body each time they practiced in class or at home.

No change was observed on the other three dimensions that comprise the KIMS, including describing, acting with awareness, and accepting (or allowing) without judgment, between the yoga and control groups following the 12 weeks of Hatha yoga participation. It is not perhaps that surprising that change was not seen for the describing KIMS subscale as it entails the rapid labelling of thoughts (i.e. mental tapes) and then continuing attending to the present moment. The program did not address thought processes or the labelling of thoughts specifically in the Hatha yoga teaching. The focus of the sessions was instead on awareness of the body and mind by attending to the breath and its qualities. Similarly, the accepting without judgment subscale of KIMS was also not directly emphasized or taught in a formal sense in the implementation of the Hatha yoga sessions. This skill is potentially honed when practiced in the midst of unwanted experiences and by then choosing to be present in that experience without rushing to change or eliminate the situation (Baer et al., 2004). The program did not knowingly address or create unwanted experiences during the Hatha yoga sessions; thus, it is not entirely surprising that change was not shown by the study findings.

Conversely, not to have found change in the acting with awareness subscale the KIMS is more difficult to understand. As this dimension is defined as engaging wholly in an activity with total focus in each moment, and given that mindfulness practitioners practice this skill in daily activities such as washing dishes and brushing their teeth (Baer et al., 2004), it would have been expected that in practicing Hatha yoga with a engaged focus and intent that change would have been observed.

Because yoga is representative of a spiritual life philosophy that includes but is not exclusive to physical activity in the movements of the numerous asana or postures, other variables beyond competence and acceptance may be useful at deciphering how yoga may work to create change in the physical self for women in midlife. Overall, middle-aged women with no previous experience with Hatha yoga seem to experience a change in a host of psychological variables associated with well-being. Given the importance for women in postmenopausal years to continue exercise participation (Asbury, Chandruangphen, & Collings, 2006), the asana and breath work inclusive of Hatha yoga may help provide a safe and accessible activity for ageing women. Other research with healthy postmenopausal women, which represents a portion of the present research sample, found moderate-intensity exercise interventions to produce changes in psychological health and quality of life but must be maintained to sustain these improvements (Asbury et al., 2006). Subsequently, Hatha yoga seems an appropriate activity for women, especially those in the middle-aged years, but may also need to be practiced regularly similar to other moderate-intensity activities, to reap the full potential for health benefits.

Another important area of discussion surrounds the appropriateness of the actual use of the EXSEM with Hatha yoga itself. Practitioners and experts of yoga alike are

quick to highlight the long-standing tradition that yoga is steeped in and the overarching philosophy it involves. Georg Feuerstein a leading expert on the philosophy of yoga describes the tradition of yoga as a process dedicated to self-knowledge and ultimately to self-realization or our true identity. He goes on to argue that much of contemporary yoga is narrowly focussed on the physical improvements possible through yoga (i.e., keeping fit), but then misses out on yoga's other more important development of the spiritual domain (Feuerstein, 2000). This is to say that while Hatha yoga focuses on the physical postures similar to other forms of exercise (e.g., strength training, aerobic exercise), it is not limited to physical activity alone. The practice of Hatha yoga goes beyond the physical posture work and is generally viewed as a life practice or philosophy that invites a person to also consider, for example, restraints and observances (yamas, niyamas), regulation of the breath (pranayama), drawing of the senses inward (prathyahara), concentration (dharana), and meditation (dhyana), as well as the ending of suffering and increased awareness (Arpita, 1983; Schell, Allolio, & Schonecke, 1994). In addition to the philosophical basis of Hatha yoga not being a perfect fit with the EXSEM, it could also be argued that another reason for this fit not being ideal could be with the use of the PSPP. If we follow the logic that Hatha yoga is part of an ancient and vast philosophy including but not exclusive to exercise, then the domains of the PSPP are not fully applicable to Hatha yoga (e.g., sport skills). Thus, there are a few points for why the use of the EXSEM might not actually be able to address the full scope of what is Hatha yoga.



## CHAPTER 4

### 4.1 SUMMARY AND CONCLUSIONS

Findings from the present research provide evidence that participation in a 12-week Hatha yoga intervention program for middle-aged women has some impact on dimensions of the physical self as examined by the EXSEM. For the middle-aged women who participated in the research, scores on the PSPP subscales of physical self-worth, conditioning, and strength; the Body Image Visual Analog Scale, one of the measures assessing physical acceptance (i.e., BIVAS); and various yoga self-efficacy scores (i.e., yoga total score, forward bends, twists, and seated/supine subscales) were found to be higher than for the control group. Additionally, in observing the interactions for the major study variables, a significant group by time interaction was found for the observation subscale of the KIMS. By the post-test measurement period, it was shown that the women in the yoga group nearly matched the pre-test values of the control group on the observation dimension of the KIMS. It seems possible that the yoga group was able to transfer the observations that took place on the mat in the yoga sessions into their daily lives.

It is unclear to what extent the use of the EXSEM helps explain the processes of change involved for middle-aged women. With the needed development of new measures of physical acceptance, and the use of mixed methodology to give voice to the experiences of participants within exercise interventions, specifically with Hatha yoga, a

better understanding of changes to the physical self may emerge. Additionally, given that some would oppose to classifying Hatha yoga as an exercise and instead as a life philosophy of self-discovery and awareness, it may be that the EXSEM is not the most appropriate method of examining yoga practice. Perhaps the best way to observe change in perceptions of the physical self with yoga practice may be through alternative "self" measures in the literature, such as self-compassion or body appreciation.

As well, researchers in the area of mindfulness would likely not be surprised by the present research findings given the belief that regulation, which is based on mindfulness rather than on self-regard or self-esteeming, allows individuals to live more vitally, act more authentically, and to be healthier; as well mindfulness might contribute to well-being and happiness (Ryan & Brown, 2003; Brown & Ryan, 2003). There appears to be a lot of support for the various self-report measures available to quantify mindfulness, including the KIMS, which is the only measure of mindfulness whose subscales are based on an empirically supported factor structure (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). However, only partial support was found for the use of the KIMS with short-term Hatha yoga practice in my study. Therefore, Hatha yoga seems to represent a practice that appears to be complex and difficult to interpret within the context of the current methodologies used to examine the physical self. With the advancements in the field of exercise psychology, and the continued value placed on the importance of health and well-being, the interest in further research studies examining yoga and other eastern movement practices is likely to continue.

## **4.2 LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH**

There were a few notable limitations that should be addressed with regards to the present research study. Firstly, due largely to the length of the intervention and available resources to conduct the study, the sample size ( $N = 51$ ) was limited. As a result, there were a few differences on a few of the key variables between the yoga and control groups at the post-test, despite random assignment of participant to either the yoga or control group. These differences would likely have been diminished had the sample size had been larger. However, even with the limited sample size, there were differences on only 3 of 25 mean comparisons, suggesting that random assignment remained relatively effective in equating the groups at the pre-test.

An additional challenge shared among researchers in the social sciences, is adherence to the intervention requirements. Even with the incentive of a one-month period of yoga for the women randomized to the control group, based on the recommendations from Jacobs and colleagues (2004), 20 women dropped out of the study before its completion (60.8% retention). Reasons for dropouts included failure to complete the minimum yoga requirements for inclusion within data analysis, illness and personal issues, or in failing to be present during data collection. Relevant studies have found similar adherence rates with a 51.7% adherence for sedentary middle-adults engaged in a 20-week aerobic exercise program examining self-efficacy, and 64% for participants performing yoga for 12-weeks to assess chronic low back pain (Jacobs et al., 2004; McAuley et al., 1991). Although the retention rate was similar to other yoga intervention research, ultimately if we are to fully understand change within exercise interventions, finding ways to retain a greater percentage of participants is needed.

A third notable limitation with the current study was the modest duration of the intervention. The 12-week period used for the intervention matched the length of time used in the study examining chronic low back pain (Jacobs et al., 2004); however, it has been highlighted that the shortest period of time to be used with the EXSEM with interventions be 12 weeks in duration with some continued contact for an additional 6 months. Relevant to this issue, the original research on the EXSEM utilized the American College of Sports Medicine recommendation that a minimal intervention duration should be between 15 to 20 weeks to detect the presence of physical training effects (Fox, 2000; Sonstroem & Morgan, 1989). It is possible that findings from the study might have differed or been strengthened had the length of the study exceeded the minimum time period recommended in the literature. It also would have been interesting to track the women over several time intervals following the completion of the study to assess the long-term impacts that the practice of Hatha yoga might have on these psychological variables.

An additional study limitation involved the requirements of the control group. Participants in the control group were given instructions after filling out the first questionnaire package to abstain from taking yoga classes or learning about yoga in other ways such as reading, over the 12-week period. However, whether the participants actually did abstain from participating or learning about yoga during the study was not evaluated and could be cause for concern. While the statistical analysis found significant group by time interactions on yoga self-efficacy for forward bends, twists, seated/supine, and total yoga self-efficacy scores following the 12-week intervention, there is no way to evaluate whether the control group abstained from yoga during the study. Retrospectively, it would have been an improvement in the research design had I

phoned control group participants midway through the intervention with a reminder to abstain from yoga experiences or perhaps we could have included an item in the second questionnaire package for the control group to better assess whether the group had abstained from yoga during the study.

As well, physical activity guidelines for control group participants were not established for the present study. The lack of such guidelines could have influenced the study findings since we did not record what physical activities the women were engaged and how their involvement might have changed from pre-test to post-test. For example, findings might be attributed to decreased physical activity involvement for the control group rather than due to the effects of the yoga treatment. Similarly, it is possible that participants in the control group were participating in yoga-like activities such as pilates or tai chi during the intervention since these were not restricted. Another possibility could be that the yoga group simply replaced the Hatha yoga participation for some other physical activity they would typically do instead. Consequently because we did not control for physical activity for the study, we are left to wonder with how much confidence changes between groups can be attributed to the yoga treatment alone.

Finally, measurement issues were a source of concern in the present research study. Notably, the physical competence domain of the EXSEM has repeatedly been the focus of previous research using the EXSEM (Sonstroem et al., 1994). Given that physical acceptance is proposed to mediate the relationship between physical competence and global self-esteem, and is at the same level in the model as physical competence, the need to continue to develop acceptance measures is necessary. In particular, development of physical acceptance measures is necessary for a full understanding of the relationship between self-esteem and exercise for women (Levy &

Ebbeck, 2005). It may be that physical acceptance as assessed by the BES and the BIVAS is not the most important method by which to capture acceptance or the types of change that occur with an ongoing Hatha yoga practice. Because the emphasis of Hatha yoga is on the inner body and acceptance of one's current ability level with the postures, changes in satisfaction with body parts or processes might not capture the philosophy that the women were working with in their yoga practice process. It could also be that the measures used in the research were not sufficiently sensitive to detect subtle trending changes.

