

AN ABSTRACT OF THE THESIS OF

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Given the high risk of relapse during the first year of exercise involvement, it is important to determine the processes of self-motivation which enable novice exercisers to become long-term maintainers. This study was designed to extend previous Stages of Change (Prochaska & DiClemente, 1983) research by comparing the Possible Selves (Markus & Nurius, 1986) of individuals at different points within the Maintenance stage of exercise. Participants consisted of female university employees, spouses, and dependents age 35-59 years who volunteered for the study. Participants completed the Stage of Exercise Scale (SOES; Cardinal, 1995) and a self-administered form of the Possible Selves Inventory (Cross & Markus, 1991) which was adapted to address the exercise domain. Women classified by the SOES as being in the Maintenance stage of exercise ($N = 92$) were assigned to one of three groups based on the duration of their exercise maintenance (6 months - 5 years, 6-10 years, and 11-20 years). The three maintenance groups were compared with regard to the number and category of open-ended and exercise-related possible selves and the self-efficacy and outcome expectancy associated with three focused selves (most important, exercise-related, and exercise-specific). The results indicated that the three maintenance groups did not differ significantly in their possible selves. These findings provide support for the

current conceptualization of the Stages of Change Model (Prochaska & DiClemente, 1983) and suggest that differences between novice and expert maintainers may be behavioral, rather than cognitive, in nature. Several implications for intervention design and suggestions for future research are discussed.

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Possible Selves and Exercise Maintenance Among Middle-Aged Women

by

Robin E. Blais

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APPROVED:

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Major Professor, representing Human Performance

Redacted for Privacy

Chair of Department of Exercise and Sport Science

Redacted for Privacy

Dean of Graduate School

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Robin E. Blais

Robin E. Blais, Author

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CHAPTER 1 INTRODUCTION

The World Health Organization (WHO) recently issued a report entitled the Heidelberg Guidelines for Promoting Physical Activity Among Older Persons (WHO, 1997). These comprehensive guidelines represent a clear and definitive statement by members of the World Health Organization on the critical role of physical activity in healthy aging. The statement reflects a consensus among researchers and health professionals that many of the chronic diseases and disabling conditions associated with aging can be prevented, postponed, or ameliorated with regular physical activity.

Despite the well-documented psychological, social, and physiological benefits of regular physical activity, few adults choose to participate in it. Epidemiological studies indicate that only 22% of American adults engage in regular leisure time physical activity (U.S. Department of Health and Human Services [USDHHS], 1996), that across age groups significantly fewer women engage in leisure-time physical activity than their male counterparts (USDHHS, 1996), and that the number of inactive adults doubles after age 55 (O'Brien & Vertinsky, 1991). On a more positive note, recent evidence suggests that sedentary adults who increase their activity levels can reduce their cardiovascular disease risk to the level of those who have been active for many years (Paffenbarger et al., 1993).

Researchers have identified middle-age as the life stage at which the benefits of regular physical activity may be most relevant in preventing, minimizing, or reversing many of the physiological, psychological, and social problems that often accompany aging (WHO, 1997). Given the health-protective and health-promotive effects of physical activity, health

professionals are faced with the challenge of finding ways to increase exercise participation, particularly among middle-aged and older women.

While the positive effects of physical activity on health have been well-documented, it is also clear that such effects are transitory. Most of the beneficial adaptations that result from regular exercise will be reversed if an individual stops exercising (Spiriduso, 1995). Herein lies the problem: exercise can prevent premature aging and promote optimal health only for those who establish and *maintain* long-term activity patterns. Unfortunately, little is known about the determinants of exercise maintenance behavior. Research has documented that, across a variety of populations, approximately 50% of individuals who begin an exercise program will drop out within a year (Dishman, 1982, 1988). According to Dishman, exercise adherence across time is characterized by a negatively accelerating curve. There is a rapid 50% drop-out rate within six to twelve months of initial involvement. The drop-out rate tends to stabilize at this point and then gradually decrease with time. Although many studies have attempted to address the problem of exercise relapse and some have shown positive effects on short-term adherence to relatively brief programs, Dishman reports that little success has been achieved in improving long-term maintenance of exercise behavior.

A review of the exercise adherence literature has led Dishman (1982, 1988, 1994) to recommend that future exercise behavior research employ a theory-based "process approach." According to this perspective, exercise behavior is a continuous, dynamic process in which diverse psychological, social, and contextual factors play different roles at different stages of exercise adoption. While a number of stage models have been proposed for the exercise domain (e.g., Dishman, 1990; Sallis & Hovell, 1990), the stage model with the greatest validity for health behavior change is Prochaska and DiClemente's (1982, 1983, 1986) Stages of Change Model (SCM). The SCM was originally developed to study how

individuals changed addictive health behaviors such as smoking. More recently, Marcus and her colleagues have successfully applied the model to the process of exercise behavior change (e.g., Marcus, Rakowski & Rossi, 1992; Marcus, Selby, Niaura, & Rossi, 1992; Marcus & Simkin, 1993).

The SCM is comprised of five stages of behavior change: *precontemplation* (not exercising and not intending to start), *contemplation* (not currently exercising, but intending to start), *preparation* (exercising, but not regularly), *action* (exercising regularly but for less than 6 months), and *maintenance* (sustaining regular exercise for more than 6 months) (Marcus, Selby, et al., 1992). The stages represent degrees of motivational readiness to change which fall along a continuum from precontemplation to maintenance (Marcus, Selby, et al., 1992). The model predicts that movement through the stages may be cyclical as individuals make many attempts to change before reaching their goal (Marcus, Selby, et al., 1992; Prochaska & DiClemente, 1983).

Movement through the five stages is described by three constructs: self-efficacy, decisional balance, and processes of change. Self-efficacy refers to an individual's confidence in his/her ability to effect a desired outcome (Bandura, 1986). This construct is positively associated with an individual's progress through the stages of change, with precontemplators typically exhibiting the lowest self-efficacy, and those in maintenance exhibiting the highest (Marcus & Owen, 1992; Marcus, Selby, et al., 1992). Decisional balance refers to the balance of the perceived pros (benefits) and cons (costs) associated with behavior change (Prochaska & Marcus, 1994). Studies of exercise behavior (Gorley & Gordon, 1995; Jaffee, Lutter, & Wu, 1996; Marcus & Owen, 1992; Marcus, Rakowski, et al., 1992) indicate that pros increase and cons decrease from precontemplation to maintenance. This suggests that individuals in earlier stages place greater emphasis on the negative aspects

(e.g., time involvement), whereas those in later stages emphasize the positive aspects (e.g., feeling better) of exercise. Processes of change refer to a set of ten processes underlying intentional behavior change (e.g., self-reevaluation refers to a reappraisal of one's value system with regard to exercise). Research indicates that individuals emphasize different processes of change at each stage of behavior change (Prochaska & DiClemente, 1986). For example, Gorley and Gordon (1995) found that older adults in the maintenance stage were significantly more likely to engage in counterconditioning (substituting alternative behaviors) and consciousness raising (seeking new information and understanding of exercise) than older adults in the preparation stage.

The SCM has been shown to distinguish reliably between individuals who differ in their activity levels in samples of older adults (Bark & Nicholas, 1990; Gorley & Gordon, 1995) and middle-age women (Cardinal, 1996; Jaffee, et al., 1996). A large work-site study found stage of exercise to be a significant predictor of exercise behavior six months later, even after controlling for age, gender, and self-efficacy (Armstrong, Sallis, Hovell, & Hofstetter, 1993). In addition, a six-week intervention study (Marcus, Banspach, et al., 1992) involving a sample of community volunteers demonstrated that individuals in contemplation, preparation, and action can successfully progress through the stages of exercise.

A review of the SCM literature reveals a theoretical limitation, however, with regard to the ability of the model to explain and predict long-term exercise maintenance. The limitation involves the current conceptualization of maintenance: individuals exercising more than six months are collectively relegated to a single stage. This definition precludes within stage analysis; differences between individuals who succeed (i.e., sustain exercise for many years) and those who will relapse within, for example, a year. In order to increase the

number of individuals who become habitual exercisers, we must be able to identify and study short-term (those who may drop out) and long-term (those who have sustained exercise) maintainers.

In essence we know that compared to individuals in earlier stages, maintainers have a specific profile with regard to the SCM constructs. A profile of these individuals is characterized by higher self-efficacy, placing emphasis on the benefits rather than the costs of exercise, and a continued use of behavioral processes of change such as counterconditioning (substituting alternative behaviors) and stimulus control (controlling factors that contribute to inactivity). What remains to be determined is the specific mechanism underlying these stage-specific differences. What enables active women to feel highly efficacious, focus on the benefits of exercise, and employ effective self-regulatory strategies where so many others fail? Considering the key to successful maintenance, Prochaska and DiClemente concluded, "perhaps most important is the sense that one is becoming more of the kind of person one wants to be. Continuing to apply counterconditioning and stimulus control is most effective when it is based on the conviction that maintaining change supports a sense of self that is highly valued by oneself and at least one significant other" (1986, p. 10). This analysis suggests the answer may lie in a consideration of the self-concept: the specific images, conceptions, and feelings these active women have about their present as well as their future with regard to exercise.

In fact, there is a growing consensus among researchers concerning the value of the self-system (i.e., self-perceptions, self-appraisal) as an explanatory mechanism for the choice and performance of health behaviors. Consistent with this approach, Markus and her colleagues (Cross & Markus, 1991; Markus & Herzog, 1991; Markus & Nurius, 1986) contend that *possible selves* (images of the self in future states) represent a valuable tool for

explaining goal-directed behavior and personal health outcomes. Possible selves include images of what an individual hopes to become or to accomplish in the future (*hoped-for selves*), as well as images of oneself that one fears or dreads becoming (*feared selves*).

Markus and her colleagues (Cross & Markus, 1991; Markus & Herzog, 1992; Markus & Nurius, 1986) propose that possible selves function both as incentives for future behavior and as an interpretive context for current behavior. The authors contend that possible selves serve as key resources for cognitive expectations such as *self-efficacy* (one's degree of confidence in one's ability to achieve a desired outcome or goal) and *outcome expectancy* (the perceived likelihood of actually achieving the goal) (Bandura, 1977, 1986) and their subsequent effects on behavior. Self-efficacy and outcome expectancy are commonly referred to as self-regulatory processes (Hooker & Kaus, 1992). According to Markus and Ruvolo (1989), an individual's perceptions of efficacy and outcome expectancy arise from specific images of the self in the future achieving the desired goal state. The strength of the self-regulatory processes associated with a particular possible self then determine the particular action plans (i.e., processes of change such as self-reevaluation) engaged in service of the goal (Hooker & Kaus, 1992; Markus & Ruvolo, 1989).

The methodology used to assess possible selves consists of open-ended interviews or questionnaires in which individuals are asked to spontaneously generate a list of their hoped-for and feared selves. A review of the literature suggests that possible selves vary developmentally. Specifically, life-span research by Cross and Markus (1991) indicates significant age-related differences with regard to the total number of selves generated as well as the domains most frequently reported. However, across all age groups (adults 18 to 86 years of age), the possible selves individuals reported they most feared were in the physical (i.e., health, fitness, appearance) domain. In addition, the frequency of hoped-for selves in

the physical domain increased across the age groups. Support for the developmental nature of possible selves is also provided by Hooker's (1992) research which found that older adults were significantly more likely (86%) than college students (36%) to report health-related possible selves and that these health-related selves emerged as salient concerns in middle-age (Hooker & Kaus, 1994).

The literature also provides evidence to support the proposed function of possible selves as motivators for behavior. For example, possible selves were found to differentiate between delinquent and non-delinquent adolescents (Oyserman & Markus, 1990) and the balance between the number of hoped-for and feared possible selves more accurately predicted adolescent delinquent behavior than more global measures of self-esteem and optimism (Oyserman & Markus, 1990). Additionally, the balance of possible selves in the academic domain was shown to predict academic achievement and persistence among inner city youth (Oyserman, Gant, & Ager, 1995).

In the health domain Hooker and Kaus (1992) found that outcome expectancy associated with a hoped-for health-related possible self was a significant predictor of self-reported health behaviors in a sample of older adults (mean age = 72). In a second study, the authors found that among those individuals who had a health-related possible self, both young (24-39) and middle-aged (40-59) adults were far more likely to have feared than hoped-for selves in this domain. Perceived self-efficacy to avoid a feared health-related self was found to be a significant predictor of health behavior (Hooker & Kaus, 1994). Thus it appears that possible selves may help us to determine why some women engage in regular exercise (a health-protective behavior) while the majority of their peers are sedentary (a health-risk behavior). Furthermore, possible selves are a potentially useful approach for exploring the cognitive mechanisms that differentiate stages of exercise maintenance.

Statement of the Problem

A limitation with regard to the current SCM literature involves the research emphasis on adoption rather than maintenance of physical activity. Given the highly unstable nature (i.e., the high risk of drop-outs) of the action and maintenance stages, it is ironic that the focus of current research is on exercise adoption rather than on long-term adherence (Dishman, 1988). In addition, the current conceptualization of the maintenance stage which fails to recognize varying degrees of maintenance limits the usefulness of the SCM for addressing relapse prevention and long-term exercise behavior. To date, few, if any studies have attempted to look within the maintenance stage. This is of particular importance, if the first 6 months of the maintenance stage (which are the second 6 months of the total exercise program) are characterized by a 50% drop-out rate (Dishman, 1988).

The purpose of this study was to examine the tenability of possible selves as a means to differentiate middle-aged women who vary in their degree of exercise involvement. Participants in the maintenance stage of the SCM were divided into three groups based on the duration of their exercise involvement (6-12 months, 1-2 years, and 2+ years). Possible selves represent a compelling heuristic from which to explore the cognitive mechanisms that motivate women at different levels of exercise maintenance. By elucidating the self-system and its relationship to maintenance behavior, possible selves may provide information which enables the SCM to more accurately capture the dynamics inherent in habitual exercise behavior.

Research Questions

In order to explore the role of possible selves in the long-term maintenance of exercise behavior, the following questions were addressed:

1. Do the number and domains (i.e., health, career, family) of open-ended hoped-for possible selves vary across stages of maintenance?
2. Does the domain of the hoped-for possible self most closely related to exercise vary across stages of maintenance?
3. Do the self-regulatory processes (self-efficacy and outcome expectancy) associated with the three focused hoped-for possible selves (the most important open-ended self, the possible self most closely related to exercise, and the possible self derived from a pilot study) differentially predict exercise maintenance, and if so, which one of these three is the strongest predictor?
4. Do the number and domains of open-ended feared possible selves vary across stages of maintenance?
5. Does the domain of the feared possible self most closely related to exercise vary across stages of maintenance?
6. Do the self-regulatory processes associated with the three focused feared possible selves (the most important open-ended self, the possible self most closely related to exercise, and the possible self derived from a pilot study) differentially predict exercise maintenance, and if so, which one of these three is the strongest predictor?