Clearly, the YSES needs to be evaluated for both reliability and validity so it could be used to investigate yoga self-efficacy within the EXSEM framework. More specifically, the YSES needs to be assessed for analysis of item characteristics, internal consistency and stability of subscales, and for convergent validity with EXSEM measures. Given the reality of the measure needing to be further researched either by myself or other researchers more research is needed. On a positive note, change over time was observed using the YSES for the present study giving it some merit as a potentially usable measure for yoga self-efficacy.

Last but certainly not least, a potential limitation of the study is that I taught half of the yoga classes offered during the 12-week intervention. According to self-efficacy theory, four variables are theorized to influence self-efficacy: past performance accomplishments, vicarious experiences, social or verbal persuasion, and physiological arousal (McAuley, 1994). Social or verbal persuasion, a commonly used technique by teachers, coaches and peers to bolster individuals' personal efficacy, is less powerful in influencing self-efficacy compared to personal accomplishments. Considering I taught half of the yoga sessions, it is important to acknowledge the potential that my teaching

influenced the yoga self-efficacy improvements that were observed. Ideally, I would like to have been able to obtain two instructors to teach the yoga intervention classes but limited funding required that I assist in the teaching.

Overall, despite these limitations, the findings seemed to somewhat support a hierarchical bottom-up approach following the 12-week yoga intervention, as the EXSEM predicts. Theory would posit that given the presence of general support for change in all lower levels of the model there would greater potential to see change at the highest level of self-esteem (Sonstroem & Morgan, 1989). In the present study, the strongest support for change was in self-efficacy, and the weakest support for change was in self-esteem, which provides indirect evidence of a bottom-up flow. However, there is a need for future research to directly assess the direction of causal flow in various component of the EXSEM. Previous research has found no support for top-down or bottom-up effects models of self-esteem, suggesting limited support that changes in specific levels of these models influence one another (Kowalski et al., 2003; Marsh & Yeung, 1998). Even after the duration of a one-year study, Kowalski and colleagues (2003) found bottom-up effects were weak for adolescent females. However, the Kowalski et al. (2003) study was not an intervention study, and they recognized that the results might differ in interventions specifically targeting changes in the physical self. The challenge, of course, is that adequate testing of the flow from one level to the next in the EXSEM will require both large samples and sufficiently long time periods of intervention.

Future studies seeking to explore the capacity for change in variables of the physical self with middle-aged female populations will also need to find new and creative ways to increase adherence to exercise interventions. In addition, researchers

in the field of exercise and the physical self will need to address the underdevelopment of the physical acceptance domain of the EXSEM, if this domain continues to be part of the model. Given the original emphasis on the importance of physical acceptance to relating to physical competence and global self-esteem by Sonstroem and Morgan (1989), it seems due time to invest in improving both how acceptance of the physical self is defined and measured within the EXSEM.

Furthermore, while much interest has been garnered for the use of Buddhist based mindfulness as an alternative to self-esteem, self-compassion having received less research attention offers another option (Neff, 2004). Based on concepts drawn from Buddhist philosophy similar to mindfulness, the construct of self-compassion has been promoted as an alternative to self-esteem theory recently in Western psychology due to its freedom from the evaluation process (Neff, 2003a). The basic premise of self-compassion and how it fundamentally differs from self-esteem, involves less judgement of the self and of others, as evaluations and comparisons are not theorized to alter self-esteem (Neff, 2003b). Self-compassion is felt to be more easily changed than self-esteem via individuals adopting realistic views of the self and making behaviour changes out of the desire to improve the well-being of others and themselves (Neff, 2003b). Self-compassion comprises three distinct components: self-kindness, common humanity, and mindfulness (Neff, 2003a). Self-kindness allows a person to regard failure and pain in a kind and understanding manner; common humanity creates a sense of belonging to a larger human experience; and mindfulness in the context of self-compassion would lend balanced awareness of painful thoughts and feelings rather than over-identification (Neff, 2003b). Given the philosophical background of Hatha yoga and its focus on awareness, it would be interesting to assess whether self-compassion would be a relevant



construct to use in place of the EXSEM. It follows, that had self-compassion been assessed in the current study, participants might have experienced heightened self-compassion even though no changes were observed in global self-esteem. This is of course only speculation because self-compassion was not assessed in my study, but is an interesting question for future research.

Another recommendation for future research needs to address the issue of the absence of participants' voices in the discussion. Because the study used only quantitative methodology, the qualitative experiences of the women have not been fully understood. This viewpoint was shared with me by one of the participants in an email sent to me after the completion of the data collection. Future research could utilize qualitative methods, such as interviewing and focus groups, to gain a clearer and more complete picture of the change process arising from participation in a yoga intervention and the impact that yoga participation has on elements of self-esteem, physical competence, physical acceptance, and physical self-efficacy. The original intent of the research was to include a mixed-methods design but was altered due to time constraints. Additional insight into the topic of how the practice of Hatha yoga might influence self-esteem, physical self-perceptions, physical acceptance of the body, and mindfulness may have been gathered through the inclusion of such a qualitative research component. In this way, emergent concepts and themes generated from the participants themselves could have informed how change occurred and what that change entailed. In the words of the participant who e-mailed me (repeated here with permission), "... yoga has offered me way more than I think the questionnaire gets at. I understand why you have to work with a standardized questionnaire...I think these awarenesses are very important for women as they age. It helps cope with the physiological changes as well as

contributing a positive subtle sense of self by carrying oneself a little taller and perhaps with a little more confidence.”

#### **4.2.1 Self-Reflection**

Given the failure of the present methodology and statistical analysis to capture the full understanding of the processes underway for middle-aged women participating in Hatha yoga, what might I have done differently? Originally my study was intended to be mixed-methods in nature but due to time constraints with my masters degree program was reduced solely to quantitative methodology. Before excluding the qualitative component from the research I conducted the first of four proposed stages of qualitative analysis with a focus group session. At that time, the question I was interested in exploring was to understand the experiences of Hatha yoga instructors who teach with middle-aged women. I felt that speaking with Hatha yoga instructors was a more feasible process to tease out the potential processes of change that occur with ongoing Hatha yoga practice than to interview participants in the quantitative study (i.e., the 51 middle-aged women). I was partially correct in my assumption, given the incredible stories and insights these female teachers had to share about the processes at play with Hatha yoga practice for both themselves as middle-aged women and for the women they teach. After having completed the quantitative study, I now realize that I was also partially wrong in my assumption that the 51 women who participated would not be able to articulate changes that might occur with the 12-weeks of yoga practice. I was amazed at how many stories and insights the participants shared with me and also to the other yoga instructor in the study. The women spoke of experiences of increased body and breath awareness both during yoga and outside of the study in their daily lives; of

decreased back pain; of respect and confidence in their bodies; and of increased relaxation, peacefulness, and rest. The greatest lesson I have learned from these women is to never underestimate the ability of students of yoga of whatever level of experience to be able to express their experiences.

## REFERENCES

- Alfermann, D., & Stoll, O. (1997). Exercise and self-concept in middle-aged adults. In R. Lidor & M. Bar-Eli (Eds.), *Proceedings of the 9<sup>th</sup> World Congress of Sport Psychology, Innovations in sport psychology: Linking theory and practice* (pp. 68-70). Netanya, Israel: The Wingate Institute for Physical Education.
- Asbury, E. A., Chandruangphen, P., & Collins, P. (2006). The importance of continued exercise participation in quality of life and psychological well-being in previously inactive postmenopausal women: A pilot study [Electronic version]. *Menopause: The Journal of The North American Menopause Society, 13*, 561-567.
- Asci, F. H. (2002). The effects of step dance on physical self-perception of female and male university students. *International Journal of Sport Psychology, 33*, 431-442.
- Asci, F. H., Kin, A., & Nazan Kosar, S. (1998). Effect of participation in an 8 week aerobic dance and step aerobics program on physical self-perception and body image satisfaction. *International Journal of Sport Psychology, 29*, 366-375.
- Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky inventory of mindfulness skills. *Assessment, 11*, 191-206
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27-45.
- Baldwin, M. K., & Courneya, K. S. (1997). Exercise and self-esteem in breast cancer survivors: An application of the exercise and self-esteem model. *Journal of Sport*

*and Exercise Psychology, 19, 347-358.*

- Blascovich, J., & Tomaka, J. (1993). Measures of self-esteem. In J. P., Robinson, P. R., Shaver, & L. S. Wrightman (Eds.), *Measures of personality and social psychological attitudes (3<sup>rd</sup> ed.)* (pp. xx-xx). Ann Arbor: Institute for social research.
- Bloch, A. (2002). Self-awareness during the menopause. *Maturitas, 41, 61-68.*
- Brown, D. R., Wang, Y., Ward, A., Ebbeling, C. B., Fortlage, L., Puleo, E., Benson, H., & Rippe, J. M. (1995). Chronic psychological effects of exercise and exercise plus cognitive strategies. *Medicine and Science in Sports and Exercise, 27, 765-775.*
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role is psychological well-being. *Journal of Personality and Social Psychology, 84, 822-848.*
- Buckworth, J., & Dishman, R. K. (2002). *Exercise psychology*. Champaign, IL: Human Kinetics.
- Cameron, M. E. (2002). Yoga. In Snyder, M. and Ruth Lindquist (Eds), *Complementary /alternative therapies in nursing*. NY: Springer Publishing Company.
- Carlson, L. E., Speca, M., Patel, K. D., & Goodey, E. (2004). Mindfulness-based stress reduction in relation to quality of life, mood, symptom of stress and levels of cortisol, dehydroepiandrosterone sulphate (DHEAS) and melatonin in breast and prostate cancer outpatients. *Psychoneuroendocrinology, 29, 448-474.*
- Caruso, C. M., & Gill, D. L. (1992). Strengthening physical self-perceptions through exercise. *Journal of Sports Medicine and Physical Fitness, 32, 416-427.*
- Chrisler, J. C., & Ghiz, L. (1993). *Body image issues of older women*. In N. D. Davis,

- E. Cole, & E. D. Rothblum (Eds.), *Faces of women and aging* (pp. 67-75).  
NY, NY: The Hawthorn Press, Inc.
- Clance, P. R., Mitchell, M., & Engelman, S. R. (1980). Body cathexis in children as a function of awareness training and yoga. *Journal of Clinical Child Psychology*, 9, 82-85.
- Copeland, J. L., Kowalski, K. C., Donen, R. M., & Tremblay, M. S. (2005). Convergent validity of the physical activity questionnaire in adults: The new member of the PAQ family. *Journal of Physical Activity and Health*, 2, 216-229.
- Cusumano, J. A., & Robinson, S. E. (1992). The short-term psychological effects of hatha yoga and progressive relaxation on female Japanese students. *Applied Psychology: An International Review*, 42, 77-90.
- Daubenmier, J. J. (2005). The relationship of yoga, body awareness, and body responsiveness to self-objectification and disordered eating. *Psychology of Women Quarterly*, 29, 207-219.
- DeVellis, R. F. (1991). Scale Development: Theory and applications. In R. F. DeVellis, *Guidelines in scale development* (pp. 51-90). Newbury Park, CA: Sage Publications.
- Engelman, S. R., Clance, P. R., & Imes, S. (1982). Self and body-cathexis change in therapy and yoga groups. *Journal of the American Society of Psychosomatic Dentistry and Medicine*, 29, 77-88.
- Feuerstein, G. (2000). Retreating into the self with yoga. *International Association of Yoga Therapists* [Online Version].
- Fishman, L. (2003). Yoga in medicine. In S.E. Wainapel & A. Fast (Eds.), *Alternative medicine in rehabilitation: A guide for practitioners* (pp. 139-173). NY, NY:

Demos Medical Publishing.

- Fox, K. R. (1997). The physical self and processes in self-esteem development. In K. R. Fox (Ed.), *The physical self: From motivation to well-being* (pp.111-140). Champaign, IL: Human Kinetics.
- Fox, K. R. (1998). Advances in the measurement of the physical self. In J. L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 295-310). Morgantown, WV: Fitness Information Technology, Inc.
- Fox, K. R. (2000a). Self-esteem, self-perceptions and exercise. *International Journal of Sport Psychology*, *31*, 228-240.
- Fox, K. R. (2000b). The effects of exercise on self-perceptions and self-esteem. In Biddle, S. J. H. Biddle, K. R. Fox, & S. H. Boutcher (Eds.), *Physical activity and psychological well-being* (pp. 88-117). NY: Routledge.
- Fox, K. R., & Corbin, C. B. (1989). The Physical Self-Perception Profile: Development and preliminary validation. *Journal of Sport and Exercise Psychology*, *11*, 408-430.
- Francis, L. J., & Wilcox, C. (1995). Self-esteem: Coopersmith and Rosenberg compared. *Psychological Reports*, *76*, 1050.
- Franzoi, S. L., & Shields, S. A. (1984). The Body Esteem Scale: Multidimensional structure and sex differences in a college population. *Journal of Personality Assessment*, *48*, 173-178.
- Gift, A. G. (1989). Visual analogue scales: Measurement of subjective phenomena. *Nursing Research*, *38*, 286-288.
- Godin, G., Jobin, J., & Bouillon, J. (1986). Assessment of leisure time exercise behavior

- by self-report: A concurrent validity study. *Canadian Journal of Public Health*, 77, 359-361.
- Godin, G., & Shephard, R. J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Science*, 10, 141-146.
- Harinath, K., Malhotra, A. S., Pal, K., Prasad, R., Kumar, R., Kain, R. C., Rai, L., & Sawhney, R. C. (2004). Effects of hatha yoga and omkar meditation on cardiorespiratory performance, psychologic profile, and melatonic secretion. *The Journal of Alternative and Complementary Medicine*, 10, 261-268.
- Jacobs, D. R., Ainsworth, B. E., Hartman, T. J., & Leon, A. S. (1993). A simultaneous evaluation of 10 commonly used physical activity questionnaires. *Medicine and Science in Sports and Exercise*, 25, 81-91.
- Jacobs, B. P., Mehling, W., Goldberg, H., Eppel, E., Acree, M., Lasater, J., & Miasowski, C. (2004). Feasibility of conducting a clinical trial of hatha yoga for chronic low back pain: Methodological lessons. *Alternative Therapies in Health and Medicine*, 10, 80-83.
- Keith, L. K., & Bracken, B. A. (1996). Self-concept instrumentation: A historical and evaluative review. In B. A. Bracken (Ed.), *Handbook of self-concept: Developmental, social, and clinical considerations* (pp. 91-165). New York: Wiley.
- King, A. C., Taylor, C., Haskell, W. L., & DeBusk, R. F. (1989). Influence of regular aerobic exercise on psychological health: A randomized, controlled trail of healthy middle-aged adults. *Health Psychology*, 8, 305-324.
- King, A. C., Taylor, C., & Haskell, W. L. (1993). Effects of differing intensities and



- formats of 12 months of exercise training on psychological outcomes in older adults. *Health Psychology, 12*, 292-300.
- Kolter, A. (Ed.) (2004), *The Thich Nhat Hanh Collection: Peace is every step, teachings on love, the stone boy and other stories*. NY, NY: One Spirit.
- Kowalski, K. C., Crocker, P. R. E., Kowalski, N. P., Chad, K. E., & Humbert, L. M. (2003). Examining the physical self in adolescent girls over time: Further evidence against the hierarchical model. *Journal of Sport and Exercise Psychology, 25*, 5-18.
- Krishnamurti, J. (1970). In D. Rajagopal (Ed.), *Think on these things*. NY, NY: First Perennial Library.
- Lachman, M. E., & Bertrand, R. M. (2001). *Personality and the self in midlife*. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 279-309). NY, NY: John Wiley & Sons, Inc.
- Lasater, J. H. (1999). *Living your yoga: Finding the spiritual in everyday life*. Berkeley, CA: Rodmell Press.
- Leary, M. R. (1995). *Self-Presentation: Impression management and interpersonal behavior*. Madison, WI: Brown & Benchmark's Publishers.
- Lee, C. (2002). *Om yoga: A guide to daily practice*. San Francisco, CA: Chronicle Books.
- Levy, S. S., & Ebbeck, V. (2005). The exercise and self-esteem model in adult women: the inclusion of physical acceptance. *Psychology of Sport and Exercise, 6*, 571-584.
- Lofshult, D. (2003). Targeting yoga to special populations: Points to consider when designing yoga programs for pre/postnatal women, seniors, children, and clients

- with weight and health challenges. *IDEA Health and Fitness Sources*, 21, 36-43.
- Malathi, A., Damodaran, A., Shan, N., & Patil, N. (1999). Self-actualization and practice of yoga. *NIMHANS Journal*, 17, 39-44.
- Marcus, B. H., Dubbert, P. M., King, A. C., & Pinto, B. M. (1995). Physical activity in women: Current status and future directions. In A. L. Stanton & S. J. Gallant (Eds.), *The psychology of women's health: Progress and challenges in research and application* (pp. 349-379). Washington, DC: American Psychological Association.
- Marsh, H. W. (1994). The importance of being important: Theoretical models of relations between specific and global components of physical self-concept. *Journal of Sport and Exercise Psychology*, 16, 306-325.
- Marsh, H. W., & Sonstroem, R. J. (1995). Importance ratings and specific components of physical self-concept: Relevance to predicted global components of self-concept and exercise. *Journal of Sport and Exercise Psychology*, 17, 84-104.
- Marsh, H. W., & Yeung, A. S. (1998). Top-down, bottom-up, and horizontal models: The direction of causality in multidimensional, hierarchical self-concept models. *Journal of Personality and Social Psychology*, 75, 509-527.
- Martin, J. R. (1997). Mindfulness: A proposed common factor. *Journal of Psychotherapy Integration*, 7, 291-312.
- Martin, K. A., & Lichtenberger, C. M. (2002). Fitness enhancement and changes in body image. In T. F. Cash, & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 414-421). New York: Guilford Press.
- McAuley, E. (1994). *Physical activity and psychosocial outcomes*. In C. Bouchard, R. J.

- Shephard, & T. Stephens (Eds.), Physical activity, fitness, and health: International proceedings and consensus statement (pp. 551-568). Champaign, IL: Human Kinetics.
- McAuley, E., Blissmer, B., Katula, J., Duncan, T. E., & Mihalko, S. L. (2000). Physical activity, self-esteem, and self-efficacy relationships in older adults: A randomized controlled trial. *Annals of Behavioral Medicine*, 22, 131-139.
- McAuley, E., Courneya, K. S., & Lettunich, J. (1991). Effects of acute and long-term exercise on self-efficacy responses in sedentary, middle-aged males and females. *The Gerontologist*, 31, 534-542.
- McAuley, E., & Mihalko, S. L. (1998). Measuring exercise-related self-efficacy. In J. L. Duda (Ed.), *Advances in Sport and Exercise Psychology Measurement* (pp. 371-390). Morgantown, WV: Fitness Information Technology, Inc.
- McQuaide, S. (1998). Discontent at midlife: Issues and considerations in working towards women's well-being. *Families in Society: The Journal of Contemporary Human Services*, 79, 532-541.
- Neff, K. (2003a). The development and validation of a scale to measure self-compassion. *Self and Identity*, 2, 223-250.
- Neff, K. (2003b). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, 2, 85-101.
- Neff, K. (2004). Self-compassion and psychological well-being. *Constructivism in the Human Sciences*, 9, 27-37.
- Paxton, S. J., & Phytian, K. (1999). Body image, self-esteem, and health status in middle and later adulthood. *Australian Psychologist*, 34, 116-121.
- Pearlman, S. F. (1993). *Late midlife astonishment: Disruptions to identity and self-*

- esteem*. In N. D. Davis, E. Cole, & E. D. Rothblum (Eds.), *Faces of women and aging* (pp. 1-12). NY, NY: The Hawthorn Press, Inc.
- Pliner, P., Chaiken, S., & Flett, G. L. (1990). Gender differences in concern with body weight and physical appearance over the life span. *Personality and Social Psychology Bulletin*, *16*, 263-273.
- Rani, N. J., & Roa, P. V. (1994). Body awareness and yoga training. *Perceptual and Motor Skills*, *79*, 1103-1106.
- Ross, R. (2001). *Yoga as a therapeutic modality*. In M. I. Weintraub (Ed), *Alternative and Complementary Treatment in Neurologic Illness* (pp. 75-92). NY: NY, Churchill Livingstone.
- Ryan, R. M., & Brown, K. W. (2003). Why we don't need self-esteem: On fundamental needs, contingent love, and mindfulness. *Psychological Inquiry*, *14*, 71-76.
- Ryff, C. D. (1995). Psychological well-being in adult life. *Current Directions in Psychological Science*, *4*, 99-104.
- Sahajpal, P., & Rinpari, R. (2000). Impact of induced yogic relaxation training (IYRT) on stress-level, self-concept and quality of sleep among minority group individuals. *Journal of Indian Psychology*, *18*, 66-73.
- Saper, R. B., Eiseberg, D. M., Davis, R. B., Culpepper, L., & Phillips, R. S. (2004). Prevalence and patterns of adult yoga use in the United States: Results of a national survey. *Alternative Therapies in Health and Medicine*, *10*, 44-49.
- Saucier, M. G. (2004). Midlife and beyond: Issues for aging women. *Journal of Counseling & Development*, *82*, 420-425.
- Schell, F. J., Allolio, B., & Schonecke, O. W. (1994). Physiological and psychological