Expected Outcomes

While the present study was a preliminary exploration of possible selves across stages of exercise maintenance, this line of research might predict several outcomes. First, the number of hoped-for and feared selves in the Physical category was expected to be positively related to individuals' duration in the maintenance stage. Second, it was predicted that long-term maintainers would be more likely to cite Health and Physical categories as most closely related to their current exercise behavior than novice maintainers. Third, it was expected that the self-efficacy and outcome expectancy associated with the exercise-related self would be the strongest predictors of exercise behavior and that this predictive power would be greatest for long-term maintainers.

Operational Definitions

The following definitions were used for the present study:

Exercise was defined as any planned activity in which the participant engages for the purpose of maintaining or increasing health or fitness, such as walking, swimming, dancing, strength training, or bicycling (adapted from Courneya, 1995).

Regular Exercise was defined as participating in this type of activity at least three times per week, thirty minutes or more per day (consecutively or cumulatively) (adapted from Cardinal, 1995).

Possible Selves are future-oriented self-conceptions (Markus & Nurius, 1986) identified by participants. These self-conceptions were measured with an extended version of the Possible Selves Instrument (Cross & Markus, 1991).

Focused Possible Selves included the most important open-ended possible self (most important), the possible self most closely related to exercise (exercise-related), and the possible self derived from a pilot study and presented to (rather than generated by) the participants (exercise-specific).

Stage of change is one of the five stages of health-related behavior originally defined by Prochaska and DiClemente (1983), and extended to the exercise domain by Marcus, Banspach, et al., (1992). The stages are: precontemplation (not exercising, and not intending to start), contemplation (not currently exercising, but intending to start), preparation (some exercise, but no regular routine established), action (exercising regularly for less than six months), and maintenance (exercising regularly for six months or more). Stage of change was measured using the Stages of Exercise Scale (Cardinal, 1995).

Assumptions

This study is based on several assumptions. First, it was assumed that the participants understood the instructions and terminology employed in this study. This assumption was based on pilot studies (see Whaley, 1997) verifying the clarity of instructions and the validity of the exercise-specific focused possible selves. Second, this study was predicated on the assumption that participants would be honest both in their answers to the questionnaire and in their description of the possible selves they imagine for themselves. It is hoped that the assurance of confidentiality extended to participants in the initial cover letter helped to ensure the integrity of participant responses.

Limitations

There are several limitations inherent in the design of the present study. First, an important limitation is that all analyses were conducted using self-report data. Self-report research is often limited by the potential for response bias such that people are motivated to portray themselves in a favorable light (Babbie, 1992). A related concern involves the potential for variability in the degree of effort and honesty of the participants' responses. There also exists the possibility that participants were biased toward exercise-related possible selves, because they were aware that the study involved women's perceptions about exercise. It must be noted that such pre-assessment knowledge might preclude the truly spontaneous generation of possible selves. An additional limitation involves the potential for self-selection bias, since all of the participants were volunteers.

Delimitations

The generalizability of the present study is limited to women between the ages of 35 and 59 in the maintenance stage of exercise behavior. Despite efforts to maximize the potential diversity of this sample of university employees, the sample overrepresented well-educated, affluent Caucasians and underrepresented ethnic minorities due to the geographic location of the study. Due to the non-experimental design of the study, relationships between variables of interest are delimited to an associative rather than causal nature.

CHAPTER 2

REVIEW OF LITERATURE

The 1996 Surgeon General's report on Physical Activity and Health identified physical activity and fitness as priority areas, both in general health promotion and as specific national health objectives (USDHHS, 1996). The report reflects our current national public health dilemma: despite the well-documented benefits of an active life-style, few adults choose to exercise regularly. Moreover, O'Brien and Vertinsky (1991) report that women are significantly less likely than men to take advantage of exercise as a resource to achieve optimal health. This is of particular concern given that the population profile of the Western industrialized countries shows an increasing predominance of older adults, particularly older women.

While many of these women will outlive their male counterparts, their extra years of life are likely to be characterized by chronic illness (O'Brien & Vertinsky, 1991). The extended life of older women may be of questionable benefit if the quality of their later years is compromised by poor health and loss of independence. In many cases, declining activity levels among women in middle-age contribute to the onset of a myriad of chronic and debilitating conditions collectively defined as "pathological aging." The stage is set in mid-life for a precipitous downward spiral in which a sedentary lifestyle results in the premature onset of disease and further reductions in activity levels, thereby increasing the risk of chronic disease and consequent loss of functional independence.

Given the health-protective and health-promotive effects of physical activity, researchers are faced with the challenge of discovering methods to increase exercise participation, particularly among middle-aged women. In order to meet this challenge, researchers must first gain insight into the elusive motivational factors underlying voluntary

exercise behavior. The synthesis of two theoretical models, Stages of Change (Prochaska & DiClemente, 1983; Marcus, Selby, et al., 1992) and Possible Selves (Markus & Nurius, 1986), provides a compelling conceptual framework from which exercise motivation might be explored.

The purpose of this chapter is to review the relevant sport and exercise psychology literature regarding the benefits of physical activity and the patterns of exercise participation among women, and to relate this literature to the examination of exercise maintenance behaviors in middle-aged women. The Stages of Change Model (SCM) and its application to exercise behavior will be reviewed, as well as the Possible Selves construct and support for its role in explicating motivated behavior. Because exercise behavior must be maintained in order to produce health benefits, the potential limitations in the definition of maintenance as currently conceptualized in the SCM literature will also be discussed.

Benefits of Physical Activity

Research suggests that exercise may represent a powerful resource for preventing premature morbidity and mortality. Studies have shown that approximately 50% of what is currently accepted as the “normal” and inevitable process of aging is actually hypokinesia (Drinkwater, 1988). According to Drinkwater (1988), physical inactivity leads to “the degeneration and functional loss of muscle and bone tissue” (p. 148). The common hypokinetic syndromes include musculoskeletal frailty, cardiovascular vulnerability, obesity, depression, and premature aging. In effect, hypokinesia represents empirical support for and medicalization of the colloquial “use it or lose it.”

According to O'Brien & Vertinsky (1991), women are predisposed to more illness than men due to gender differences in activity levels, employment, and life-role stress. Aging

women are particularly vulnerable to chronic disorders which undermine their motivation to remain active: spinal degeneration and deformity, bunions, varicose veins, colitis, anemia, migraine headaches, and bladder infections are all two to three times more common among women over 75 than among their male counterparts. According to a Canadian health survey (Charette, 1988, as cited in O'Brien & Vertinsky, 1991), "normal aging" among elderly women describes a distressing profile: 75% are physically limited in daily activity; 60% of women over 65 have been screened out of random public physical fitness testing for reasons of health risk, and 46% are institutionalized by the age of 85. The implication of inactivity in the premature morbidity associated with the "normal" aging process suggests that exercise represents a greatly underutilized resource for women in mid-life who wish to remain independent and experience optimal health in their later years.

A woman need not have been active all her life to derive the health-protective benefits of physical activity. Blair et al. (1989) studied differences in morbidity and mortality rates among individuals representing five levels of activity. They found that the single most significant predictor of longevity was not being in the sedentary (Level 1) category. The greatest health-protective benefits were derived by formerly sedentary individuals who moved from Level 1 to Level 2 (low levels of activity). Moreover, although some physical decline with aging is inevitable, a woman who adopts and maintains an active lifestyle, even after years of inactivity, can expect to enjoy benefits of the change for the remainder of her life. For example, research has demonstrated that physically active women are physiologically one or two decades younger than their sedentary contemporaries (Drinkwater, 1988) and that active women in their 80's can have a level of fitness that equals or exceeds that of sedentary 20-year-olds (Spiriduso, 1995).

Numerous studies have demonstrated that exercise can play a critical role in determining quality of life as individuals age. In fact, physical activity is consistently identified as one of the most important health interventions in the lives of older adults. Briefly, exercise has therapeutic effects on and is commonly prescribed in the treatment of coronary artery disease, hypertension, diabetes mellitus, obesity, arthritis, and depression (Bouchard, Shepherd, & Stevens, 1994). Recent data indicate that exercise may also reduce the incidence of selected types of cancer and prevent osteoporosis. As O'Brien and Vertinsky (1991) note, no medicine can address the range of conditions for which exercise is prescribed.

In addition to the physiological benefits of physical activity, there is strong empirical support for the psychological benefits. McAuley and Rudolph (1995) reviewed the effects of exercise and physical activity on the psychological well-being of middle-aged adults (mean age = 56.7 years). Their review of 38 studies offered evidence to support the widely accepted positive relationship between physical activity and psychological well-being. They noted that the strength of this relationship was directly related to the *duration* of an individual's commitment to regular exercise. According to the authors, those participants whose involvement in physical activity was maintained over time (i.e., more than 10 weeks) consistently reported more positive results. Moreover, McAuley and Rudolph suggest that it may be the actual *participation* in physical activity rather than any resulting improvements in physical fitness, which is responsible for improved psychological well-being. Thus, the psychological benefits will be lost if the activity is not maintained.

Consequently, there is a caveat: these health-protective benefits are available only to those who establish and *maintain* long-term activity patterns. The importance of increasing the number of women committed to life-long physical activity cannot be understated. It is

insufficient merely to address the number of women initiating an exercise program if half of them will discontinue within a year (Dishman, 1988). Most of the beneficial adaptations that result from exercise will be reversed if an individual stops exercising. Many of the benefits of exercise -- both endurance and resistance activities -- diminish within 2 weeks if physical activity is substantially reduced, and effects disappear within 2 to 8 months if physical activity is not resumed (Spiriduso, 1995). Unfortunately very few people maintain their commitment to regular exercise long enough to retain these benefits.

Physical Activity Patterns Among Women

Epidemiological studies show that perhaps as few as 8% of American adults meet the ACSM's guidelines for physical activity, while fully 70-80% are sedentary (Dishman, 1988). Research across diverse populations indicates that approximately 50% of the individuals who begin an exercise program will drop out within six months to a year (Dishman, 1988).

Furthermore, research indicates that activity levels decrease with age (Dishman, 1988). The percentage of women reporting they *never* engage in leisure-time physical activity more than doubles from 17% among young adults to 50% of those 75 and older (USDHHS, 1996). Older adults are significantly less likely than younger people to believe that they can improve their health through exercise (National Health & Welfare Canada, cited in O'Brien & Vertinsky, 1991). Moreover, data from large national surveys indicates that older adults both overestimate the risks and underestimate the potential health benefits of exercise (O'Brien & Vertinsky, 1991).

More importantly for this study, across age groups, significantly fewer women engage in leisure-time physical activity than their male counterparts. Substantial differences exist between the sexes for many activities. For example, the 1991 National Health Interview Survey found that among middle-aged adults (45-64 years), participation in resistance training was twice as prevalent among men (12.2%) as among women (5.1%). Middle-aged men were three times more likely to report jogging or running (7.7%) than middle-aged women (2.5%). When the intensity levels are standardized to control for declines in cardiorespiratory fitness, the proportion of men reporting regular vigorous activity increases at retirement age and remains relatively stable through the ninth decade (USDHHS, 1996). In contrast, the proportion of women reporting regular participation in vigorous activity continues to decline with age.

Several gender-differentiated variables may negatively influence the patterns of women's participation in physical activity. Marcus (1995) found that marriage, parenthood, divorce, widowhood, lack of social support, lack of child care, and lack of economic resources may all represent barriers to exercise for women. Middle-aged and older women may also find it particularly difficult to overcome patterns of socialization. According to Coakley, "sport participation decisions at all points during the life course are tied to the perceived cultural importance of sport and the links among involvement, general social acceptance, and the achievement of personal goals" (1993, p. 175). The current cohort of middle-aged women may have had limited opportunities to participate in physical activity. According to a recent report by the President's Council on Physical Activity and Fitness (1997), fewer than one percent of high-school girls participated in high school athletics prior to the passage of Title IX in 1972, compared to 30.5 percent who participated in 1990-1991. The number of boys participating during this time period remained constant at one in two.

Although social attitudes and expectations about women's involvement in exercise have changed over the past few decades, barriers still remain. For example, most women lack peer role models for appropriate physical activity and few physicians provide women with routine information about exercise (Marcus, Dubbert, King & Pinto, 1995). Adult women may thus find themselves in a state of double jeopardy, as both their age and gender may make a physically active life-style more difficult.

In conclusion, research indicates that despite the well-documented benefits, relatively few middle-aged women have made physical activity an integral part of their lives. Given the considerable health benefits associated with an active life-style, researchers are charged with discovering methods to increase exercise adoption and maintenance. To meet this challenge, they must first gain a better understanding of the factors underlying voluntary exercise participation. A recent approach to this challenge involves the application of the SCM (Prochaska & DiClemente, 1983) to the process of exercise behavior change.

The Stages of Change Model

The SCM was originally designed to explain the stages individuals progress through when they change addictive behaviors such as smoking (Prochaska & DiClemente, 1983). More recently, Marcus and her colleagues have successfully applied the model to the process of exercise behavior change (e.g., Marcus, Rakowski, et al., 1992; Marcus, Selby, et al., 1992).

The Conceptual Model

The SCM consists of three hierarchical levels integrated to explain the process of behavior change: Level 1, the five stages of behavior change; Level 2, the three constructs

proposed to explain behavior change across the stages; and Level 3, the behavioral context. Although the present study will focus primarily on the first level, each of the three levels will be discussed to provide a complete description of the model.

The first level of the SCM consists of five dynamic stages of behavior change: *precontemplation* (no intention of changing), *contemplation* (considering a change), *preparation* (making small changes), *action* (participating regularly in the behavior for less than 6 months), and *maintenance* (sustaining the behavior for more than 6 months) (Prochaska & DiClemente, 1983). The stages represent degrees of motivational readiness to change which fall along a continuum from precontemplation to maintenance (Marcus, Selby, et al., 1992). Individuals move through the stages as they change from an unhealthy (e.g., inactive) to a healthy (e.g., active) behavior. The model predicts that movement through the stages may be cyclical as individuals make repeated attempts to change before reaching their goal (Marcus, Selby, et al., 1992; Prochaska & DiClemente, 1983).