- effects of hatha-yoga exercise in healthy women. *International Journal of Psychosomatics*, 41, 46-52.
- Secord, P. F., & Jourard, S. M. (1953). The appraisal of body cathexis: Body cathexis and the self. *Journal of Consulting Psychology*, 17, 343-347.
- Shaw, J. M., Ebbeck, V., & Snow, C. M. (2000). Body composition and physical self-concept in older women. *Journal of Women and Aging*, 12, 59-75.
- Silber, E., & Tippett, J. (1965). Self-esteem: Clinical assessment and measurement validation. *Psychological Reports*, 16, 1017-1071.
- Sonstroem, R. J. (1984). Exercise and self-esteem. *Exercise and Sport Sciences Review*, 12, 123-155.
- Sonstroem, R. J. (1998a). The physical self-system: A mediator of exercise and self-Esteem. In K.R. Fox (Ed.), *The physical self from motivation to well-being* (pp.1-26). Champaign, IL: Human Kinetics.
- Sonstroem, R. J. (1998b). Physical self-concept: Assessment and external validity. In J. O. Holloszy (Ed.) *Exercise and sport sciences reviews* (Vol. 26, p. 133-164). Baltimore: Williams & Wilkins.
- Sonstroem, R. J., Harlow, L. L., Gemma, L. M., & Osborne, S. (1992). Test of structural relationships within a proposed exercise and self-esteem model. *Journal of Personality Assessment*, 56, 348-364.
- Sonstroem, R. J., Harlow, L. L., & Josephs, L. (1994). Exercise and self-esteem: Validity of model expansion and exercise associations. *Journal of Sport and Exercise Psychology*, 16, 29-43.
- Sonstroem, R. J., & Morgan, W. P. (1989). Exercise and self-esteem: Rational and model. *Medicine and Science in Sports and Exercise*, 21, 329-337.

- Sonstroem, R. J., & Potts, S. A. (1996). Life adjustment correlates of physical self-concepts. *Medicine and Science in Sports and Exercise*, 28, 619-625.
- Sonstroem, R. J., Speliotis, E. D., & Fava, J. L. (1992). Perceived physical competence in adults: An examination of the Physical Self-Perception Profile. *Journal of Sport and Exercise Psychology*, 14, 207-221.
- Sorensen, M., Anderssen, S., Hjerman, I., Holme, I., & Ursin, H. (1997). Exercise and diet interventions improve perceptions of self in middle-aged adults. *Scandinavian Journal of Medicine and Science in Sports*, 7, 312-320.
- Statistics Canada – Census population data (2001). Profile of the Canadian population by age and sex: Canada ages. Retrieved April 11, 2005, from <http://www12.statcan.ca/english/census01/Products/Analytic/companion/age/images/96F0030XIE2001002.pdf>
- Staudinger, U. M., & Bluck, S. (2001). A view of on midlife development from life-span theory. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 3-39). NY, NY: John Wiley & Sons.
- Stokes, R., & Frederick-Recascino, C. (2003). Women's perceived body image: Relations with personal happiness. *Journal of Women & Aging*, 15, 17-29.
- Tabachnick, & Fidell (2001). *Using multivariate statistics* (4<sup>th</sup> Ed.) Boston, MA: Allyn & Bacon.
- Taylor, M. J. (2003). Yoga therapeutics: An ancient, dynamic systems theory. *Techniques in Orthopaedics*, 18, 115-125.
- Tucker, L A., & Mortell, R. (1993). Comparison of the effects of walking and weight training programs on body image in middle-aged women: An experimental study. *American Journal of Health Promotion*, 8, 32-42.

- Tran, M. D., Holly, R. G., Lashbrook, J., & Amsterdam, E. A. (2001). Effects of hatha yoga practice on the health-related aspects of physical fitness. *Preventative Cardiology, 4*, 165-170.
- Wilcox, S. (1997). Age and gender in relation to body attitudes: Is there a double standard of aging? *Psychology of Women Quarterly, 21*, 549-565.
- Wilson, S. R. (1988). The “real self” controversy: Toward an integration of humanistic and interactionist theory. *Journal of Humanistic Psychology, 28*, 39-65.
- Whitbourne, S. K., & Skultety, K. M. (2002). Body image development: Adulthood and aging. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 83-90). New York: Guilford Press.
- Wolsko, P. M., Eisenberg, D. M., Davis, R. B., & Phillips, R. S. (2004). Use of mind-body medical therapies. *Journal of General Internal Medicine, 19*, 43-50.
- Wylie, R. C. (1989). *Measures of self-concept*. Lincoln, NB: University of Nebraska Press.
- Yee, R. (2001). *Yoga: Poetry of the body*. Pembroke, MA: Griffen.

## APPENDICES



**APPENDIX A**  
**ETHICS APPROVAL**



**UNIVERSITY OF SASKATCHEWAN  
BEHAVIOURAL RESEARCH ETHICS BOARD**

<http://www.usask.ca/research/ethics.shtml>

**NAME:** Kent Kowalski (Sarah Junkin)  
Kinesiology

**Beh #05-163**

**DATE:** July 7, 2005

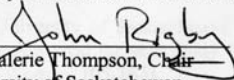
The University of Saskatchewan Behavioural Research Ethics Board has reviewed the Application for Ethics Approval for your study "Yoga and Self-Esteem: Exploring the Capacity for Change in Middle-Aged Women" (05-163).

1. Your study has been **APPROVED SUBJECT TO THE FOLLOWING MINOR MODIFICATION(S)**:
  - Please revise the consent form to include:
    - The correct contact information for the Office of Research Services (306.966.2084).
    - A statement acknowledging that participants may call the Office of Research Services collect.
    - The consent form should provide more details regarding the potential risks involved in the yoga class, and describe the steps taken to minimize those risks. The consent form should also indicate what steps will be taken should a participant become injured during the class.
    - Please remove the statement that says that the art work produced by the participants to become the property of the researcher. Participants have the right to withdraw retroactively, and to reclaim their artwork; they should also be afforded the right to reclaim their work once the need for it has passed.
  - Please ensure that all identifying information about the participants is destroyed once the need for it has passed.
2. Please send one copy of your revisions to the Ethics Office for our records. **Please highlight or underline any changes made when resubmitting.**
3. The term of this approval is for 5 years.
4. This letter serves as your certificate of approval, **effective as of the time that the requested modifications are received by the Ethics Office.** If you require a letter of unconditional approval, please so indicate on your reply, and one will be issued to you.

**Office of Research Services, University of Saskatchewan**  
Room 1607, 110 Gymnasium Place, Box 5000 RPO University, Saskatoon SK S7N 4J8 CANADA  
Telephone: (306) 966-8576 Facsimile: (306) 966-8597  
<http://www.usask.ca/research>

5. Any significant changes to your proposed study should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.
6. **This approval is valid for five years on the condition that a status report form is submitted annually to the Chair of the Research Ethics Board.** This certificate will automatically be invalidated if a status report form is not received within one month of the anniversary date. Please refer to the website for further instructions: <http://www.usask.ca/research/behavrsc.shtml>

I wish you a successful and informative study.

  
605 Dr. Valerie Thompson, Chair  
University of Saskatchewan  
Behavioural Research Ethics Board  
VT/cc

**APPENDIX B**

**PARTICIPANT RECRUITMENT POSTER**



## Research Study College of Kinesiology



**Are you a woman between 40 and 64 years?**

**Have you ever wished you could try yoga?**

If you answered yes to these questions, you may be eligible to participate in a research study looking at whether 12-weeks of yoga practice might impact self-esteem and mindfulness. The requirements for the study are that:

- 1) You have either no previous experience with yoga or are practicing yoga no more than once per week in the last 3 months

AND

- 2) For the 12-week period you are available to meet at the Yoga Central Studio located at 211B – 3521 8<sup>th</sup> St. E., **two times per week (1 hour)** of the times listed below:

Day: Monday	Time: 7 - 8 am
Day: Tuesday	Time: 12:15 - 1:15 pm
Day: Wednesday	Time: 7:30 - 8:30 pm
Day: Thursday	Time: 12:15 - 1:15 pm
Day: Saturday	Time: 3 - 4 pm
Day: Sunday	Time: 3:30 – 4:30 pm

And you are willing to do a **half-hour home practice 1-2 times per week** starting the week of September 12, 2005

To express interest in the research study please call Sarah at 306.230.7697 (leave msg. if necessary) or email to [sarah.junkin@usask.ca](mailto:sarah.junkin@usask.ca)

**APPENDIX C**  
**CONSENT FORM**

## UNIVERSITY OF SASKATCHEWAN

### **Informed Consent Form**

You are invited to participate in a study entitled: *Yoga and Self-Esteem: Exploring the Capacity for Change in Middle-Aged Women*. Please read this form carefully and feel free to ask any questions you might have.

**Researchers:** Sarah Junkin, College of Kinesiology, U of S, 966-1123  
sarah.junkin@usask.ca

Kent Kowalski, College of Kinesiology, U of S, 966-1079  
kent.kowalski@usask.ca

**Purpose and Procedure:** The purpose of the study is to examine the effectiveness of 12-weeks of Hatha yoga practice at changing perceptions about the physical self such as self-esteem, physical competence, physical acceptance, self-efficacy, and mindfulness for a group of middle-aged women. The study will include a Hatha yoga group in addition to a control group. The results of the study will help shed light on previous research showing positive psychological benefit of Hatha yoga practice.

The study will involve filling out a series of questionnaires before and after having completed 12-weeks of yoga or having been part of the control group. These questionnaires will be collected and analyzed by the researcher and are expected to take between 30 and 40 minutes to complete. If you are assigned to the yoga group you will need to attend two 60-minute yoga classes per week for the 12-week period at the Yoga Central Studio located at 211B – 3521 8<sup>th</sup> St. E. In addition, you will be asked take part in a 30-minute home practice routine one to two times per week and to record details of this practice on exercise forms which will be provided by the researcher throughout the study. Conversely, if you are assigned to the control group your involvement will entail filling out the same series of questionnaires on two separate occasions and you will be asked to refrain from participation in yoga for the duration of the study. For those people assigned to the control group there will be the opportunity to attend free yoga classes following the completion of the study with the yoga mats provided.

**Potential Risks:** You will not be subjected to any psychological risk. Like with any participation in an exercise program the chance of developing a physical injury does exist. To minimize your risks of sustaining a physical injury, yoga props and varying the position of yoga poses will be used to modify the difficulty of the poses for your individual needs. The yoga teachers will be CPR/C, Standard First Aid, and PFLC (Professional Fitness and Lifestyle Consultant) certified. The yoga facility will be equipped with a phone as well as a first aid kit to be used in the case of an injury. If you sustain an injury requiring medical attention during the program, you will be advised to meet with your physician. Any general injury requiring medical attention will require a note from your physician indicating clearance to continue in the yoga intervention and the note must be given to the researcher. You will have the right to refuse to answer any

question within the questionnaires, or to refuse to take any or all of the questionnaires; however, incomplete information means your results will not be used for the study. Should the researcher feel that your continuation in the project is placing you under undo stress or injury, she can choose to discontinue your involvement in the study, at which time any data that has been collected will be deleted (erased) from the study and destroyed.

**Potential Benefits:** While there are no guarantees that benefits will result from your participation in the study, you may notice physical and psychological improvements through your 12-week commitment to yoga practice. In addition, your participation is hoped to add to understanding of the literature in the area of yoga and psychological health for middle-aged women.

**Confidentiality:** It is anticipated that the data from this study will be published and presented at scholarly conferences; however, your individual identity will be kept confidential. Results will be expressed in terms of the overall groups (yoga or control) making your identity unknown. In the database your identity will be represented as a number, and no attachment will be associated with you name. Only the researcher will review and analyze the data collected. Names or other identifying particulars will not be discussed or made public outside of the research team.

In addition, limits do also exist with regards to the level of confidentiality that the researcher can ensure. Because the participants for this study have been selected from the community, all of whom might be known to each other or come to know one another it is possible that you may be identifiable to other people on the basis of what you have said at any point during the study.

**Storage of Data:** All research material will be securely stored by Sarah Junkin and her advisor Dr. Kent Kowalski at the University of Saskatchewan for a minimum of five years following the completion of the research study.

**Right to Withdraw:** You have the ability to withdraw from the study for any reason, at any time, without penalty of any sort, including current or future participation in this or any other study. Should you decide to withdraw from the project, your information in terms of consent forms and questionnaires will be deleted (erased) from the study and destroyed.

**Questions:** If you have any questions concerning the study, please feel free to ask at any point; you are also free to contact the researcher at the number provided above if you have questions at a later time. Any questions regarding your rights as a participant may be addressed to the University of Saskatchewan Behavioural Sciences Research Ethics Board through the Office of Research Services at 306.966.2084 (if you are out of town you can call collect). You may contact the researcher to find out the results of the study. A copy of the final published manuscript can also be requested.



**Consent to Participate:** I have read and understood the description provided above. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above and understand that I may withdraw this consent at any time. A copy of this consent form has been given to me for my records.

_____	_____	_____
Name	Signature	Date

_____	_____	_____
Researcher's Name	Researcher's Signature	Date

**APPENDIX D**

**PHYSICAL ACTIVITY READINESS QUESTIONNAIRE (PAR-Q)**

# PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
<input type="checkbox"/>	<input type="checkbox"/>	2. Do you feel pain in your chest when you do physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	3. In the past month, have you had chest pain when you were not doing physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	4. Do you lose your balance because of dizziness or do you ever lose consciousness?
<input type="checkbox"/>	<input type="checkbox"/>	5. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?
<input type="checkbox"/>	<input type="checkbox"/>	6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
<input type="checkbox"/>	<input type="checkbox"/>	7. Do you know of any other reason why you should not do physical activity?

If  
you  
answered

## YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

## NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active — begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal — this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

### DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever — wait until you feel better; or
- if you are or may be pregnant — talk to your doctor before you start becoming more active.

**PLEASE NOTE:** If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

**No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.**

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME \_\_\_\_\_

SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_

SIGNATURE OF PARENT  
or GUARDIAN (for participants under the age of majority) \_\_\_\_\_

WITNESS \_\_\_\_\_

**Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.**



© Canadian Society for Exercise Physiology

Supported by:



Health  
Canada

Santé  
Canada

continued on other side...

**APPENDIX E**

**MEAN COMPARISONS BETWEEN EXCLUDED YOGA SAMPLE AND FINAL  
SAMPLE**

Mean comparisons at Pre-test for Drop-Outs ( $n = 20$ ) and Non Drop-Outs ( $n = 51$ ).

Variable	Pre			
	Drop-Outs		Non Drop-Outs	
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>
LTEQ1	35.00	26.74	33.55	19.33
LTEQ2	1.95	0.89	2.02	.68
Age	49.05	6.40	49.31	6.12
Ht	1.64	.64	1.61	.17
Wt	69.95	11.24	66.59	9.94
GSE	15.00	1.86	15.39	1.66
PSW	12.90	3.74	13.57	3.88
PSPPST	13.30	3.18	14.57	3.85
PSPPCO	12.4	4.22	13.94	4.83
PSPPBO	12.10	4.60	12.06	4.23
PSPPSP	13.00	3.89	11.57	3.86
BESSA	46.30	8.68	43.00	7.14
BESWC	28.15	8.93	28.20	9.00
BESPC	25.65	6.70	27.67	7.03
BIVAS	5.11	2.20	4.94	2.36
YSEFB	57.75	22.26	60.29	22.34
YSEBB	73.50	20.07	72.25	21.45
YSESP	77.83	17.69	79.05	17.10
YSETW	65.50	22.82	66.08	22.80
YSESS	77.44	19.70	79.66	15.75
YSET	72.07	17.71	73.48	16.42
KIMSOB	32.70	6.11	32.98	6.43
KIMSDE	23.95	4.63	22.29	5.27
KIMSAW	23.45	4.17	24.76	4.87
KIMSAC	25.05	5.01	24.84	4.42

*Note:*

No significant differences were found on any of the mean comparison in the analysis  
 $*p < .05$

LTEQ1 = Leisure Time Exercise Questionnaire question #1 (scale range = 0 – no ceiling)

LTEQ2 = Leisure Time Exercise Questionnaire question #2 (scale range = 1 - 3 [with lower values representing more activity])

Ht = Height measured in meters

Wt= Weight measured in kilograms

GSE = Global Self-Esteem (scale range = 10 to 40 [higher scores indicating higher self-esteem])

PSW = Physical Self-Worth (scale range = 6 to 24 [higher scores indicating higher physical self-worth])

PSPPST = Physical Strength Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher physical strength])  
PSPPCO = Physical Condition Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher physical condition])  
PSPPBO = Body Attractiveness Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher body attractiveness])  
PSPPSP = Sports Competence Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher sports competence])  
BESSA = Sexual Attractiveness Subscale of BES (scale range = 13 to 65 [higher scores indicating higher sexual attractiveness])  
BESWC = Weight Control Subscale of the BES (scale range = 10 to 50 [higher scores indicating higher weight control])  
BESPC = Physical Condition Subscale of BES (scale range = 9 to 45 [higher scores indicating higher physical condition])  
BIVAS = Body Image Visual Analog Scale (scale range = 0 to 10 [higher scores indicating greater satisfaction of the body])  
YSEFB = Forward Bending Poses Subscale of the Yoga Self-Efficacy Scale  
YSEBB = Backward Bending Poses Subscale of the Yoga Self-Efficacy Scale  
YSESP = Standing Poses Subscale of the Yoga Self-Efficacy Scale  
YSETW = Twist Poses Subscale of the Yoga Self-Efficacy Scale  
YSESS = Supine/Seated Poses Subscale of the Yoga Self-Efficacy Scale  
YSET = Total Score of the Yoga Self-Efficacy Scale  
KIMSOB = Observing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 12 to 48 [higher scores indicate greater ability to observe])  
KIMSDE = Describing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 8 to 32 [higher scores indicate greater ability to describe])  
KIMSAW = Acting with Awareness Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 10 to 40 [higher scores indicate greater ability to act with awareness])  
KIMSAC = Accepting without Judgment Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 9 to 36 [higher scores indicate greater ability to accept without judgment])

Mean comparisons at Pre-test for Participants Excluded from Analysis ( $n = 15$ ) and Final Sample ( $n = 21$ ).

Variable	Pre-test			
	Excluded Sample		Final Sample	
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>
LTEQ1	39.80	28.33	30.33	20.76
LTEQ2	2.00	0.93	2.19	.60
Age	49.53	6.06	50.38	6.34
Ht	1.65	.07	1.57	.25
Wt	70.97	10.64	67.70	11.71
GSE	14.33	1.54	14.76	1.58
PSW	12.40	3.04	12.33	3.43
PSPPST	13.40	2.85	14.00	3.54
PSPPCO	11.87	3.74	12.19	4.96
PSPPBO	11.40	3.74	10.86	4.32
PSPPSP	12.93	4.03	10.33	3.48
BESSA	46.60	8.77	41.52	5.58
BESWC	26.73	8.01	25.14	8.25
BESPC	24.33	5.95	25.95	6.89
BIVAS	4.91	2.14	3.96	2.05
YSEFB	55.00	23.75	58.57	20.39
YSEBB	76.00	20.11	69.76	20.09
YSESP	77.00	17.73	79.21	13.44
YSETW	64.00	23.37	63.97	16.82
YSESS	75.75	20.87	78.45	11.91
YSET	71.05	18.32	72.24	12.52
KIMSOB	31.93	6.63	32.33	6.97
KIMSDE	23.20	4.96	21.57	5.53
KIMSAW	23.67	4.62	23.67	4.93
KIMSAC	24.60	5.45	23.57	4.44

*Note:*

Significant differences were found on two of the mean comparison in the analysis;

BESSA ( $t[34] = 2.12$ ) and PSPPSP ( $t[34] = 2.07$ )

\* $p < .05$

LTEQ1 = Leisure Time Exercise Questionnaire question #1 (scale range = 0 – no ceiling)

LTEQ2 = Leisure Time Exercise Questionnaire question #2 (scale range = 1 - 3 [with lower values representing more activity])

Ht = Height measured in meters

Wt= Weight measured in kilograms

GSE = Global Self-Esteem (scale range = 10 to 40 [higher scores indicating higher self-esteem])