The second level of the SCM consists of three constructs theorized to influence behavior change: self-efficacy, decisional balance, and processes of change. Self-efficacy, or situation-specific self-confidence (Bandura, 1986), has been shown to play an integral role in determining a wide variety of complex behaviors. Exercise self-efficacy refers to one's confidence in one's ability to exercise despite adverse conditions. Efficacy perceptions are theorized to influence an individual's physical activity patterns with regard to the choice of activity, effort expended, and persistence in adverse conditions (Bandura, 1986). Prochaska and DiClemente (1986) have proposed that exercise self-efficacy is related to an individual's stage of change, and several studies have provided support for this hypothesis. For example, exercise self-efficacy has been found to reliably differentiate stages of exercise adoption in the SCM literature. Specifically, research has demonstrated that individuals show increases

in exercise self-efficacy as they progress through the stages of exercise (e.g., Cardinal, 1995; Gorley & Gordon, 1995; Marcus, Selby, et al., 1992).

Additional research specifically focusing on the role of exercise self-efficacy in exercise behavior among middle-aged adults has produced several significant findings. McAuley, Lox, and Duncan (1993) examined the role of exercise self-efficacy in the maintenance of exercise in middle-aged adults during a 9-month follow-up to a structured walking program. The results indicated that while VO_{2max} , past exercise behavior, and exercise self-efficacy all contributed to compliance (to prescribed guidelines), exercise self-efficacy was the only predictor of exercise maintenance (degree of participation) over the 9 month follow-up. The implication of exercise self-efficacy in exercise maintenance is consistent with earlier research showing its role in the early stages of exercise adoption (McAuley, 1992; Sallis et al., 1989). Additionally, exercise self-efficacy has been found to increase following an initial fitness test and across 20 weeks of an exercise program (McAuley, Courneya, & Lettunich, 1991).

The second Level 2 construct is decisional balance, based on Janis and Mann's 1977 conflict model (as cited in Prochaska & DiClemente, 1986). This decision-making model posits that individuals weigh the potential benefits (pros) and costs (cons) involved in a decision (i.e., to begin or continue exercising). Marcus and Owen (1992) found that decisional balance (pros minus cons) differed across the stages of exercise adoption: at precontemplation cons outweighed pros, at contemplation pros balanced with cons, and at the action and maintenance stages pros outweighed cons. These findings suggest that individuals in the earlier stages of exercise change place greater emphasis on the negative aspects (e.g., time involvement) whereas those in later stages emphasize the positive aspects of exercise (e.g., feeling better). Studies applying the SCM to 12 problem behaviors indicate

the cons of changing consistently outweigh the pros during precontemplation, whereas the pros outweigh the cons in action and maintenance (Prochaska & Marcus, 1994). Similarly, two work-site studies (Jaffee, et al, 1996; Marcus, Rakowski, et al., 1992) found that individuals who perceived more benefits to physical activity or who reported valuing the benefits of physical activity above the costs were more likely to participate in physical activity.

The third Level 2 construct, processes of change, represents processes “initiated or experienced by an individual in modifying affect, behavior, cognitions, or relationships” (Prochaska & DiClemente, 1986, p. 7). Prochaska and DiClemente (1986) have suggested that although there are many different coping strategies, there are a limited number of processes underlying behavior change. The ten processes of change have been organized into five experiential processes and five behavioral processes. The experiential processes are consciousness raising, dramatic relief, self-reevaluation, social reevaluation, and social liberation. The behavioral processes are environmental reevaluation, relationship fostering, counterconditioning, contingency management, and stimulus control (Prochaska & Marcus, 1994). Based on their research with self-changers (people who successfully quit smoking on their own), Prochaska and DiClemente (1986) suggest that individuals emphasize different processes of change during each stage of behavior change. Consistent with studies of smoking behavior (Prochaska & DiClementi, 1986), research in the exercise domain has shown that precontemplators use the ten processes significantly less than individuals in the other stages (Marcus, Rossi, Selby, Niaura, & Abrams, 1992). Such findings support the model’s definition of precontemplation, indicating that people in this stage do little to address their inactivity and its consequences. Generally, experiential processes are more important for understanding and predicting progress in the early stages of change, whereas

behavioral processes predict transitions among the later stages (Prochaska & DiClementi, 1986). For example, Murphy (1992) found counterconditioning (e.g., “When I feel tired I make myself exercise anyway because I know I will feel better afterward.”) was the strongest discriminator of stage membership. Among both middle-aged and older adults use of this behavioral process increased across the stages, with individuals in maintenance using the process most frequently.

The third level of the SCM concerns the context in which the behavior occurs. This level identifies changes necessary for individuals to successfully overcome their problem behavior (Prochaska & DiClemente, 1986). This “level of change” dimension represents five distinct but interrelated levels of psychological problems that may be addressed in treatment: symptom/situational, maladaptive cognitions, current interpersonal conflicts, family/systems conflicts, and intrapersonal conflicts. It is considered essential that programs for behavior change are then matched to an individual’s problem level (Prochaska & DiClemente, 1986).

The Exercise-Related Literature

The SCM was first applied to the exercise domain in a study by Barke and Nicholas (1990) which demonstrated that the model effectively distinguishes groups of older adults who differ in their level of physical activity. The sample of fifty-nine older adults (aged 59-80 years) consisted of exercise program participants ($n = 18$), a matched group of retirees ($n = 21$), and elderhostel program participants ($n = 21$). Between-groups analyses indicated that exercise program and elderhostel groups scored significantly higher on the action and maintenance stages than retirees, who scored significantly higher on the precontemplation stage.

Armstrong et al. (1993) found the SCM to be a significant predictor of future physical activity involvement, even after controlling for other factors such as age, gender, and self-efficacy. The authors examined the progression of baseline precontemplators and contemplators to the stages of action and maintenance. Multivariate analyses indicated that baseline stage of change was a significant predictor of later adoption of vigorous exercise. Six months post-baseline, contemplators were almost twice as likely as precontemplators to advance to the action stage (46% vs. 24%), and nearly four times more likely to progress to the maintenance stage (25% vs. 6%).

A more recent application of the SCM involves a study by Jaffee, et al. (1996) examining motives for physical activity in a work-site sample ($N = 54$) of middle-aged women (mean age = 42 years). Participants were categorized as “inactive” (those in precontemplation and contemplation) or “active” (those in action and maintenance). Women in the preparation stage were distinct from both the active and inactive groups and were therefore analyzed separately.

Analysis revealed striking differences between the active and inactive groups. For example, active women were five times more likely to agree that it was extremely important to exercise regularly (79% vs. 15.4%) and nearly twice as likely as to believe they could improve their health through regular exercise (87.5% vs. 46.2%). The two groups also differed with regard to their expectations about the benefits of physical activity. Compared to their inactive counterparts, active women were far more likely to expect improved fitness, weight control, and enjoyment. While 37.5% of the active women did not expect any negative outcomes from physical activity, all of the inactive women expected less time for family, work, or other activities. Physically inactive women also reported more obstacles to physical activity. While lack of time was the single most frequently reported obstacle for

both active (62.5%) and inactive (76.9%) women, there were striking group differences with regard to perceived internal barriers to exercise. Inactive women were nearly twice as likely as active women to cite lack of discipline (61.5% vs. 33%) and more than three times more likely to cite lack of motivation (61.5% vs. 16.7%).

The researchers also asked the active women what motivated them to begin and to maintain their active life-styles. Of particular interest is the finding that motives for initiating physical activity (adoption) were not always the same as motives for continuing to be physically active (maintenance). Active women reported a variety of reasons for initiating physical activity; they were motivated by improved health and fitness (20%), habit (20%), fun or enjoyment (16%), weight control (16%), and psychological benefits such as stress management (8%). They were motivated to remain physically active by health and fitness benefits (32%), psychological benefits (24%), weight control (16%), fun (8%), and habit (8%). When asked to describe the most important benefit of regular physical activity, the active women reported it was feeling better, physically and psychologically.

It should be noted that this study provides support for the contention that motivation to become physically active (adoption) may differ from motivation to remain physically active (maintenance). Moreover, the implication of self-perceptions and expectations as central to exercise behavior is consistent with previous SCM research demonstrating that individuals' perceptions that exercise would make them feel healthier and better were positively related to greater readiness to exercise (Marcus, Eaton, Rossi & Harlow, 1994). These results suggest that self-perceptions may be critical determinants of maintaining physical activity behavior.

A potential limitation of the SCM involves its failure to recognize different levels of exercise adherence; individuals exercising more than 6 months are collectively relegated to

the maintenance stage. Based on this definition of maintenance, the SCM is of questionable value for the study of factors related to long-term maintenance. It is unlikely that a formerly sedentary individual who has exercised regularly for just 6 months employs the same self-regulatory processes as one for whom regular exercise has become "a way of life." It could also be argued that having maintained a behavior for six months is hardly assurance against relapse. In fact, we know that half of the individuals who begin an exercise program will drop out within a year (Dishman, 1988). This limitation in the current conceptualization of the SCM suggests the need for future research to determine the tenability of the model in describing long-term exercise maintenance.

While the SCM represents a useful framework for studying the dynamics of exercise behavior, the motivational aspects of complex behaviors such as exercise may best be understood from a consideration of the self-system. In fact, there is a growing consensus concerning the potential value of the self-system as an explanatory mechanism in understanding complex behavior (Hooker, 1992; Markus & Herzog, 1992). As a result of this interest in the role of self-perception in behavior, recent research has focused on explicating the content and processes of the self-concept.

The Self-Concept

As conceptualized by Markus and Nurius (1986), the self-concept is a dynamic, multi-dimensional construct which serves as the foundation for an individual's perceptions of control and competence. The authors define the self-concept as "a system of affective-cognitive structures (also called theories or schemas) about the self that lends structure and coherence to the individual's self-relevant experiences" (p. 955). The self-concept is shaped by a variety of sociocultural factors and contains a wide repertoire of self-representations

(e.g., self-schemata, possible selves), incentives, plans, strategies, and rules guiding behavior (Markus & Herzog, 1992). The working self-concept consists of an integrated subset of this repertoire that is currently accessible in working memory. Specific self-representations become active in working memory when an individual experiences a self-relevant event or more deliberately invokes them. The working self-concept can therefore be conceptualized as a continually shifting collection of currently relevant and accessible self-knowledge (Markus & Herzog, 1992).

According to Markus and Ruvolo (1992), the self-concept serves to organize cognitive processes such as the interpretation of information (e.g., events and experiences) and self-regulation. The authors suggest that “as an active interpretive framework, the self-concept integrates an individual’s experiences across time and provides continuity and meaning to them” (1992, p. 110). In this perspective, the organizational and functional nature of the “mediating self-concept” provides the mechanisms by which individuals render experience meaningful. As such, the self-concept is critically implicated in how an individual interprets and responds to life events.

Self-Schemata

According to Markus (1977), the self-concept consists of a collection of self-schemata or knowledge structures. These domain-specific generalizations about the self are derived from past experience. They represent “theories of the self,” self-knowledge about one’s attributes and abilities with regard to specific domains (e.g., “I am not athletic,” “I am shy,” “I am a good parent,” etc.) (Markus, 1977; Markus & Herzog, 1992). Self-schemata serve to organize and direct the processing of self-relevant information. Specifically, self-schemata influence the speed and nature of judgments about the self, predictions about

one's future behavior, memory for schema-related information, and resistance to schema-inconsistent information (Markus, 1977). These "theories of the self" guide the individual's interpretation of events (e.g., whether an event is seen as threatening or challenging) and subsequent response (Markus & Herzog, 1992).

Research by Kendzierski (1994) provides support for the hypothesized influence of self-schema on information processing and behavior. Kendzierski defined young adults as exercise schematic if they considered exercise to be (a) extremely self-descriptive and (b) very important to their self-image. She found that, compared to individuals who lacked an exercise schema, exercise schematics reported higher rates of exercise participation, had more strategies to remain active, processed exercise-related information faster, and made more plans to exercise in the future.

The personalized nature of self-schemata helps explain why people respond to the same life events (e.g., marriage, illness, divorce, retirement) in highly individualized ways (Markus & Herzog, 1992; Ruvolo & Markus, 1992). In addition to providing cohesion to past and present experiences, self-schemata are also "claims of responsibility for one's future actions" in a given domain (Markus & Ruvolo, 1989, p. 213). The elements of self-schemata that represent the *future* in an individual's domains of concern have been termed "possible selves" (Markus & Nurius, 1986).

The Possible Selves Model

Possible selves are specific, personalized images of an individual's hopes, fears, and dreams of what is possible in the future (Markus & Nurius, 1986; Markus & Ruvolo, 1992). *Hoped-for selves* are images of what an individual hopes to become or accomplish in the future. For example, a young adult might have hoped-for images of graduating from college, having

an exciting career, and getting married. *Feared selves* are representations of one's self in the future that we fear or dread. Thus, the aforementioned young person might have feared images of failing to graduate from college, being trapped in a terminally boring job, and being divorced.

Markus and Ruvolo (1989) contend that possible selves represent a link between the self-concept and motivation. They suggest that "clearly elaborated possible selves and the strategies of realizing them decrease the psychological distance between one's current state and the desired state" (1992, p. 119). According to the authors, the process of creating possible selves enables an individual to experience a connection (i.e., to "bridge the psychological distance") between one's current self and one's imagined future self. The more vivid and tangible an individual's possible selves, the more they enable one's current self to approach the desired state. According to the model (Markus & Nurius, 1986), possible selves serve two functions: as motivators for future behavior and as contexts for evaluation of the current self.

Markus and Ruvolo (1989) propose that possible selves motivate behavior by enabling individuals to (a) personalize the goal, (i.e., "make the goal one's own") and (b) construct the sequence of self-representations that will enable them to realize the goal. They argue that a critical aspect of goal effectiveness is the sense (cognitive, affective, somatic) of one's self approaching and achieving the goal. These images of the self approaching and realizing the desired end-state serve to capture elements of what individuals consciously experience when they are engaged in motivated or goal-directed behavior. Envisioning oneself achieving a desired end-state may also have affective or somatic consequences. For example, by imagining oneself successfully completing a marathon, one may anticipate and actually experience a taste of the exhilaration and pride associated with achieving that goal.

These somatic and affective sensations can be drawn upon as motivational resources as the individual completes the intermediate steps toward realizing the goal.

Research has also demonstrated that envisioning one's own success enhances ability perceptions (e.g., self-efficacy, competence, and control), which results in increased effort and persistence, thereby enhancing performance (Ruvolo & Markus, 1992). Possible selves may further serve to motivate behavior by providing specific strategies to attain a goal. Faced daily with a myriad of possible behaviors, an individual with a possible self of "being healthy and active" will be motivated to choose those which are health-enhancing (e.g., choosing a baked potato rather than fries, biking to work rather than driving).