PSW = Physical Self-Worth (scale range = 6 to 24 [higher scores indicating higher physical self-worth])

PSPPST = Physical Strength Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher physical strength])  
PSPPCO = Physical Condition Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher physical condition])  
PSPPBO = Body Attractiveness Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher body attractiveness])  
PSPPSP = Sports Competence Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher sports competence])  
BESSA = Sexual Attractiveness Subscale of BES (scale range = 13 to 65 [higher scores indicating higher sexual attractiveness])  
BESWC = Weight Control Subscale of the BES (scale range = 10 to 50 [higher scores indicating higher weight control])  
BESPC = Physical Condition Subscale of BES (scale range = 9 to 45 [higher scores indicating higher physical condition])  
BIVAS = Body Image Visual Analog Scale (scale range = 0 to 10 [higher scores indicating greater satisfaction of the body])  
YSEFB = Forward Bending Poses Subscale of the Yoga Self-Efficacy Scale  
YSEBB = Backward Bending Poses Subscale of the Yoga Self-Efficacy Scale  
YSESP = Standing Poses Subscale of the Yoga Self-Efficacy Scale  
YSETW = Twist Poses Subscale of the Yoga Self-Efficacy Scale  
YSESS = Supine/Seated Poses Subscale of the Yoga Self-Efficacy Scale  
YSET = Total Score of the Yoga Self-Efficacy Scale  
KIMSOB = Observing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 12 to 48 [higher scores indicate greater ability to observe])  
KIMSDE = Describing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 8 to 32 [higher scores indicate greater ability to describe])  
KIMSAW = Acting with Awareness Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 10 to 40 [higher scores indicate greater ability to act with awareness])  
KIMSAC = Accepting without Judgment Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 9 to 36 [higher scores indicate greater ability to accept without judgment])



**APPENDIX F**  
**DEMOGRAPHIC INFORMATION SHEET**

**Yoga and Self-Esteem: Exploring the Capacity for Change in Middle-Aged Women:**

**QUESTIONNAIRE PACKAGE**

*Thank you for taking the time to participate in this study. This questionnaire should take you approximately 30-40 minutes to complete. Please answer each question honestly and remember that the questions are to be answered individually. Remember there are no incorrect answers; you want to answer the questions in a way that reflects how you feel.*

**Name:** \_\_\_\_\_

**Age:** \_\_\_\_\_

**Height:** \_\_\_\_\_

**Weight:** \_\_\_\_\_

**Sociocultural Information:**

*How would you describe yourself? You may mark more than one or specify, if applicable.*

\_\_\_ White

\_\_\_ Chinese

\_\_\_ Black

\_\_\_ Filipino

\_\_\_ Latin American

\_\_\_ Arab

\_\_\_ Korean

\_\_\_ Japanese

\_\_\_ South Asian (*e.g., East Indian, Pakistani, Sri Lankan, etc.*)

\_\_\_ Southeast Asian (*e.g., Vietnamese, Cambodian, Malaysian, Laotian, etc.*)

\_\_\_ West Asian (*e.g., Iranian, Afghan, etc.*)

\_\_\_ Other – *Specify*

\_\_\_\_\_

**APPENDIX G**

**EASTERN PHILOSOPHIES OPEN-ENDED QUESTION**

*Please answer the following sets of questions as accurately and honestly as possible. Some of the scales may have specific instructions. Please read the instructions and/or response formats carefully. If you do not understand a question, please ask for clarification.*

### **Background Information – Eastern Philosophy**

In the space provided below please take the time to describe any experiences you have with Eastern philosophies (e.g. Tai Chi, Meditation Practice and/or Meditation Retreat). If you do not have any experiences with Eastern philosophies you may either state this in the space below or skip to the next section in the questionnaire package.

**APPENDIX H**

**MEAN COMPARISONS BETWEEN PARTICIPANTS WITH AND WITHOUT**

**EASTERN PHILOSOPHY EXPERIENCE**

Mean comparisons at Pre-test for participant with Eastern philosophy experience ( $n = 23$ ) and participants with no Eastern philosophy experience ( $n = 28$ ).

Variable	Pre-test			
	Experience		No Experience	
	<i>M</i>	<i>sd</i>	<i>M</i>	<i>sd</i>
LTEQ1	33.13	19.94	33.89	19.18
LTEQ2	2.22	.52	1.86	.76
Age	50.30	5.52	48.50	6.55
Ht	1.62	.07	1.59	.22
Wt	65.51	11.28	67.54	8.70
GSE	32.04	5.56	30.71	5.00
PSW	13.91	3.84	13.29	3.97
PSPPST	14.43	3.45	14.68	4.22
PSPPCO	13.43	4.45	14.36	5.17
PSPPBO	12.57	4.15	11.64	4.31
PSPPSP	11.04	3.36	12.00	4.24
BESSA	43.83	7.66	42.32	6.75
BESWC	30.22	9.11	26.54	8.73
BESPC	28.39	7.33	27.07	6.84
BIVAS	5.53	2.02	4.45	2.55
YSEFB	62.83	21.69	58.21	23.04
YSEBB	75.22	19.84	69.82	22.75
YSESP	82.75	16.43	76.01	17.33
YSETW	69.42	22.44	63.33	23.13
YSESS	81.96	15.29	77.77	16.15
YSET	76.30	15.77	71.16	16.86
KIMSOB	34.57	6.45	31.68	6.23
KIMSD	23.30	5.68	21.46	4.86
KIMSAW	24.35	5.36	25.11	4.50
KIMSAC	25.78	4.42	24.07	4.35

*Note:*

No significant differences were found on any of the mean comparison in the analysis  
 $*p < .05$

LTEQ1 = Leisure Time Exercise Questionnaire question #1 (scale range = 0 – no ceiling)

LTEQ2 = Leisure Time Exercise Questionnaire question #2 (scale range = 1 - 3 [with lower values representing more activity])

Ht = Height measured in meters

Wt= Weight measured in kilograms

GSE = Global Self-Esteem (scale range = 10 to 40 [higher scores indicating higher self-esteem])

PSW = Physical Self-Worth (scale range = 6 to 24 [higher scores indicating higher physical self-worth])  
PSPPST = Physical Strength Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher physical strength])  
PSPPCO = Physical Condition Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher physical condition])  
PSPPBO = Body Attractiveness Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher body attractiveness])  
PSPPSP = Sports Competence Subscale of PSPP (scale range = 6 to 24 [higher scores indicating higher sports competence])  
BESSA = Sexual Attractiveness Subscale of BES (scale range = 13 to 65 [higher scores indicating higher sexual attractiveness])  
BESWC = Weight Control Subscale of the BES (scale range = 10 to 50 [higher scores indicating higher weight control])  
BESPC = Physical Condition Subscale of BES (scale range = 9 to 45 [higher scores indicating higher physical condition])  
BIVAS = Body Image Visual Analog Scale (scale range = 0 to 10 [higher scores indicating greater satisfaction of the body])  
YSEFB = Forward Bending Poses Subscale of the Yoga Self-Efficacy Scale  
YSEBB = Backward Bending Poses Subscale of the Yoga Self-Efficacy Scale  
YSESP = Standing Poses Subscale of the Yoga Self-Efficacy Scale  
YSETW = Twist Poses Subscale of the Yoga Self-Efficacy Scale  
YSESS = Supine/Seated Poses Subscale of the Yoga Self-Efficacy Scale  
YSET = Total Score of the Yoga Self-Efficacy Scale  
KIMSOB = Observing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 12 to 48 [higher scores indicate greater ability to observe])  
KIMSDE = Describing Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 8 to 32 [higher scores indicate greater ability to describe])  
KIMSAW = Acting with Awareness Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 10 to 40 [higher scores indicate greater ability to act with awareness])  
KIMSAC = Accepting without Judgment Subscale of the Kentucky Inventory of Mindfulness Skills (scale range = 9 to 36 [higher scores indicate greater ability to accept without judgment])

**APPENDIX I**

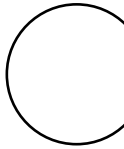
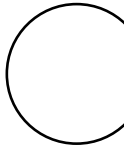
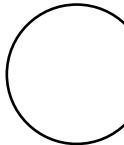
**GODIN LEISURE TIME-EXERCISE QUESTIONNAIRE (LTEQ)**



# Leisure Time Exercise Questionnaire

1. Considering a **7-day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your **free time** (write in each circle the appropriate number).

**TIMES PER WEEK**

- |  |   |
|--|---|
| <p>a) <b>STRENUOUS EXERCISE</b><br/>(HEART BEATS RAPIDLY)<br/>(i.e. running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)</p> |    |
| <p>b) <b>MODERATE EXERCISE</b><br/>(NOT EXHAUSTING)<br/>(i.e. fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)</p>   |  |
| <p>c) <b>MILD EXERCISE</b><br/>(MINIMAL EFFORT)<br/>(i.e. yoga, archery, fishing from river bank, bowling, horseshoes, golf, snowmobiling, easy walking)</p>   |  |

2. Considering a **7-day period** (a week), during your **leisure-time**, how often do you engage in any regular activity long enough to **work up a sweat** (heart beats rapidly)?

OFTEN                      SOMETIMES                      NEVER/RARELY

1. [ ]                      2. [ ]                      3. [ ]

**APPENDIX J**

**ROSENBERG SELF-ESTEEM SCALE (RES)**

*The response format for the following questions is as follows:*

*1 = strongly agree, 2 = agree, 3 = disagree, and 4 = strongly disagree.*

*Please circle the number which indicates your response.*

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

---

1            **2**            **3**            **4**  
                 strongly agree            agree            disagree            strongly disagree

**APPENDIX K**

**PHSICAL SELF-PERCEPTION PROFILE (PSPP)**

## THE PHYSICAL SELF PERCEPTION PROFILE (PSPP)

### WHAT AM I LIKE?

These are statements which allow people to describe themselves. There are no right or wrong answers since people differ a lot.

First, decide which one of the two statements best describes you.

Then, go to that side of the statement and check if it is just "sort of true" or "really true" FOR YOU.