Markus and Nurius (1986) propose a second function of possible selves as standards for evaluation of the current self. The affective evaluation of one's current self (and resulting satisfaction or dissatisfaction) is determined by the surrounding context of possibility. For example, a woman with a hoped-for image of herself as "fit and healthy" may feel dissatisfied if she evaluates her current self as "overweight and sedentary." This dissatisfaction with the current state may then serve to motivate specific behaviors (e.g. daily exercise) in service of the hoped-for possible self. Similarly, a feared health-related self of "me developing heart disease" may serve as an incentive for the very same behaviors. Markus and Herzog (1992) refer to this juxtaposition of a hoped-for and feared self in a single domain as the "balance" of possible selves, which is theorized to be a crucial determinant of their influence on behavior. Specifically, the authors contend that a balance of possible selves will provide superior action strategies because the individual's behavior is guided simultaneously by both the desire to achieve a hoped-for self and the desire to avoid a feared self.

According to Markus and Ruvolo (1992), possible selves mediate the effects of ability perceptions such as self-efficacy and outcome expectancy on behavior. Self-efficacy refers to one's degree of confidence in one's ability to execute successfully a given behavior (Bandura, 1977, 1986). Outcome expectancy relates to one's confidence that a given goal is actually obtainable (Bandura, 1986). Specifically, an individual's perceptions of efficacy and outcome expectancy arise from specific images of the self in the future achieving the desired goal state. The degree of self-efficacy and outcome expectancy determine the particular action plans (e.g., processes of change, goal setting, self-reinforcement) engaged in service of the goal (Hooker & Kaus, 1992; Markus & Ruvolo, 1989).

There is strong empirical support for the influence of ability perceptions upon self-regulation of goal-oriented behaviors (Bandura, 1989; McAuley, 1992). Given the difficulty many people have in trying to change exercise behavior, it is not surprising that self-regulatory behaviors have been consistently implicated in successful adoption and maintenance of this behavior. A strong sense of self-efficacy and the ability to employ and nurture self-regulatory skills and strategies to enhance efficacy cognitions have been identified as determinants of physical activity in laboratory settings (McAuley & Courneya, 1992), in long-term exercise participation (e.g., Garcia & King, 1991; McAuley, 1992), and in larger survey population studies (e.g., Sallis et al., 1989).

The Possible Selves Literature

The methodology used to assess possible selves consists of open-ended interviews or questionnaires in which individuals are asked to spontaneously generate a list of their hoped-for selves. Respondents are then asked to identify their most important hoped-for possible self. Likert-type scales are employed to evaluate self-regulatory processes (perceived self-

efficacy and outcome expectancy) associated with achieving the most important possible self. The process is then repeated for feared-selves. Items from participants' self-generated lists of possible selves are then coded into a domain (e.g., health, family, relationships, occupation).

A review of the literature indicates support for the theoretical view that possible selves vary developmentally and are linked to motivated behavior. In order to assess the developmental nature of the construct, Cross and Markus (1991) examined the possible selves of individuals ranging from 18 to 86 years of age. The sample ($N = 173$) was divided into four age groups representing young adulthood (18-24), maturity (25-39), middle-age (40-59), and old age (60 and older).

There were significant differences in the number of possible selves generated by members of the four groups. The total number (hoped-for and feared selves) declined across age groups, with young adults reporting the highest number and older adults the least. While the authors reported that possible selves varied dramatically in their degree of elaboration (detail), there were no systematic age-related differences in degree of elaboration across the groups. However, there were significant differences across groups with respect to the category of possible selves most frequently mentioned.

Compared to the possible selves of middle-aged and older adults, young adults' possible selves were relatively futuristic, idealistic and family and career oriented. In contrast, the possible selves of the middle-aged group expressed a concern with the losses and declines typically associated with aging (e.g., being widowed, being physically incapacitated, financial insecurity). The authors suggest that as with their hoped-for selves, the fears of this group indicated a shifting perspective on time, from "years since birth" to "time left to live" (Neugarten, 1968, as cited in Hooker & Kaus, 1994).

Older adults' possible selves emphasized the personal and physical domains, were more realistic, and indicated a concern with maintaining the status quo. This group appeared to consolidate their possible selves, indicating fewer selves in a smaller range of categories. However, compared to their younger counterparts, older adults reported engaging in a proportionately greater number of activities to achieve or avoid their possible selves.

With regard to health-related possible selves, young adults generated fewer hoped-for selves in the physical category than the other three groups. In fact, the frequency of hoped-for selves in the physical category increased with age across the four groups. Across all four age groups, the possible selves people reported they most feared were in the physical domain (i.e., health, fitness, appearance). Moreover, older adults mentioned feared selves in the physical category significantly more often than individuals in the three younger groups.

Support for the relationship between possible selves and behavior has been provided by research involving group comparisons. For example, possible selves have been shown to differentiate between delinquent and non-delinquent adolescents (Oyserman & Markus, 1990). Several studies also provide support for the theoretical proposition that possible selves are correlates of motivated behavior. For example, Oyserman, Gant, and Ager (1995) found that a balance of possible selves in the academic/career domain predicted academic achievement and persistence among inner city youth. Similarly, the degree of balance between hoped-for and feared selves more accurately predicted adolescent delinquent behavior than more global measures of self-esteem and optimism (Oyserman & Markus, 1990).

Of particular interest in the possible selves literature is a series of studies applying a life-span approach to the investigation of health-related possible selves and associated self-regulatory variables (Hooker, 1992; Hooker & Kaus, 1992; Hooker & Kaus, 1994). The

original study (Hooker, 1992) explored hypothesized age-related differences in the possible selves of young adults (college students) and older adults (ages 55-89). The two groups were asked to (a) describe their hoped-for possible selves, (b) identify their most important hoped-for self, and (c) indicate their perceptions of efficacy and outcome expectancy associated with this most important self. These procedures were then repeated for feared selves.

As hypothesized, older adults were significantly more likely than younger adults to report a hoped-for or feared self in the domain of health. The majority of older adults (86%) and college students (71%) reported health-related selves. However, when possible selves related to body weight were excluded from the analysis, the number of young adults indicating a health-related possible self dropped dramatically to 36%. Moreover, fully 73% of the older adults indicated that the self they most hoped to achieve or avoid was one related to health. Additionally, older adults scored higher than college students on a global measure of health value, although the groups did not differ in perceived health. Interestingly, the self-regulatory variables associated with a most important hoped-for health-related self were significant predictors of perceived health, but the relationship did not hold true for feared selves.

The second study (Hooker & Kaus, 1992) explored the relationship between self-regulatory processes and self-reported health behaviors in a sample ($N = 114$) of community-dwelling older adults (mean age = 72 years). Health-related possible selves were obtained with the method employed in the previous study. Health behaviors were assessed with an inventory of common health-promoting or endangering behaviors (e.g., exercise, smoking, alcohol use, nutrition, stress management, etc.). Results supported the hypothesized relationship between self-regulatory processes and reported health behaviors.

Outcome expectancy proved to be a significant predictor of health behavior. In essence, adults who believed their health goals were obtainable were more motivated to engage in health-protective behaviors than their less optimistic counterparts. It is interesting to note that even within this older sample (55-89 years), the age-related differences found in the previous study (Hooker, 1992) were evident. Specifically, a post-hoc analysis indicated that the sub-group of adults (14% of the sample) who did *not* indicate a health-related possible self (hoped-for or feared) were significantly younger and less likely to be retired than the rest of the sample.

The third study (Hooker & Kaus, 1994) demonstrated support for the proposal that self-regulatory processes provide the means by which possible selves influence behavior. Health-related possible selves were examined in a sample of young (24-39 years) and middle-aged (40-59 years) adults. Consistent with earlier studies (Cross & Markus, 1991; Hooker, 1992), health-related possible selves varied in the predicted manner across the two age groups. A significantly greater proportion of middle-aged adults (87%) than young adults (64%) reported either a hoped-for or a feared health-related possible self. It is important to note that issues of body weight were again coded as health-related possible selves unless they were described in the context of concerns with appearance. Two variables, perceptions of self-efficacy and number of activities employed to avoid a feared health outcome, were significant predictors of health behaviors. As with earlier studies (Cross & Markus, 1991; Hooker, 1992), both young and middle-aged adults' conceptualizations of their future health were more likely to be defined in terms of feared outcomes than positive health goals they hoped to achieve. The authors concluded that health-related goals become progressively more relevant to one's self-definition over the life-span. Moreover, it appeared that health-related possible selves, while still predominantly feared images to be avoided, emerge as

salient concerns in middle-age. However, the authors noted that an earlier study (Hooker, 1992) found that an individual's most important health-related self in later years was no more likely to be a feared image than a hoped-for image.

Summary

Commitment to an active life-style appears to prevent premature morbidity and mortality, as well as enhancing psychosocial and physical health. As such, long-term exercise is a valuable means of maintaining functional independence and quality of life throughout the life span. The claim that up to 50% of the decline associated with aging may in fact be attributable to hypokinetic (i.e., inactivity-related), and therefore preventable, chronic disease has important implications for individuals entering middle age (Drinkwater, 1988). Despite compelling evidence of the benefits an active life-style, the majority of women in the United States remain sedentary (Marcus, Dubbert, et al., 1995). Given the current lack of explanatory evidence concerning the mechanisms of self-motivation, discovering the processes of personal motivation for maintaining physical activity is a high research priority.

As a model of dynamic behavior change, the SCM provides a useful framework from which to apply a process approach to the study of exercise behaviors. However, the tenability of the maintenance stage as currently conceptualized in the SCM remains to be determined. The possible selves construct represents a theoretical perspective from which to explore possible variations among individuals at different stages of exercise involvement within the maintenance stage. It seems likely that an analysis of exercise participation patterns may indicate distinct stages of exercise maintenance. Qualitative reports of possible selves may then enhance our understanding of the cognitive processes employed by individuals representing these different stages of exercise maintenance. By studying the role

of possible selves in exercise motivation, we may learn more about the determinants of long-term maintenance among middle-aged women. The identification of such maintenance stages, as well as stage-specific self-perceptions, would enable practitioners to design effective stage-based interventions to increase adherence.

CHAPTER 3 METHODS AND PROCEDURES

The methods employed in this study are described in the following sequence: (a) description of participants, (b) instrumentation, (c) procedures, and (d) data analysis.

Description of Participants

The participants recruited for the study were middle-aged women between 35 and 59 years of age. All of the participants were either full or part time employees of Oregon State University or were a spouse/partner of a university employee. Middle-aged women were chosen as the focus of the present study for several reasons. First, women are underrepresented in studies of aging adults (Calasanti, 1992), despite the fact that into the next century women will greatly outnumber men in the older adult population (Hartman, 1990). Historically, studies of physical activity, particularly as it relates to cardiovascular health and disease, have not adequately represented women (Marcus et al., 1995). This is of particular concern given that women are much less likely to engage in exercise than men (O'Brien Cousins, 1996). In addition, Markus and Oyserman (1989) contend that men and women construct their self-structures differently, and as a result their thought processes may be different in both content and form. These differences are thought to result from gender-differentiated patterns of social interaction and interpersonal experiences. Subsequently, the authors recommend that studies examining possible selves analyze the construct separately by gender.

Middle-aged women also represent an age group that is likely to become increasingly less active with age (Marcus et al., 1995). Epidemiological studies (USDHHS, 1996) show that the number of American women reporting they never engage in physical activity

increases steadily from 17.4% among 18-29 year olds to 54.3% among those 75 years and older. In addition, the World Health Organization's guidelines for promoting physical activity among older adults has identified middle-age as the life stage at which the benefits of physical activity may be most relevant in preventing, minimizing, and/or reversing many of the physiological, psychological, and social problems often associated with aging (WHO, 1997).

Developmentally, middle-age is a time when people begin to address the finiteness of their lives (Prochaska & DiClemente, 1986). According to Neugarten (1968, as cited in Hooker & Kaus, 1994) this is the life-stage in which many people experience a shift in time perspective from "time since birth" to "time left to live." Faced with the realization of their own mortality, middle age is a period when many adults reevaluate their lives and their future goals. This may be a time when people become acutely aware of the role their physical health will play in their quality of life as they age. Subsequently, research has shown that health-related possible selves become salient in middle-age and that self-efficacy associated with health-related feared selves is predictive of health behaviors (Hooker & Kaus, 1994).

The identification of factors critical to long-term exercise maintenance among middle-aged women will facilitate the development of more effective interventions as these individuals move into their next stage of life. Dishman (1994) reports that physical activity levels in adulthood predict future activity levels. Thus interventions designed to increase the number of middle-aged adults exercising regularly may have a dramatic impact on public health by facilitating a subsequent increase in the number of adults who remain active in their later years. This is of particular significance given that the current cohort of middle-aged individuals will represent the largest numbers of older adults our country has ever witnessed.

A secondary reason for focusing on middle-aged adults was one of practicality. Middle-aged adults represent a large percentage of the workforce population at the university from which this sample was drawn. By focusing on this age group, we hoped to capture individuals representing the maintenance continuum in sufficient numbers to examine potential differences in possible selves. To date, limited research has focused on individuals in the maintenance stage, and less yet has compared the self-perceptions of exercisers at various stages of maintenance. The intent was to sample a large enough population of middle-aged women to obtain an accurate representation of the different levels of exercise maintenance. While the sample provided a wide range of income and education levels, it was primarily Caucasian and middle class, reflecting the demographics of the greater community.

Approximately 70% of the female faculty and staff of Oregon State University met the eligibility criteria of being between 35 and 59 years of age. A sixty percent return rate (considered "good" by Babbie, 1992) would have resulted in approximately 650 participants. Estimates of subsamples by stage are based upon two previous SCM studies of exercise participation among adults. In the first, Marcus, Rossi, et al. (1992) surveyed 1,172 male and female employees from two worksites. Their subsamples by stage consisted of 24% precontemplators, 33% contemplators, 9.5% in preparation, 11% in action, and 22% in maintenance. Out of a total sample of 583 male and female older adults, Gorley and Gordon (1995) found maintenance to be the largest subsample (37%). Precontemplation accounted for 15%, contemplation 9.6%, preparation 29%, and action 9.4% of the total. Based on these findings, 20% appeared to be a conservative minimum percentage to expect for the maintenance stage. In the proposed study, that would have resulted in a maintenance sample of 130 participants. This is consistent with the possible selves literature, in which

sample sizes have ranged from 55 (Oyserman, Gant, & Ager, 1995) to fifteen hundred participants (Cross & Markus, 1994). Thus, allowing for a minimum 20% of respondents in the maintenance stage and some loss of participants due to incomplete questionnaire packets, the target sample of individuals was set at 90 individuals.

The participants in this research project were part of a larger study examining women across all five stages of change. For the purposes of the present study, analysis was limited to those individuals classified as being in the maintenance stage of exercise according to the SCM. This maintenance sample was divided into 3 sub-samples based on the duration of their exercise involvement. This grouping was designed to capture the natural and distinct periodicity of exercise maintenance which occurs as a function of the negatively decelerating relapse curve. Dishman (personal communication, April 14, 1997) has suggested an empirical approach to periodizing the maintenance stage be based upon a logarithm reflecting the exponential character of the drop-out rate.

Instrumentation

Stages of Exercise Scale (SOES)

The SOES (Cardinal, 1995) was employed to determine participants' stage of exercise with respect to the SCM. The SOES is theoretically based and exercise specific. This instrument has been found to significantly and meaningfully differentiate between individuals in the five stages of the SCM with respect to three physiological measures. Employing a sample of female university employees, Cardinal (1995) established test-retest reliability over three days (Spearman's $\rho = 1.00$), as well as concurrent validity with the three physiological measures (Pearson's $r = .36 - .40$). The SOES is comprised of five

statements arranged like the rungs on a ladder, each of which represent one of the stages of change. Participants are asked to choose which of the statements best represents their current exercise status (0 = precontemplation, 4 = maintenance). For example, an individual who chose “I presently get some exercise, but not regularly” would be placed in the preparation stage (Rung 2). In this manner, individuals are categorized into one of the five stages of precontemplation (not currently exercising and not intending to exercise in the next six months), contemplation (thinking about exercise, but no action steps taken), preparation (has participated in some exercise, but not on a regular basis for any period of time), action (actively exercising in a consistent manner), or maintenance (actively exercising for a period of at least 6 months). For the present study, the SOES was adapted to include an assessment of the length of time an individual has been in the maintenance stage. Subsequently, participants who identified themselves in the maintenance stage (i.e., “I presently exercise on a regular basis and have been doing so for longer than 6 months”) were then asked to quantify (in months and years) how long they have maintained this level of physical activity. Participants were then classified into one of three groups based on their level of exercise maintenance. A copy of the SOES appears in Appendix C.

Possible Selves Instrument (PSI)

Possible Selves were evaluated using an expanded version of the Possible Selves Instrument (PSI). The PSI was adapted by Hooker and Kaus (1994) from a questionnaire originally developed by Cross and Markus (1991). The PSI was expanded for the present study to include the assessment of possible selves in the exercise domain. This multiple-page instrument was designed to assess four self-perceptions (the latter two of which were

designed specifically for this study): (1) open-ended possible selves; (2) most important possible self; (3) exercise-related possible self; and (4) exercise-specific possible self.

Open-Ended Possible Selves. The first page of the PSI provides participants with a structured introductory statement which includes a definition of the construct and clarifying examples (i.e., likely and unlikely possible selves, what is and is not a possible self). Participants are asked to spontaneously describe ALL of the hoped-for possible selves which are currently important to them.

Most Important Possible Self. The second page of the PSI asks participants to identify their MOST IMPORTANT hoped-for self from their list of open-ended possible selves on the previous page. Next they are asked to explain WHY this self is important to them, and to answer a series of Likert-scale questions which assess self-regulatory processes associated with that self. These questions assess perceived self-efficacy ("how capable do you feel of achieving this possible self?"), outcome expectancy ("how likely do you think it is that this possible self will be achieved?"), and importance ("how important is it to you to achieve this possible self?"). Importance has been shown to be related to the translation of intention to action, particularly when viewed in conjunction with social support (Nurius, 1991). In this study, the importance scale functioned as a validity check of the possible self identified as most important (Hooker & Kaus, 1992). Each of the responses were recorded on a 7-point Likert-type scale, where 1 represents not at all capable/likely/important and 7 represents extremely capable/likely/important.

Exercise-Related Possible Self. In order to specifically explore the relationship between possible selves and exercise behavior, each respondent was asked to choose the hoped-for possible self most closely related to their current level of exercise behavior. The instructions suggest this possible self need not deal specifically with exercise or physical

activity (e.g., it may be related to occupation or family). Because this relationship may be indirect, participants are then asked to explain HOW this hoped-for self is related to their current level of exercise and to complete the Likert-type scales related to self-regulatory processes described above.

Exercise-Specific Possible Self. The exercise-specific self was designed to ensure that each participant had the opportunity to explore at least one possible self in the physical activity domain. Therefore, in the final page of the PSI participants were asked to respond to the aforementioned series of questions with respect to a contrived (as opposed to self-generated) exercise-specific hoped-for self. The specific wording of this contrived statement was derived from a pilot study in which a similar population was asked to describe hoped-for selves in the exercise domain (see Whaley, 1997 for a detailed description). The exercise-specific selves were: “to be an attractive, healthy, older women” (hoped-for) and “not be able to enjoy later life to the fullest” (feared).

This entire four-page process was then repeated for feared possible selves, except the sequence of follow-up questions was worded to capture participants’ perceived efficacy, outcome expectancy, and importance of preventing these feared selves. A copy of the PSI can be found in Appendix D.

Demographic Assessment

The demographic instrument was comprised of questions concerning age, ethnicity, education (highest level completed), current living situation, and employee status (staff or faculty member). A copy of the demographic assessment can be found in Appendix E.

Physical Activity Assessment

The final element of the questionnaire packet consisted of a self-report physical activity questionnaire. This measure was included to provide qualitative information concerning differential exercise patterns among the groups. Participants were asked to list the activities in which they were currently involved. For each activity listed, they were asked to provide information concerning: (a) seasonality (whether participation is seasonal or year-round), (b) frequency (average hours/week), (c) intensity (low, medium, high), and (d) the duration of their involvement (months and years). The Physical Activity Questionnaire appears in Appendix F.

Procedures

Participants were recruited by means of electronic-mail lists specifically chosen to target women faculty and staff, a campus-wide newsletter, and via flyers posted in areas with large concentrations of women. The recruitment notices provided a brief description of the purpose of the study and instructed women meeting the eligibility criteria (35-59 years of age)¹ to contact the researchers by e-mail or phone. Participants indicating an interest in the study then received a packet of materials.

The packet included a cover letter describing the study as well as instructions for completing and returning the packet. The cover letter requested that participants answer the questionnaires as thoroughly and honestly as possible. Additionally, they were asked to complete the questionnaires in the order provided and to refrain from discussing their

¹ Participants in this research project were part of a larger study involving women across all five stages of change. For the purposes of the present study, analysis were limited to those individuals classified as being in the maintenance stage of exercise according to the SOES.

answers while they were working on the packet. Participants were provided with an approximation of the time required to complete the packet (based on the pilot administration), as well as a phone number and e-mail address of individuals to contact for additional information. A copy of the cover letter can be found in Appendix A. Participants were asked to read and sign an informed consent document before participating, as required by the OSU Institutional Review Board for the Protection of Human Subjects. A copy of the informed consent document can be found in Appendix B. In addition to the cover letter and informed consent, the packet consisted of the Stages of Exercise Scale (SOES; Cardinal, 1995), the Possible Selves Instrument (PSI; Hooker & Kaus, 1994), the demographic assessment, and the physical activity assessment.

The packet also included a return address label and participants were instructed to return all of the items in the original envelope by a specific date (15 days from receipt). Participants failing to return their packet within two weeks of the initial mailing received a reminder via electronic mail. A general reminder was also posted on the e-mail networks employed in the initial recruitment. These distribution protocols were based on those outlined by Babbie (1992) and have been adapted for use with electronic mail. This protocol resulted in a 90% return rate on questionnaires. Due to the low response rate of non-exercisers (stages 0 and 1) required for a parallel study (see note 1), a second recruiting effort was undertaken. A second posting on e-mail networks and flyers solicited individuals for the study. In addition, questionnaires were mailed to 120 female employees randomly chosen from the faculty/staff directory. The random mailing resulted in a response rate of 30%.

Data Analysis

Preliminary Analyses

The questionnaires were checked for completeness, and incomplete packets returned to the respondents. Data entry and analysis were conducted with SPSS 7.5 for Windows. Coding of possible selves into categories followed procedures established by Cross and Markus (1991). After the questionnaires were coded, participants were assigned to one of three groups based on the duration of their time in the maintenance stage. In order to facilitate the statistical analysis, twenty years (240 months) was chosen as the maximum duration for maintenance stage membership. The few women who reported exercising regularly for more than 240 months were simply coded as twenty years. This re-coding seemed appropriate as it did not affect group membership and the study did not examine within-group differences.

Descriptive statistics were reported for the distribution of participants with respect to demographic variables of age, ethnicity, education, and employee status. Descriptive statistics were also reported for physical activity variables including number of activities, number of seasonal activities, frequency, intensity, and months of experience. Number of activities equaled the total number of activities listed, while number of seasonal activities represented the number of total activities which were seasonal (i.e., not performed year-round). Exercise frequency represented the sum of the number of hours per activity per week. Exercise intensity scores for each activity (where low = 1, moderate = 2, and high = 3) were added to produce an overall intensity score for each participant, and the experience score was derived by adding the total number of months of participation for each activity divided by the number of activities.

Research Questions

In order to answer the research questions of interest, the data analysis examined hoped-for and feared possible selves separately and involved both quantitative and qualitative analyses.

Open-ended Possible Selves. Analyses of variance (ANOVA) were conducted to determine if the mean number of open-ended hoped-for possible selves varied differentially across the three levels of exercise maintenance (Research Question 1-A). Maintenance stage (3 levels) served as the independent variable and the mean number of possible selves per group served as the dependent variable.

The second part of this research question involved the comparison of between-group differences in the categories of possible selves reported most frequently (Research Question 1-B). Accordingly, possible selves were first coded into categories following the procedures established by Cross & Markus (1991) (see the Results section for details). A multivariate analysis of variance (MANOVA) was then conducted with the maintenance stage serving as the independent variable and the mean number of possible selves reported by participants in each of the nine categories serving as the dependent variables.

Exercise-related Possible Self. Recall that the exercise-related possible self was the self which the respondent felt was most closely related to her current level of exercise. This possible self was coded into one, and only one category. Therefore, each participant had just one exercise-related hoped-for and one exercise-related feared self. Frequencies of the categories of exercise-related selves were examined in order to determine whether the category of the exercise-related self varied across the three groups (Research Question 2).

Self-Regulatory Processes. Research Question 3 concerned the relationships between the self-regulatory processes associated with the three focused hoped-for selves (most important open-ended, exercise-related, and exercise-specific) and exercise behavior. In order to statistically examine these relationships, three linear, multiple non-stepwise regression analyses were conducted (one for each of the focused possible selves). Self-efficacy and outcome expectancy served as the set of predictor variables and maintenance stage as the dependent variable. The amount of variance in exercise behavior explained by the set of predictor variables was compared across the three regression analyses. In addition, the researcher noted the individual predictor variables in each analysis which had contributed significantly to exercise behavior. All of the aforementioned analyses were then repeated for feared possible selves (Research Questions 4-6).

CHAPTER 4

RESULTS

The purpose of this study was to examine the possible selves of middle-aged women who vary in their degree of exercise involvement. Results are organized in two sections, Descriptive Statistics and Research Questions. Descriptive Statistics presents a description of the participants with regard to demographic and physical activity variables. Research Questions are organized into three sections, each presenting results from the data analyses employed to examine research questions concerning open-ended selves, exercise-related selves, and self-regulatory variables. For each research question, results are presented first for hoped-for and then feared selves.

Descriptive Statistics

The original intent was to group participants by duration of stage membership based upon logarithmic time points along the maintenance continuum. Group 1 was to consist of those women who had exercised regularly for 6-12 months, Group 2 consisted of those exercising 13-24 months, and Group 3 was comprised of those who had exercised 25+ months. Despite additional recruiting efforts (see Methods for detailed information on recruitment), there were insufficient numbers of women exercising at the lower time points of the continuum to form the groups as originally intended. After two phases of recruitment, the final maintenance sample ($N = 92$) was distributed as follows: 5% Group 1 ($n = 5$), 13% Group 2 ($n = 12$), and 82% Group 3 ($n = 75$). However, a frequency distribution of the sample by the duration of stage membership (i.e., number of months exercising regularly) indicated a natural pattern in which nearly equivalent groups emerged.

One-third of the sample (33.7%) had exercised regularly between 6 months and 5 years, one-third (32.6%) had exercised regularly between 6 and 10 years, and one-third (33.7%) had maintained regular exercise between 11 and 20 years. In order to allow for statistical analysis, this distribution was used to divide the sample into groups as follows: Group 1 ($n = 31$) consisted of individuals who have been in the maintenance stage between 6 months and 5 years, Group 2 ($n = 30$) individuals have been in the maintenance stage between 6 and 10 years, and Group 3 ($n = 31$) individuals have been in the maintenance stage between 11 and 20 years. This grouping enabled the researcher to compare the self-perceptions of women with varying degrees of experience in maintaining a long-term commitment to exercise. All subsequent analyses are based upon this grouping as the three levels of exercise behavior.

Demographic Variables

The average age of the participants was 48 years ($SD = 6.7$), with a range from 35 to 59 years. The sample was predominantly Caucasian (96%), highly educated (57% holding an advanced degree and all but 2% having earned some college credit), and primarily married or partnered (64%). Nearly half (48%) of the sample reported their employment status as full-time professional faculty (non-teaching, non-research faculty that often have administrative positions) while 26% were full-time classified staff, and 22% full-time teaching faculty. Due to a recent change in the staff classification system and the subsequent confusion regarding employment status, it is likely that professional faculty may have been overrepresented and teaching faculty underrepresented. Table 1 displays frequencies and percentages for demographic variables of interest.

Table 1
Frequencies and Percentages for Demographic Variables

Variable	N	Percentage
Education		
High school	2	2.2
Some College	12	13.0
College degree	26	28.3
Masters degree	29	31.5
Ph.D.	23	25.0
Ethnicity		
White	87	95.6
Black	0	0.0
Asian	2	2.2
Hispanic	1	1.1
American Indian	1	1.1
Current Living Status		
Single	18	20.2
Married/Partnered	57	64.0
Divorced	13	14.6
Widowed	1	1.1
Employee Status		
Teaching Faculty	20	22.0
Professional Faculty	44	48.0
Classified Staff	24	26.0
Dependent	4	4.0

Physical Activity Variables

The Physical Activity Questionnaire assessed five activity variables: (a) number of activities, (b) number of seasonal activities, (c) exercise frequency, (d) exercise intensity, and (e) months of experience. The average number of activities reported was 4, ranging from 3 for Group 1 to 4.6 for Group 3. The number of seasonal activities ranged from 1.2 (Group

1) to 1.8 (Group 3), with a mean of 1.5. The mean exercise frequency was 10.8 hours per week, ranging from 10.1 (Group 1) to 12 (Group 3). Cumulative exercise intensity scores ranged from 6.2 (Group 1) to 9.2 (Group 3). The mean experience (total number of months reported for each activity divided by the number of activities) was 9.7, ranging from 6.8 (Group 1) to 12.8 (Group 3). For number of activities, number of seasonal activities, frequency, intensity, and experience, mean scores increased with duration of exercise maintenance. A one-way analysis of variance (ANOVA) was run for each of the five activity variables with the maintenance groups serving as the three levels of the independent variable. The significance level for all ANOVA's was set at $p < .05$. Number of activities was significant, $F(2, 89) = 6.06, p = .003$. Post hoc analysis utilizing Student Newman Keuls (SNK) indicated that Groups 1 and 2 were significantly different from Group 3 and Group 1 was significantly different from Groups 2 and 3. Intensity level was also significantly different across the groups, $F(2, 89) = 5.22, p = .007$. A SNK's post hoc indicated that again, Groups 1 and 2 were significantly different from Group 3 and Group 1 was significantly different from Groups 2 and 3. Months of experience was significant, $F(2, 88) = 11.85, p = .0001$, with SNK's post hoc analysis showing all three of the groups were significantly different from each other. Differences between the three maintenance groups for the number of seasonal activities and frequency variables were not statistically significant. A summary of the activity variables appears in Table 2.