Really True for Me	Sort of True for Me	EXAMPLE	Sort of True for Me	Really True for Me		
<input type="checkbox"/>	<input type="checkbox"/>	Some people are very competitive	BUT	Others are not quite so competitive	<input checked="" type="checkbox"/>	<input type="checkbox"/>

REMEMBER to check only ONE of the four boxes

1.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel that they are not very good when it comes to playing sports	BUT	Others feel that they are really good at just about every sport	<input type="checkbox"/>	<input type="checkbox"/>
2.	<input type="checkbox"/>	<input type="checkbox"/>	Some people are not very confident about their level of physical conditioning and fitness	BUT	Others always feel confident that they maintain excellent conditioning and fitness	<input type="checkbox"/>	<input type="checkbox"/>
3.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel that compared to most, they have an attractive body	BUT	Others feel that compared to most, their body is not quite so attractive	<input type="checkbox"/>	<input type="checkbox"/>
4.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel that they are physically stronger than most people of their sex	BUT	Others feel that they lack physical strength compared to most others of their sex	<input type="checkbox"/>	<input type="checkbox"/>
5.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel extremely proud of who they are and what they can do physically	BUT	Others are sometimes not quite so proud of who they are physically	<input type="checkbox"/>	<input type="checkbox"/>
6.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel that they are among the best when it comes to athletic ability	BUT	Others feel that they are not among the most able when it comes to athletics	<input type="checkbox"/>	<input type="checkbox"/>

	Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me	
7.	<input type="checkbox"/>	<input type="checkbox"/>	Some people make certain they take part in some form of regular vigorous physical exercise	BUT	Others don't often manage to keep up regular vigorous physical exercise	<input type="checkbox"/>	<input type="checkbox"/>
8.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel that they have difficulty maintaining an attractive body	BUT	Others feel that they are easily able to keep their bodies looking attractive	<input type="checkbox"/>	<input type="checkbox"/>
9.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel that their muscles are much stronger than most others of their sex	BUT	Others feel that on the whole their muscles are not quite so strong as most others of their sex	<input type="checkbox"/>	<input type="checkbox"/>
10.	<input type="checkbox"/>	<input type="checkbox"/>	Some people are sometimes not so happy with the way they are or what they can do physically	BUT	Others always feel happy about the kind of person they are physically	<input type="checkbox"/>	<input type="checkbox"/>
11.	<input type="checkbox"/>	<input type="checkbox"/>	Some people are not quite so confident when it comes to taking part in sports activities	BUT	Others are among the most confident when it comes to taking part in sports activities	<input type="checkbox"/>	<input type="checkbox"/>
12.	<input type="checkbox"/>	<input type="checkbox"/>	Some people do not usually have a high level of stamina and fitness	BUT	Others always maintain a high level of stamina and fitness	<input type="checkbox"/>	<input type="checkbox"/>
13.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel embarrassed by their bodies when it comes to wearing few clothes	BUT	Others do not feel embarrassed by their bodies when it comes to wearing few clothes	<input type="checkbox"/>	<input type="checkbox"/>
14.	<input type="checkbox"/>	<input type="checkbox"/>	When it comes to situations requiring strength some people are one of the first to step forward	BUT	When it comes to situations requiring strength some people are one of the last to step forward	<input type="checkbox"/>	<input type="checkbox"/>
15.	<input type="checkbox"/>	<input type="checkbox"/>	When it comes to the physical side of themselves some people do not feel very confident	BUT	Others seem to have a real sense of confidence in the physical side of themselves	<input type="checkbox"/>	<input type="checkbox"/>
16.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel that they are always one of the best when it comes to joining in sports activities	BUT	Others feel that they are not one of the best when it comes to joining in sports activities	<input type="checkbox"/>	<input type="checkbox"/>

- |     | Really<br>True<br>for Me | Sort of<br>True<br>for Me |  |     | Sort of<br>True<br>for Me  | Really<br>True<br>for Me |                          |
|-----|--------------------------|---------------------------|--|-----|--|--------------------------|--------------------------|
| 17. | <input type="checkbox"/> | <input type="checkbox"/>  | Some people tend to feel a little uneasy in fitness and exercise settings                                      | BUT | Others feel confident and at ease at all times in fitness and exercise settings                              | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. | <input type="checkbox"/> | <input type="checkbox"/>  | Some people feel that they are often admired because their physique or figure is considered attractive         | BUT | Others rarely feel that they receive admiration for the way their body looks                                 | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. | <input type="checkbox"/> | <input type="checkbox"/>  | Some people tend to lack confidence when it comes to their physical strength                                   | BUT | Others are extremely confident when it comes to their physical strength                                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. | <input type="checkbox"/> | <input type="checkbox"/>  | Some people always have a really positive feeling about the physical side of themselves                        | BUT | Others sometimes do not feel positive about the physical side of themselves                                  | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. | <input type="checkbox"/> | <input type="checkbox"/>  | Some people are sometimes a little slower than most when it comes to learning new skills in a sports situation | BUT | Others have always seemed to be among the quickest when it comes to learning new sports skills               | <input type="checkbox"/> | <input type="checkbox"/> |
| 22. | <input type="checkbox"/> | <input type="checkbox"/>  | Some people feel extremely confident about their ability to maintain regular exercise and physical condition   | BUT | Others don't feel quite so confident about their ability to maintain regular exercise and physical condition | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. | <input type="checkbox"/> | <input type="checkbox"/>  | Some people feel that compared to most, their bodies do not look in the best of shape                          | BUT | Others feel that compared to most their bodies always look in excellent physical shape                       | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. | <input type="checkbox"/> | <input type="checkbox"/>  | Some people feel that they are very strong and have well developed muscles compared to most people             | BUT | Others feel that they are not so strong and their muscles are not very well developed                        | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. | <input type="checkbox"/> | <input type="checkbox"/>  | Some people wish that they could have more respect for their physical selves                                   | BUT | Others always have great respect for their physical selves   | <input type="checkbox"/> | <input type="checkbox"/> |
| 26. | <input type="checkbox"/> | <input type="checkbox"/>  | Given the chance, some people are always one of the first to join in sports activities                         | BUT | Other people sometimes hold back and are not usually among the first to join in sports                       | <input type="checkbox"/> | <input type="checkbox"/> |

	Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me	
27.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel that compared to most they always maintain a high level of physical conditioning	BUT	Others feel that compared to most their level of physical conditioning is not usually so high	<input type="checkbox"/>	<input type="checkbox"/>
28.	<input type="checkbox"/>	<input type="checkbox"/>	Some people are extremely confident about the appearance of their body	BUT	Others are a little self-conscious about the appearance of their bodies	<input type="checkbox"/>	<input type="checkbox"/>
29.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel that they are not as good as most at dealing with situations requiring physical strength	BUT	Others feel that they are among the best at dealing with situations which require physical strength	<input type="checkbox"/>	<input type="checkbox"/>
30.	<input type="checkbox"/>	<input type="checkbox"/>	Some people feel extremely satisfied with the kind of person they are physically	BUT	Others sometimes feel a little dissatisfied with their physical selves	<input type="checkbox"/>	<input type="checkbox"/>



**APPENDIX L**  
**BODY ESTEEM SCALE (BES)**

## Body Esteem Scale

*On this page are listed a number of body parts and functions. Please read each item and indicate how you feel about this part or function of your own body using the following scale and placing the corresponding number in the area provided beside each question:*

*1 = have strong negative feelings, 2 = have moderate negative feelings,  
3 = have no feeling one way or the other, 4 = have moderate positive feelings,  
5 = have strong positive feelings.  
Please circle the number which indicates your response.*

1. body scent	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
2. appetite	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
3. nose	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
4. physical stamina	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
5. reflexes	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
6. lips	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
7. muscular strength	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
8. waist	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive

9. energy level	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
10. thighs	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
11. ears	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
12. biceps	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
13. chin	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
14. body build	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
15. physical coordination	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
16. buttocks	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
17. agility	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
18. width of shoulders	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive

19. arms	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
20. chest or breasts	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
21. appearance of eyes	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
22. cheeks/cheekbones	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
23. hips	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
24. legs	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
25. figure of physique	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
26. sex drive	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
27. feet	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
28. sex organs	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
29. appearance of stomach	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive

30. health	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
31. sex activities	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
32. body hair	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
33. physical condition	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
34. face	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive
35. weight	<b>1</b> negative	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> positive

**APPENDIX M**

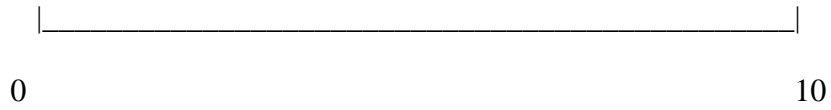
**BODY IMAGE VISUAL ANALOG SCALE (BIVAS)**

### **Body Image Visual Analog Scale**

Please mark an 'X' at any place along the line displayed below that would indicate the satisfaction with one's body reality (i.e. the satisfaction with the body as it really exists).

Complete Dissatisfaction

Complete Satisfaction



**APPENDIX N**

**YOGA SELF-EFFIACY SCALE (YSES)**



## Yoga Self-Efficacy Scale

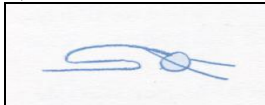
Using the scale below, please indicate in the space provided next to each yoga picture how confident you are that you could be successful in doing the pose displayed from 0 to 100%.

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100 %  
 No Confidence At all                                      Somewhat Confident                                      Completely Confident

For example, if you have *complete confidence* that you could successful duplicate the pose displayed you would circle 100%. However, if you are absolutely sure that you could not demonstrate the pose you would circle 0% (*No Confidence at all*).