Table 2
Means and Standard Deviations for Activity Variables

Maintenance Group	Number of Activities*		Seasonal Activities		Exercise Frequency		Exercise Intensity*		Experience (Months)*	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Group 1 (<u>N</u> = 31)	3.1	1.3	1.2	1.2	10.1	10.6	6.2	2.6	6.8	4.8
Group 2 (<u>N</u> = 30)	3.9	1.8	1.5	1.4	10.4	7.3	7.4	3.5	9.5	4.7
Group 3 (<u>N</u> = 31)	4.6	1.9	1.8	1.8	12.0	6.6	9.2	4.7	12.8	4.9

Research Questions

Open-ended Hoped-for and Feared Selves

The first analysis examined whether the mean number of open-ended hoped-for (Research Question 1-A) and feared (Research Question 4-A) possible selves (prior to coding into categories) differed across groups. A one-way analysis of variance (ANOVA) was conducted with maintenance group (3 levels) as the independent variable and the mean number of possible selves per group as the dependent variable. The mean number of hoped-for selves (5.74) and feared selves (3.87) elicited in the open-ended questions differed overall. Across the three groups, differences in the mean number of hoped-for selves was significant $F(2, 89) = 3.6, p = .031$. Post-hoc analysis utilizing SNK indicated that Group 1 ($\bar{M} = 5.39$) and Group 2 ($\bar{M} = 4.93$) were significantly different from Group 3 ($\bar{M} = 6.87$) and Group 1 was significantly different from Groups 2 and 3. Between-group differences in

the mean number of feared selves were not statistically significant. Table 3 shows the mean number of open-ended hoped-for and feared selves across the three maintenance groups.

Table 3
Mean Number of Open-ended Possible Selves by Group

Maintenance Group	Hoped-for		Feared	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Group 1	5.39	2.00	3.77	1.50
Group 2	4.93	2.29	4.14	1.64
Group 3	6.87	4.09	3.71	1.35
Total	5.74	3.04	3.87	1.49

Coding of Possible Selves into Categories

Also of interest were between-group differences in the categories of hoped-for (Research Question 1-B) and feared (Research Question 4-B) open-ended possible selves. In order to address this question, categories were first defined and then each of the open-ended possible selves was coded into a single category. After reviewing the pilot data (see Whaley, 1997), Cross and Markus' (1991) original categories were redefined to more accurately capture the physical activity focus of the study. The categories originally defined by Cross and Markus were: personal, physical, abilities/education, life-style, family, relationships, occupation, material, and leisure. The most notable change involved Cross and Markus's physical category, which for the current study was further delineated to three separate categories of Health, Physical, and Body Image. This refinement seemed appropriate, given the importance of body image to self-concept among women, particularly in the domain of

physical activity. Moreover, research by Hooker (1992) demonstrated that in a sample of college students, 50% of the possible selves in the health category were actually related to body weight. Therefore, for this study the Health category was delimited to images of the self related to general health such as chronic disease (e.g., cancer), injury, and mental acuity. The Physical category consisted of physical condition (i.e., strength, endurance), activity level, and physical abilities (e.g., “to run a half-marathon”). Body Image possible selves were those related to issues of weight and personal appearance. The Personal/Spiritual category included emotional health (“to be a more happy/loving/assertive person”), and spirituality. The Dependence/Independence category which was similar to Cross and Markus’ lifestyle category, consisted of selves related to autonomy (“to be unable to care for myself”). Occupation/Education selves were those related to employment (promotion, tenure, losing one’s job) and education (e.g., returning to school). The Family/Relationships category included issues related to family (children, marriage, widowhood) and other relationships (e.g., social networks). The Personal Projects category, which was distinct from Cross and Markus’ leisure category, included projects with personal meaning such as becoming a political activist, volunteer work, hobbies, creative pursuits (music, art), and abilities (learning a new language). Finally, the Retirement/Financial category consisted of retirement concerns and financial issues (saving money, becoming a homeowner). These categories appeared to accurately capture the data, as they included all of the responses while avoiding overlap between responses. Table 4 provides examples of hoped-for and feared selves in each of the nine categories used to classify participants’ responses.

Each item from the participants’ lists of open-ended possible selves was coded into one of the nine categories. Coding followed guidelines established a priori by the two researchers and was completed prior to (i.e., independent of) group classification. First, for

Table 4
Categories of Hoped-for and Feared Selves

Category	Hoped-for-Self	Feared Self
1. Health	"To maintain vitality and health"	"Having a prolonged illness like cancer"
2. Physical	"To be a physically active old lady"	"To become physically limited in my activities"
3. Body Image	"To lose 10 pounds"	"Becoming very overweight"
4. Personal/ Spiritual	"Develop spiritual parts of myself further"	"Becoming a bitter and fearful person"
5. Independence /Dependence	"To be an independently living person"	"To be confined to a long-term care facility"
6. Occupation/ Education	"To go to graduate school in a new discipline"	"Losing my job"
7. Family/ Relationships	"To have enjoyable family relationships"	"Losing loved ones"
8. Personal Projects	"To be a master gardener"	"To be unable to organize my home the way I want"
9. Retirement/ Financial	"To have financial independence"	"To become financially destitute"

each questionnaire, the number of hoped-for and feared selves was determined. Most respondents listed their possible selves numerically, which greatly simplified this process. However, when participants recorded their possible selves in paragraph form, it was necessary to divide up the responses.

The guidelines stipulated that the researchers (a) identify key words which defined the category, (b) code the response accordingly, and (c) divide remaining compound possible selves into their component parts. For example, "to be physically, spiritually, and emotionally healthy" was coded as one possible self in the Health category, as all of the adjectives described the key word "health." However, "to become stronger physically, to become more spiritual, and to maintain my good health" was coded as three possible selves,

one each in the Physical, Personal, and Health categories. It was common to encounter individuals who listed multiple selves in a single category (i.e., two or more distinct Personal Projects). When this occurred, each distinct possible self was counted separately.

Each instrument was independently coded by the two researchers who had established the categories and then comparisons were made prior to final coding. On three different occasions over approximately a week-long period, three separate random samples of twenty questionnaires each yielded interrater reliability (measured as percent agreement) of between 92% and 100%. Coding discrepancies were discussed and decisions made by consensus, yielding a final agreement of 100%. Once all instruments were coded, the data were entered into the Windows version of SPSS 7.5 for analysis.

Categories of Possible Selves by Group

In order to examine differences between groups within categories, multivariate analysis of variance (MANOVA) was conducted using a general linear model (GLM) procedure. The GLM has an advantage over a standard MANOVA due to its flexibility regarding categorical and continuous predictor variables as well as the ability to analyze data containing empty cells (SPSS Advanced Statistics Manual, 1997). The MANOVA was run with the nine categories serving as dependent variables and the three maintenance groups serving as the independent variable. An inspection of correlations between the dependent variables (hoped-for $r = .21 - .32$ and feared $r = .26 - .38$) indicated they were not multicollinear ($r \leq .70$), providing evidence that the nine categories were distinct.

For hoped-for selves, the overall relationship was not significant. Similarly, for feared selves, the three groups were not statistically different with regard to the number of open-ended possible selves generated within each category. Table 5 presents means and

standard deviations for categories of possible selves across maintenance groups for open-ended hoped-for and feared selves.

Table 5
Categories of Open-ended Possible Selves by Group

Category	Group 1		Group 2		Group 3	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Hoped-for selves						
Health	.58	.67	.40	.56	.52	.51
Physical	.55	.72	.47	.63	.94	1.00
Body Image	.26	.51	.10	.30	.03	.18
Personal/Spiritual	.81	.95	.70	1.20	.77	.99
Dependence/Independence	.09	.30	.13	.35	.06	.25
Occupation/ Education	.87	1.00	.73	1.10	1.10	1.40
Family/Relationships	.61	.71	.63	.93	1.20	.96
Personal Projects	1.20	1.10	1.40	1.30	1.80	2.00
Retirement/Financial	.39	.62	.37	.49	.45	.72
Feared selves						
Health	.97	.84	1.10	.83	.97	.80
Physical	.16	.37	.21	.49	.26	.44
Body Image	.06	.25	.14	.35	.09	.30
Personal/Spiritual	.58	1.00	.76	1.20	.52	.72
Dependence/Independence	.42	.62	.66	.77	.42	.67
Occupation/Education	.26	.37	.17	.38	.13	.34
Family/Relationships	1.00	1.10	.76	.69	.90	.83
Personal Projects	.03	.18	.00	.00	.00	.00
Retirement/Financial	.39	.62	.31	.47	.42	.50

Note: One individual cited 22 hoped-for selves, which comprised 11% of the responses in Group 3.

Exercise-related Possible Selves

A qualitative analysis of exercise-related selves prior to coding into categories affords us a view of the future self images these women felt were most directly related to their exercise behavior. First, it was evident that many of these active women conceptualized their health in multidimensional terms, often referring to “physical, emotional, and spiritual health.” When asked HOW a particular possible self was related to their current exercise behavior, many women said very simply, “directly.”

This finding suggests the link between their exercise behavior and the achievement of future dreams or avoidance of dreaded outcomes was conceptualized as a rather direct one. Many women stated that they believed exercise was effective in preventing diseases associated with aging, even those which are typically considered beyond one’s control (e.g., cancer). A recurring theme involved the conceptualization of exercise as an investment in one’s future. For example, one participant said “health is a pre-requisite for (my other possible selves) and I think exercise is essential for health.” These women were also clearly aware of the role of exercise in reducing depressive symptomology. Women frequently said they exercised “to keep depression at bay,” “to feel better about myself” and “to reduce stress.”

Research Questions 2 and 5 involved examining the hoped-for and feared exercise-related selves (the self most closely related to the participant’s current level of exercise) to determine if the categories differed across maintenance groups. For the sample as a whole, the hoped-for selves most frequently cited as being related to exercise level were in the Physical category (34%). The second most frequently cited category was Health (31%). For hoped-for exercise-related selves, all of the categories except Dependence/Independence were cited. For feared selves, over half (57%) of the exercise-related possible selves were in

the Health category, followed by Dependence/Independence (13%), Body Image (9%), Personal (9%), and Physical (8%).

Frequencies of exercise-related hoped-for and feared selves were examined for each category in order to compare the three groups. For the most part, exercise-related selves were evenly distributed across the three groups. With regard to hoped-for selves, individuals in Group 3 were more likely than the other two groups to cite Health or Physical categories as most closely related to exercise behavior. Specifically, 37% of the individuals in Group 3 cited a self in the Health category, compared to 29% of those in Group 1 and 28% in Group 2. Individuals in Group 3 were also more likely (40%) to feel their current exercise level was related to a possible self in the Physical category than either Group 1 (32%) or Group 2 (31%). In fact, the Health and Physical categories combined accounted for 61% (Group 1), 59% (Group 2), and 77% (Group 3) of the total responses for each group.

For feared exercise-related selves, the three groups were again quite similar. Over 50% of the women across all three groups felt their current exercise level was most closely related to a possible self in the Health category. It appeared that the longer individuals had been in the maintenance stage, the more likely they were to cite the Physical category (i.e., Group 1 = 3%, Group 2 = 7%, and Group 3 = 13%). The Personal and Dependence/Independence categories combined accounted for 26% of the total responses for Group 1 and 20% of the responses for Groups 2 and 3. The Personal Projects and Retirement/Financial categories were not cited by any of the groups as being related to current exercise levels. Frequencies and percentages of hoped-for and feared exercise-related selves for the nine categories by group appear in Table 6.

Table 6
Exercise-related Hoped-for and Feared Selves by Group

Category	Group 1 (6 mos.-5 years)	Group 2 (6-10 years)	Group 3 (11-20 years)
Hoped-For Selves			
Health	9/29%	8/28%	11/37%
Physical	10/32%	9/31%	12/40%
Body Image	1/03%	3/10%	1/03%
Personal/Spiritual	2/07%	2/07%	3/10%
Dependence/Independence	0/00%	0/00%	0/00%
Education/Occupation	2/07%	1/03%	0/00%
Family/Relationships	1/03%	0/00%	2/07%
Personal Projects	5/16%	4/14%	0/00%
Retirement/Financial	1/03%	2/07%	1/03%
Feared Selves			
Health	17/55%	17/59%	18/58%
Physical	1/03%	2/07%	4/13%
Body Image	2/07%	4/14%	2/07%
Personal/Spiritual	4/13%	1/03%	3/10%
Dependence/Independence	4/13%	5/17%	3/10%
Education/Occupation	1/03%	0/00%	1/03%
Family/Relationships	2/07%	0/00%	0/00%
Personal Projects	0/00%	0/00%	0/00%
Retirement/Financial	0/00%	0/00%	0/00%

Self-Regulatory Variables

Research Questions 3 (hoped-for) and 6 (feared) examined whether the self-regulatory processes (self-efficacy and outcome expectancy) associated with the three focused selves (most important open-ended, exercise-related, and exercise-specific) differentially predict exercise maintenance.

The first analysis was a manipulation check to determine the relative importance of each participant's most important self (hoped-for and feared). Across the three focused hoped-for selves, the mean importance scores (maximum of 7) were uniformly high, from a low of 6.2 (exercise-specific) and 6.3 (exercise-related), to a high of 6.6 (most-important open-ended).

The means for feared selves were even higher, ranging from 6.7 (exercise-related) to 6.8 (most important open-ended and exercise-specific). Recall that the exercise-specific possible selves (hoped-for = "to be an attractive, healthy, older woman" and feared = "not be able to enjoy later life to the fullest") were not generated by the respondents, but rather were "contrived" having been drawn from pilot studies. These high importance ratings suggest that despite their external origin, these selves were, like the self-generated most-important and exercise-related selves, highly meaningful for the women across the groups.