### FORWARD BENDS:

1) Adho Mukha Virasana (Child's pose)



0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100 %  
 No Confidence At all                                      Somewhat Confident                                      Completely Confident

---

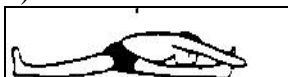
2) Pavanmuktasana (Seated forward bend)



0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100 %  
 No Confidence At all                                      Somewhat Confident                                      Completely Confident

---

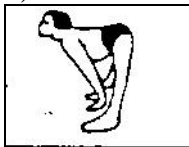
3) Parsva Pavanmuktasana (Seated forward bend with twist)



0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100 %  
 No Confidence At all                                      Somewhat Confident                                      Completely Confident

---

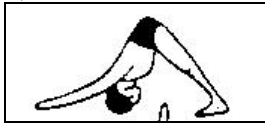
4) Prasarita Padottanasana (Feet spread forward bend)



0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100 %  
 No Confidence At all                                      Somewhat Confident                                      Completely Confident

---

5) Adho Mukha Svanasana (downward-facing dog)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

6) Uttanasana (standing forward bend)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

**BACK BENDS:**

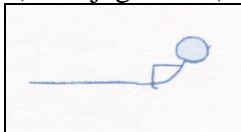
7) Setu Bandha Sarvangasana (bridge)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

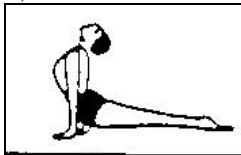
8) Bhujagasana (Cobra; Legs and hips remain on the floor)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

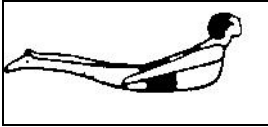
9) Urdhva Mukha Svanasana (upward-facing dog; Legs and hips off the floor)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

10) Salabhasana (locust)

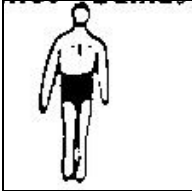


0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

**STANDING POSES:**

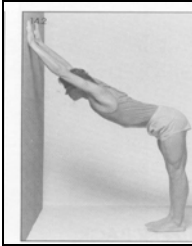
11) Tadasana (mountain)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

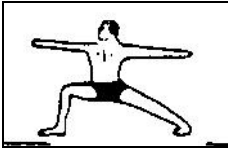
12) Half-Dog Pose at Wall



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

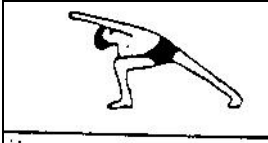
13) Virabhadrasana II (warrior II)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

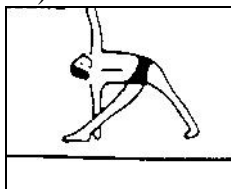
14) Utthita Parsvakonasana (extended side angle)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

15) Utthita Trikonasana (extended triangle)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

16) Parivrtta Trikonasana (revolved triangle pose)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

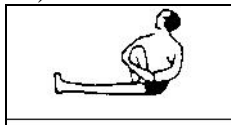
**TWISTS:**

17) Chair Bharadvajasana (seated twist)



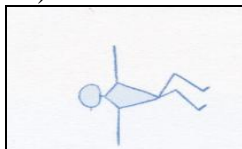
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

18) Uttihita Marchiyasana III (standing twist into wall, foot supported on chair)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

19) Jathara Parivartasana (twist with knees bent, side to side)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

**SEATED/SUPINE POSES:**

20) Virasana (hero pose)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

21) Baddha Konasana (bound angle)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

22) Ardha Pavanmuktasana (supine 1 knee bent)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

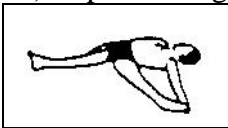
23) Supta Padangusthasana I (hamstring stretch with belt)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

24) Supta Padangusthasana II (hamstring stretch with belt, leg moved laterally)



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100 %  
 No Confidence At all Somewhat Confident Completely Confident

---

25) Supta Pavanmuktasana (supine 2 knees to chest)



0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
No Confidence	At all			Somewhat Confident				Completely Confident		

---

26) Urdhva Prasarita Padasana (with legs up wall)



0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
No Confidence	At all			Somewhat Confident				Completely Confident		

---

27) Viparita Karani (supine with legs on wall)



0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
No Confidence	At all			Somewhat Confident				Completely Confident		

---

28) Savasana (corpse pose)



0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
No Confidence	At all			Somewhat Confident				Completely Confident		

---

**APPENDIX O**

**KENTUCKY INVENTORY OF MINDFULNESS SKILLS (KIMS)**

### Kentucky Inventory of Mindfulness Skills

Please respond to the items below as honestly as possible. Use the scale below, ranging from 1 (never or very rarely true) to 4 (almost always or always true), in giving your answers below.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

1. I notice changes in my body, such as whether my breathing slows down or speeds up.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

2. I'm good at finding the words to describe my feelings.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

3. When I do things, my mind wanders off and I'm easily distracted.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

4. I criticize myself for having irrational or inappropriate emotions.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

5. I pay attention to whether my muscles are tense or relaxed.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

6. I can easily put my beliefs, opinions, and expectations into words.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

7. When I'm doing something, I'm only focused on what I'm doing, nothing else.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

8. I tend to evaluate whether my perceptions are right or wrong.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

9. When I'm walking, I deliberately notice the sensations of my body moving.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>



---

10. I'm good at thinking of words to express my perceptions, such as how things taste, smell, or sound.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

11. I drive on "automatic pilot" without paying attention to what I'm doing.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

12. I tell myself that I shouldn't be feeling the way I'm feeling.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

13. When I take a shower or a bath, I stay alert to the sensations of water on my body.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

14. It's hard for me to find the words to describe what I'm thinking.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

15. When I'm reading, I focus all my attention on what I'm reading.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

16. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

17. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

18. I have trouble thinking of the right words to express how I feel about things.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

19. When I do things, I get totally wrapped up in them and don't think about anything else.

**1**                      **2**                      **3**                      **4**  
Never or very rarely true                      almost always or always true

---

- 
20. I make judgments about whether my thoughts are good or bad.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
21. I pay attention to sensations, such as the wind in my hair or the sun on my face.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
23. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
24. I tend to make judgments about how worthwhile or worthless my experiences are.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
25. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
26. Even when I'm feeling terribly upset, I can find a way to put it into words.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
27. When I'm doing chores, such as cleaning or laundry, I tend to daydream or think of other things.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
28. I tell myself that I shouldn't be thinking the way I'm thinking.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
29. I notice the smells and aromas of things.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |
- 
30. I intentionally stay aware of my feelings.
- |                           |          |          |                              |
|---------------------------|----------|----------|------------------------------|
| <b>1</b>                  | <b>2</b> | <b>3</b> | <b>4</b>                     |
| Never or very rarely true |          |          | almost always or always true |

---

31. I tend to do several things at once rather than focusing on one thing at a time.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

32. I think some of my emotions are bad or inappropriate and I shouldn't feel them.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

33. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

34. My natural tendency is to put my experiences into words.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

35. When I'm working on something, part of my mind is occupied with other topics, such as what I'll be doing later, or things I'd rather be doing.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

36. I disapprove of myself when I have irrational ideas.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

37. I pay attention to how my emotions affect my thoughts and behaviors.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

38. I get completely absorbed in what I'm doing, so that all my attention is focused on it.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

39. I notice when my moods begin to change.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Never or very rarely true</b>			<b>almost always or always true</b>

---

**APPENDIX P**

**YOGA GROUP PRELIMINARY INFORMATION LETTER**

Tuesday September 6, 2005

Dear Participant,

Thank you again for agreeing to be a part of the yoga research study looking at self-esteem and mindfulness in women aged 40-64 years.

After having randomly distributed all the women in the study into two groups, you have been selected into the **yoga group**.

This is just a reminder that starting Monday September 12, 2005 you will begin coming to the Yoga Central studio for 2 one-hour classes for each of the 12-weeks of the study and will do 1-2 home sessions lasting 30 minutes. It is also asked that you try not to do any extra yoga beyond the requirements outlined above for the duration of the study. In other words, we would appreciate that you did not do extra yoga classes or home session within the study or at other studios/classes offered in the city for the full duration of the 12-week study.

Also, the second time to fill out the questionnaire package is to be held on Tuesday, Wednesday, and Thursday December 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> from 7:30-8:30 pm at the PAC building. The room number will be given to you at a later date once it is confirmed. You will once again be asked to come to one of the three time slots available.

If you have any additional questions or concerns do not hesitate to contact me at any time. You may phone my work number at 966.1123, my cell number 230.7697 or via email at sarah.junkin@usask.ca.

Sincerely,

Sarah Junkin  
Masters Degree Program  
College of Kinesiology  
University of Saskatchewan

**APPENDIX Q**

**CONTROL GROUP PRELIMINARY INFORMATION LETTER**

Tuesday September 6, 2005

Dear Participant,

Thank you again for agreeing to be a part of the yoga research study looking at self-esteem and mindfulness in women aged 40-64 years.

After having randomly distributed all the women in the study into two groups, you have been selected into the **comparison group**.

This is just a reminder that starting Monday September 12, 2005 you will continue to do the regular physical activities which you are currently doing. You are also free to begin any other physical activities that you would like aside from yoga. Just a reminder that we would appreciate that you did not begin any yoga classes in a studio, gym, or at home as well as to refrain from reading yoga texts/books for the duration of the 12-week study. Your period of yoga classes will be starting in January 2006 and I will be in touch with you later this fall to provide you with more details.

Also, the second time to fill out the questionnaire package is to be held on Tuesday, Wednesday, and Thursday December 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> from 7:30-8:30 pm at the PAC building. The room number will be given to you at a later date once it is confirmed. You will once again be asked to come to one of the three time slots available.

If you have any additional questions or concerns do not hesitate to contact me at any time. You may phone my work number at 966.1123, my cell number 230.7697 or via email at sarah.junkin@usask.ca.

Sincerely,

Sarah Junkin  
Masters Degree Program  
College of Kinesiology  
University of Saskatchewan

**APPENDIX R**  
**BIWEEKLY LOG FORM**



Name: \_\_\_\_\_

*This log sheet will be used to keep track of how often you participate in the 30 minute home practice routine as part of the research study. For the two-week interval displayed in the chart below please record the date (e.g. Sept. 16) in the space provided every time you performed the 30 minute home practice routine each week. There may be weeks in which you only do none or one home session per week but you are encouraged to do 2 sessions for each of the 12-weeks of the study.*

*Please be honest with how often you are doing the home practice sessions even if it means reporting no yoga sessions for a week. Being honest in your reporting of the yoga practice will help to ensure the quality of the research project.*

	Day 1	Day 2
Week	Date: _____	Date: _____
Week	Date: _____	Date: _____

**APPENDIX S**  
**HOME PRACTICE FORM**

***Yoga Research Study***  
***Home Practice Routine***

***Frequency:*** 1-2 x/week  
***Length:*** 12-weeks (September 12, 2005 – December 04, 2005)  
***Duration:*** 30 minutes  
***Equipment:*** Mat, Belt (or towel, rope, etc.), Chair, Blanket (optional)

**Mandatory Poses for daily practice:**

1. Chair or seated Bharadvajasana (Seated Twist)
2. Uttihita Marchiyasana III (Standing spinal twist into wall, one foot supported on stool; or can do from a seated position)
3. Tadasana (mountain pose)
4. Virabhadrasana II or Uttihita Parsvakonasana (Side Angle Pose)
5. Uttanasana (Supported forward bend)

**OR**

Half-dog pose at wall

**OR**

Supta Padangusthanasana I (Hamstring stretch with belt)

6. Urdhva Mukha Svanasana (Upward dog)

**OR**

Setu Bandha Sarvangasana (Bridge pose)

7. Salabhasana (Locust with 1 leg only or 1 leg and 1 contralateral arm)

**OR**

Bhujagasana (Cobra)

8. Savasana (Corpse); with blanket if desired