A preliminary analysis of correlations among the variables indicated that multicollinearity existed ($r \geq .70$) between self-efficacy and outcome expectancy responses. For the three focused hoped-for selves, correlations between self-efficacy and outcome expectancy were: $r = .784$ (most important self), $r = .858$ (exercise-related self), and $r = .834$ (exercise-specific self). For the three focused feared selves, correlations between self-efficacy and outcome expectancy were: $r = .654$ (most important), $r = .669$ (exercise-related self), and $r = .836$ (exercise-specific self). Because of this strong correlation, self-efficacy and outcome expectancy were collapsed into a new variable for each of the hoped-for and feared focused selves. Thus for hoped-for and feared focused selves, composite variables were labeled Most Important, Exercise-Related, and Exercise-Specific. The newly created composite self-regulatory variables were entered separately for each focused self into a linear regression against stage of maintenance. The composite variables met tests of normality

(skewness and kurtosis), and had means ranging from 5.5 (most important feared self) to 6.2 (exercise-specific hoped-for self) on a 7-point likert scale.

None of the hoped-for or feared composite variables significantly predicted exercise behavior. Of the six self-regulatory variables, the exercise-related composite variables were the strongest predictors of exercise maintenance, with an R square value of .008 (hoped-for) and .009 (feared). R square values and standard errors for the composite self-regulatory variables associated with the three focused hoped-for and feared selves appear in Table 7.

Table 7
Summary of Linear Regression Analyses for the Self-regulatory Variables

Composite Variable	R	R Square	Std. Error of estimate
Hoped-for			
Most Important	.061	.004	.83
Exercise-Related	.089	.008	.83
Exercise-Specific	.062	.004	.83
Feared			
Most Important	.012	.000	.83
Exercise-Related	.093	.009	.83
Exercise-Specific	.004	.000	.83

CHAPTER 5 DISCUSSION

The purpose of this study was to examine the possible selves of middle-aged women who varied in their degree of sustained exercise involvement. In this regard, the study extended previous research by comparing women at different points within the maintenance stage of the SCM. Since there were insufficient novice exercisers to form the maintenance groups as intended, the expected outcomes did not align with the findings. In order to examine the hypothesized differences among individuals in the maintenance stage, future studies must employ groupings based upon a logarithm of the drop-out rate. The results of this study were based upon a frequency distribution of the maintenance sample. As such, they indicate that despite differences in the duration of their exercise commitment, all three groups of women in maintenance were quite similar with regard to their possible selves. These findings support the current conceptualization of the SCM in which individuals who have engaged in regular exercise for more than six months are considered to be a single homogeneous group.

Number and Categories of Possible Selves

The active women in this study were able to spontaneously generate lists of open-ended possible selves, providing support for the utility of a self-administered instrument. Consistent with previous research (Cross & Markus, 1991; Hooker & Kaus, 1992), the women in this study reported more hoped-for than feared selves. Interestingly, the average number of hoped-for and feared selves was strikingly similar to the numbers generated by the middle-aged adults in the Cross and Markus (1991) study. Given the differences

between the sample used in this study and Cross and Markus' (e.g., education and activity levels were higher in the former and the latter included men), these similarities provide support for the developmental nature of the possible self construct. In their study of adults 18 to 86 years of age, Cross and Markus (1991), found that the total number of possible selves decreased over the lifespan. Although the youngest respondents reported feeling very capable of achieving their possible selves, they reported the smallest number of actions taken to achieve or prevent their most important selves. The authors suggest that as they age, individuals consolidate their possible selves and they begin to invest relatively more energy in the remaining selves. It appears that the middle-aged women in this study have begun this process whereby one's diminishing number of selves become relatively more important and therefore more motivationally significant. This is supported by the fact that these women rated their focused possible selves as very important, although the perceived importance of the open-ended selves was not assessed.

When possible selves were coded into categories, similarities among the three maintenance groups were more notable than were differences. The most frequently cited hoped-for selves were those related to Personal Projects, followed by those related to Occupation/Education. Interestingly, Cross and Markus (1991) reported that compared to younger respondents, their middle-aged sample was characterized by fewer selves reflecting "new beginnings or dramatic changes" and more selves indicating a "desire for enjoyment and achievement in current roles and responsibilities" (p. 241). Accordingly, the authors reported that Family was the most frequently cited hoped-for category and Physical (which encompassed the present study's Health, Physical, and Body Image categories) was the second most frequently cited category. It appears that in contrast to Cross and Markus' middle-aged adults, the women in this study expressed relatively more hopes for the future

that reflect new beginnings (e.g., starting a new career, learning a new language, earning a second degree). The question of whether this difference in the character of hoped-for selves is due to differences between the two samples in education level, exercise involvement, or some other factor remains unanswered.

With regard to feared selves, women across the maintenance groups cited fears related to Health most frequently followed by Family/Relationships. Similarly, Cross and Markus (1991) characterize their middle-aged sample as concerned with “the losses and decrements commonly assumed to accompany aging” (p. 244). The middle-aged adults in Cross and Markus’ study most frequently cited feared selves related to the Physical category (includes the present study’s Health, Physical, and Body Image categories), followed by those related to the Material and Relationships categories.

In order to compare this study to existing possible selves literature, it is beneficial to consider the Health category specifically. Hooker and Kaus (1994) found that adults were more likely to think of their future health in terms of feared health outcomes (e.g., getting cancer) than in terms of hoped-for outcomes (e.g., achieving optimal health). This is particularly troubling, given the growing body of research (e.g., Ewart, 1991; Hooker & Kaus, 1994; Oldridge, 1982) showing that positive health goals have been found to be motivationally superior to negative health goals. For example, Ewart (1991) reports that individuals more readily adopt health behaviors when they appear to serve important personal projects or goals. Similarly, Hooker and Kaus (1992) found that the perceived outcome expectancy of achieving a hoped-for, but not a feared, health-related self predicted health behavior in a sample of older adults. Perhaps this explains why the number of hoped-for selves was the only variable which successfully differentiated the three maintenance groups in the present study. This suggests that future exercise adherence interventions

might do well to focus on helping individuals develop vivid images of the self in the future achieving positive health outcomes.

Although not a focus of this study, it is interesting to note the balance between hoped-for and feared selves for the Health category. This is of particular interest given that much of the extant possible selves literature (i.e., Hooker, 1992, 1994; Hooker & Kaus, 1992) has dealt specifically with the health domain. According to Oyserman, Gant, and Ager (1995), a given hoped-for self is maximally effective when it is balanced by a feared self in the same category or domain. Hooker and Kaus (1994) found that middle-aged adults were three times more likely to cite a feared self than a hoped-for self in the health domain, leading the authors to conclude that health-related fears were more salient than hopes among this age group. For the active women in this study, the ratio of feared to hoped-for selves in the health domain was two to one. The fact that these active women have relatively more balanced possible selves in the health domain may help explain their consistent exercise behavior. Theoretically, the presence of a feared self (e.g., getting heart disease) balanced by a hoped-for self (e.g., remaining healthy and vigorous into old age) would prove doubly effective, as the individual would be motivated to behave (e.g., exercise) both to avoid the feared outcome and achieve the desired outcome. Exercise would thus represent a way of achieving a hoped-for self and simultaneously avoiding a feared self.

Exercise-Related Possible Selves

In the current study, participants were able to describe the possible self most closely related to their exercise behavior, as well as to respond to an experimenter-derived exercise-specific self. The inclusion of domain-specific targeted questions represents an important

methodological extension of previous studies in which participants have simply been asked to list their possible selves.

Active women across the maintenance groups reported that their current exercise level was most closely related to hoped-for images of themselves in the Physical (“to be a mountain biker at 90”) and Health (“to maintain vitality and health”) categories. For the sample as a whole, these two categories together accounted for the majority (65%) of the responses. Although there were few between-group differences, women who had exercised more than ten years were 17% more likely than the other two maintenance groups to cite Health or Physical-related selves as most closely related to current exercise behavior. This is consistent with Gauvin’s (1990) qualitative research showing that long-term autonomous exercisers cited primarily fitness and health motives while less active individuals reported a diverse range of motives to exercise.

For the sample as a whole, the majority (57%) of women felt their current level of exercise was most closely related to fears in the Health category, followed by fears related to the Independence/Dependence category. It appears that the longer women had been in the maintenance stage, the more likely they were to report that their feared self most closely related to exercise was in the Physical category (although this still only accounted for 13% of Group 3). Perhaps women who have a sustained commitment to exercise come to invest significant importance in their abilities, such that a feared image of “no longer being able to run” (Physical category) becomes a more immediate (more vivid) and therefore stronger motive to exercise than the more general “being ill with a chronic disease” (Health category). For long-term exercisers, such images of their physical selves may be more central to their sense of self, insofar as they have considerable identity invested in this self-as-athlete.

According to Oyserman and Markus (1990), the more vivid and well-elaborated an individual's possible selves, the more likely they are to influence behavior.

While this study did not examine the degree of elaboration or affective value of possible selves, it may be that differences among the women in this study were of such a qualitative nature. For example, Harter (1990) contends that self-representations play a functional role as mediators of behavior by regulating affect. Specifically, behaviors which narrow the discrepancy between one's real and ideal selves enhance self-worth, which in turn produces positive affect and the resulting motivation for behavior. In addition to a consideration of these qualitative aspects of possible selves, future research might also employ more focused questions specific to the exercise domain. Indeed, researchers in developmental psychology (e.g., Harter, 1990) and the possible selves literature (Cross & Markus, 1994) emphasize the need for domain-specific assessments of the self-concept. These researchers contend that motivation and desired behavioral outcomes in a particular domain (e.g., lifetime commitment to physical activity) are most likely to be impacted by identifying those self-representations and related affects specific to that (e.g., exercise) domain.

Keeping in mind that each woman was asked to cite only one exercise-related hoped-for and feared self, it is interesting to compare their relative frequency across categories. As a group, these active women were twice as likely to report exercise-related fears than hopes in the Health category and four and a half times more likely to report fears than hopes related to the Physical category. While none of the women in the sample felt hoped-for images in the Independence/Dependence category were most closely related to their current level of exercise, 13% of the sample cited this category as the feared image most closely related to their exercise behavior. It appears that these active women, like Hooker and Kaus'

(1994) middle-aged group, were more likely to conceptualize their future physical independence and health in negative (avoiding a dreaded loss) than in positive (striving to optimize independence and health) terms.

Self-Regulatory Variables

The self-regulatory variables (a composite of perceived self-efficacy and outcome expectancy) associated with the three targeted possible selves accounted for a negligible amount of the variance in exercise behavior for this sample. This is particularly interesting given that in a parallel study employing the identical methodology, Whaley (1997) found that the exercise-specific hoped-for composite variable accounted for 16% of the variance in exercise behavior across the stages of change. There are several possible conceptual and methodological explanations for this.

Conceptually, it is possible that such a direct link between self-regulatory variables and exercise behavior doesn't exist for women in the maintenance stage. Perhaps exercise involvement was very poorly correlated with the composite self-regulatory variable because, as Harter (1990) contends, these variables play a mediating, rather than direct role in motivating behavior. A second conceptual point concerns the fact that the present study addressed only the first of the three levels of the SCM (i.e., the stages of behavioral change). Research designs based upon the full model would likely have more predictive power. Future studies should endeavor to incorporate all three levels of the model, thereby considering the constructs hypothesized to influence behavior change (Level 2) as well as the contextual/environmental factors related to the decision to exercise (Level 3).

From a methodological standpoint, it may be that this lack of predictive power was due to the treatment of self-regulatory variables as a composite variable. An alternative

strategy would have been to examine the self-regulatory variables separately, although previous studies utilizing this approach have employed a variety of methodologies. For example, while Cross and Markus (1991) investigated the outcome expectancy and self-efficacy associated with the most important possible self, they did not report the correlation between the two variables. Using a young and middle-aged sample, Hooker and Kaus (1994) reported that self-efficacy (but not outcome expectancy) associated with a health-related feared self was a significant predictor of scores on a health behavior inventory. The authors did not examine hoped-for selves because there were insufficient numbers of subjects with a hoped-for self in the health domain to run a regression analysis. In an earlier study with older adults that examined self-regulatory variables and health behaviors, both perceived self-efficacy and outcome expectancy were significantly related to scores on a health behavior inventory (Hooker & Kaus, 1992).

It is also conceivable that other self-regulatory variables may be more predictive of exercise behavior for long-term exercisers. For example, Hooker and Kaus (1994) found that in addition to self-efficacy, the number of activities engaged in to prevent a feared health-related self explained a large amount of variance in health behavior scores for a sample of adults (ages 24-59 years). Because self-efficacy and outcome expectancy were sufficiently redundant in the present study, they were combined to create a composite measure of self-regulatory processes. Future studies might note the pattern of relationships between self-regulatory variables, as they appear highly correlated in some studies (e.g., Whaley, 1997), while quite distinct in others.

Although not a focus of this study, an alternative methodology would have been to examine whether exercise behavior predicts possible selves. Due to the cross-sectional design of this study, it was not possible to determine the temporal relationship between

possible selves and exercise behavior. It is not clear whether this particular self-representation profile leads women to become committed exercisers, or whether such a behavioral commitment produces this self-concept profile. In the future, longitudinal research is needed in order to determine if possible selves change with increasing exercise involvement.

Conclusions and Suggestions for Future Research

This preliminary study provides further support for the Stages of Change Model (Prochaska & DiClemente, 1986) as a theoretical framework from which the determinants of exercise adherence might be studied. It appears that for middle-aged women in the maintenance stage, possible selves do not differentiate women representing increasing levels of exercise involvement. These results suggest that, within the constraints of the methodology employed in this study, women with varying degrees of experience in the maintenance stage can be treated as one group, at least with regard to future-oriented self-perceptions.

More importantly, this study suggests that once women reach the maintenance stage, their possible selves may stabilize. Murphy (1992) found that in the earlier stages of change, self-reevaluation (e.g., "I struggle with the issue that not exercising keeps me from being the kind of person I want to be") was used more frequently than any other self-regulatory process. It appears that individuals who are establishing an exercise habit actively engage in a reevaluation of the self and how exercise will impact their self-perceptions. Only in the maintenance stage do individuals rely significantly more on other (behavioral, rather than cognitive) processes of change. Murphy contends that individuals in the maintenance stage have established their exercise self-image and do not need to continue actively evaluating the

self in this domain. This may help explain why, theoretically, women across the stages of exercise differed with regard to their focused possible selves (Whaley, 1997), while those across the three maintenance groups did not. Perhaps intervention efforts designed to increase exercise adoption should focus on possible selves, whereas those intended to increase adherence should shift to a more behavioral focus (e.g., relapse prevention skills). These findings are consistent with previous SCM research and suggest that future studies seeking to understand exercise adherence motives would do well to employ a behavioral rather than cognitive focus.

In choosing populations for future SCM research, attempts should be made to find samples that would contain greater numbers of women in the earlier phases of the maintenance stage. The limited number of women in the earlier stages of maintenance in this study precluded a thorough investigation of potential differences across this stage. Selectively recruiting women in the earlier stages of maintenance (when the risk of relapse is greatest) would provide a more stringent test of the SCM.

The results of this study must be considered preliminary due to several methodological limitations. One such limitation involves the fact that participants were recruited to represent the maintenance continuum based on their self-report of exercise behavior; no objective indices of exercise behavior were assessed. Although the activity assessment (an exercise history including frequency, intensity, duration, and number of activities) served as a validity check for the Stages of Exercise Scale (Cardinal, 1995), both were self-report measures. As such, these measures relied on participants' subjective interpretation of exercise intensity and their memory of physical activity patterns, and were potentially subject to self-report bias. For example, several women reported activity histories which, if accurate, would have them exercising twelve hours a day, nine days a week. Future

research should endeavor to include a more objective measure of physical activity (e.g., an activity monitor) to provide external validity for the SOES.

Moreover, there is some evidence that participants used their own definition of exercise rather than adhering to the one provided on the Stages of Exercise Scale (Cardinal, 1995). Several women listed activities (e.g., house cleaning) on the activity assessment which did not meet the criteria for "regular exercise" as defined on the SOES (a planned activity for the purpose of maintaining health or fitness, at least 30 minutes a day, three days a week). When asked how long they had maintained this level of activity, long-term maintainers were apt to respond "all my life." Theoretically, given the dynamic nature of exercise participation, it is not likely that this was an accurate response. For example, a survey of more than 2,000 adults engaged in unsupervised community exercise found that nearly half of the respondents reported at least one exercise relapse of 3 months or more (Sallis et al., 1986). If researchers wish to base their findings upon operational definitions of terms such as "regular exercise," they must find ways in which to ensure their research participants share their definition. This appears to have been an issue in other studies utilizing the SCM (e.g., Gorley & Gordon, 1995; Murphy, 1992) and other models (Gauvin, 1990), and warrants future research attention.

A second limitation of this study concerns the homogeneous nature of the sample which was characterized by high education levels, relatively easy access to worksite fitness facilities, and a lack of ethnic diversity. Future studies should strive to include more diverse populations, thereby enhancing the generalizability of the findings.

Additionally, while it was necessary in this preliminary study to include both open-ended and focused assessments of possible selves, this resulted in an admittedly time-consuming questionnaire. While this study and concurrent research by Whaley (1997)

provided support for the utility of a self-administered questionnaire and domain-specific assessment of possible selves, future studies should endeavor to design a more efficient measure. For example, asking individuals to list their three most important open-ended possible selves (rather than all of them) would result in a more efficient assessment while maintaining the integrity of the measure. Future research is also needed with regard to the efficacy of following focused possible selves with questions assessing why a particular self is most important and how a possible self is related to the individual's current level of exercise. These "mechanical" questions appear to hold much promise as an additional means of collecting qualitative data which may help explain the function of possible selves. Additional research is also needed with respect to the development of a standardized protocol for the coding of possible selves. Such a protocol (e.g., rules for coding possible selves written in paragraph form) would allow for a comparison of studies using unique categories. This would enable researchers utilizing domain-specific measures to compare findings across studies, thereby enhancing the generalizability of results.

In conclusion, the results of this study provide further evidence of the applicability of the stages of change model (Prochaska & DiClemente, 1983) to exercise maintenance. The model appears to provide a much needed theoretical rationale for the study of exercise adoption, and more importantly, long-term exercise adherence. Additionally, these results provide a preliminary profile of the future-oriented self-conceptions of women in the maintenance stage of exercise. This profile suggests several practical implications for interventions designed to increase the number of physically active middle-aged women.

First, adherence programs should address the relationship between regular physical activity and disease prevention. The active women in this study reported their primary motive for exercising was to improve or maintain their health. Moreover, the longer women

had sustained their commitment to physical activity, the more likely they were to conceptualize exercise as a means of protecting their health. These active women also evidenced a high value for the psychological benefits of a physically active lifestyle. Efforts should be made to ensure that inactive women and novice exercisers are aware of the efficacy of exercise in reducing depressive symptoms and stress while enhancing perceptions of well-being, self-esteem, and vitality.

While the women in this study demonstrated relatively balanced health-related selves, they were still more likely to conceptualize their future health in terms of feared than desired outcomes. Thus it appears that feared images of the self in the health domain may serve to motivate preventive behaviors such as exercise. This would be consistent with previous possible selves research concerning the motivational value of balanced possible selves (e.g., Oyserman & Markus, 1990; Oyserman, Gant, & Ager, 1995). Moreover, it seems likely that the fact that this cohort of women has been discouraged from physical activity plays a role in their lack of positive goals in this domain. As possible selves are theorized to be socially constructed (Markus & Herzog, 1992), social changes will likely be necessary before this goal is achieved. Women of all ages could benefit from role models of physically active older women.

Similarly, there is a need to challenge the currently accepted cultural stereotype of aging as a series of uncontrollable losses. Despite the well-documented relationship between physical activity and healthy aging, the mass media continues to ascribe to negative stereotypes of aging and examples of active, vigorous older women are conspicuously lacking. The current negative stereotypes could be replaced with models of "successful aging," effectively expanding the realm of possibility for women seeking to develop positive

images of themselves in later life. Such optimistic possible selves may enable women to avoid the passive coping strategies which arise as a result of internalized negative stereotypes.

The women in this study also provide an example of how possible selves may function as a link between the self-concept and motivation (Ruvolo & Markus, 1992). Many of the active women in this study conceptualized exercise as an investment in their future goals. If exercise is seen as a strategy to attain other important goals, it may result in positive affect, thereby enhancing well-being and motivation (Ewart, 1991; Harter, 1995).

Conversely, when exercise is seen as competing with other goals, it is likely to result in negative affect and reduced motivation. Intervention programs might strive to promote exercise as an investment in one's future (e.g., the role of improved mobility in an active retirement), as opposed to merely focusing on physical parameters (e.g., improved strength).

Finally, the results of this study indicate that the key to moving from novice (high risk of drop-out) to expert (committed) maintainer may depend more on behavioral than cognitive processes. Accordingly, interventions should focus on behavioral (e.g., relapse prevention) strategies for novice maintainers who may have acquired the cognitive processes of habitual exercisers, but lack their depth of behavioral experience.

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APPENDICES

APPENDIX A

****Please Read Before Beginning****

Dear Participant,

Thank you for consenting to be a part of this research study. Research shows that women are less likely than men to participate in physical activity, and that levels of activity decrease as we age. This study is designed to learn more about the thoughts women have regarding decisions to engage in health behaviors. I hope that as a result of your participation, you will gain some insight into your thoughts and feelings regarding your perceptions of yourself in the future, particularly as they relate to health behaviors. Enclosed you will find a number of questionnaires that I ask you to thoroughly and honestly complete. It is very important that you do the questionnaires in the order provided. Please resist the temptation to “look ahead,” and instead complete the pages consecutively. I also ask you to refrain from discussing your responses with anyone else, particularly while you are working on the packet. Based on test administration, the entire packet should take you approximately 40 minutes. **Please be sure to fill out all the pages**, and then return the entire packet of questionnaires in the envelope provided. I would appreciate it if you returned these as soon as possible - you know what happens if you put this away “for later...” Thanks again, and please feel free to call me or e-mail if you have any questions or comments.

Sincerely,

Diane Whaley, Doctoral Candidate
Department of Exercise and Sport Science
737-6805
whaleyd@ucs.orst.edu

APPENDIX B
Informed Consent Document

You are invited to participate in a research study examining people at different stages of exercise behavior, from none at all to exercising regularly. The information in this study will help expand our understanding of how women come to the decision of whether or not to exercise. If you decide to participate, you will be asked to respond to the questions enclosed in this packet. That you answer the questions as accurately and honestly as possible is all that is required of you for this study.

Your responses will remain confidential at all times. Once we receive your completed questionnaires, your name will be replaced with a code number and all information will be analyzed and reported using that code.

If you have any questions about the project, please call Diane Whaley, Langton Hall, Oregon State University at (541) 737-6805. If you have any questions concerning your rights as a participant in a research project, please contact the OSU Research Office at (541) 737-3437.

Your signature below indicates you have read and understand the information provided above, that your participation is voluntary, and that you may withdraw your consent at any time and discontinue participation without penalty.

Signature: _____

Date: _____

APPENDIX C

Stages of Exercise Scale

Directions: Please **CIRCLE** the number on the ladder that best describes your present level of exercise behavior. **"Regular exercise"** is defined as participating in any planned activity for the purpose of maintaining or increasing health or fitness at least three days per week for 30 minutes or more each day (consecutively or cumulatively). Examples of planned activities include swimming, walking, jogging, bicycling, aerobics, and dancing.

4	----->	<p>I presently exercise on a regular basis and have been doing so for longer than 6 months.</p> <p>How long have you maintained this level of physical activity?</p> <p>_____ years _____ months</p>
3	----->	<p>I presently exercise on a regular basis, but I have only begun doing so within the past 6 months.</p>
2	----->	<p>I presently get some exercise, but not regularly.</p>
1	----->	<p>I presently do not exercise, but I have been thinking about starting to exercise within the next 6 months.</p>
0	----->	<p>I presently do not exercise and do not plan to start exercising in the next 6 months.</p>

****please continue on to the next page****

APPENDIX D
Possible Selves Instrument

This questionnaire addresses how you see yourself in the future. We all think about our future to some extent. When doing so, we usually think about the kinds of experiences that are in store for us and the kinds of people we might possibly become. Sometimes we think about what we HOPE we will be like -- selves we hope to become in the future, or "HOPED-FOR POSSIBLE SELVES."

Some hoped-for possible selves seem quite likely, like becoming a homeowner, or achieving high status at work. Other future selves seem quite far-fetched but are still possible; for example winning the lottery. Things that we do are not possible selves, but are usually part of a possible self. For example, to write books is not a possible self; to be a writer is a possible self.

Please take a few minutes to think about all of your HOPED-FOR POSSIBLE SELVES. You may have just a few, or you may have many. Write all of the hoped-for possible selves which are currently important to you in the space provided, numbering each one.

Now we would like you to look back at your list on the previous page, select the MOST IMPORTANT hoped-for possible self, and respond to the following questions:

The hoped-for possible self I consider most important is:

WHY is this hoped-for self important to you?

1. How important is it to you to achieve this possible self?

1	2	3	4	5	6	7
Not at all important			Somewhat important			Very important

2. How capable do you feel of achieving this possible self?

1	2	3	4	5	6	7
Not at all capable			Somewhat capable			Very capable

3. How likely do you think it is that this possible self will be achieved?

1	2	3	4	5	6	7
Not at all likely			Somewhat likely			Very likely

****please continue on to the next page****

Now we'd like you to go back to your original list, and see which of the hoped-for possible selves you identified is most closely related to your present level of exercise behavior. It might be directly or indirectly related - that's O.K. For example, your hoped-for possible self most closely related to exercise might be "To learn to sail." Please write that possible self in the space below, and answer the same series of questions.

The hoped-for self that I consider most closely related to my present level of exercise behavior is:

HOW is this hoped-for self related to your present level of exercise behavior?

1. How important is it to you to achieve this possible self?

1	2	3	4	5	6	7
Not at all			Somewhat			Very
important			important			important

2. How capable do you feel of achieving this possible self?

1	2	3	4	5	6	7
Not at all			Somewhat			Very
capable			capable			capable

3. How likely do you think it is that this possible self will be achieved?

1	2	3	4	5	6	7
Not at all			Somewhat			Very
likely			likely			likely

please continue on to the next page

Finally, we are interested in knowing to what degree the following hoped-for possible self might be applicable to you. Please read the following hoped-for possible self, and answer the questions that follow.

"TO BE AN ATTRACTIVE, HEALTHY, OLDER WOMAN"

1. To what extent does this possible self describe you now?

1	2	3	4	5	6	7
Not at all			Somewhat			Very Much

2. How important is it to you to achieve this possible self?

1	2	3	4	5	6	7
Not at all important			Somewhat important			Very important

3. How capable do you feel of achieving this possible self?

1	2	3	4	5	6	7
Not at all capable			Somewhat capable			Very capable

4. How likely do you think it is that this possible self will be achieved?

1	2	3	4	5	6	7
Not at all likely			Somewhat likely			Very likely

****please continue on to the next page****

In addition to having hoped-for possible selves, we may have images of ourselves in the future that we *fear, dread, or don't want to happen*. Some of these FEARED POSSIBLE SELVES may seem quite likely, like losing friends, while others may seem quite unlikely, for example, becoming a homeless person. Some of us may have a large number of feared possible selves in mind, while others may have only a few.

Please take a few minutes to think about all of your feared possible selves, and write them in the space provided below. Remember, they may be likely or unlikely, and you may have a few or more. Write any feared possible selves that are important to you now, numbering each one as you list it.

****please continue on to the next page****

As we did previously with the hoped-for selves, now we'd like you to look through your list and pick out the feared self that you consider MOST IMPORTANT to you. Write this in the space provided, and answer the following questions related to that feared self.

My most-important feared self is:

WHY is this feared self important to you?

1. How important is it to you to prevent the occurrence of this possible self?

1	2	3	4	5	6	7
Not at all			Somewhat			Very
important			important			important

2. How capable do you feel of preventing this possible self?

1	2	3	4	5	6	7
Not at all			Somewhat			Very
capable			capable			capable

3. How likely do you think it is that this possible self will be prevented?

1	2	3	4	5	6	7
Not at all			Somewhat			Very
likely			likely			likely

****please continue on to the next page****

Now, go back to your list of feared possible selves and see which of the feared selves you listed is **most closely related** to your present level of exercise behavior. As with hoped-for possible selves, it may be directly or indirectly related to your exercise behavior. An example might be, "Being alone in my last years." Write the feared possible self in the space below, and answer the questions that follow.

The feared self most closely related to my present level of exercise behavior is:

HOW is this feared self related to your exercise behavior?

1. How important is it to you to prevent the occurrence of this possible self?

1	2	3	4	5	6	7
Not at all important			Somewhat important			Very important

2. How capable do you feel of preventing this possible self?

1	2	3	4	5	6	7
Not at all capable			Somewhat capable			Very capable

3. How likely do you think it is that this possible self will be prevented?

1	2	3	4	5	6	7
Not at all likely			Somewhat likely			Very likely

****please continue on to the next page****

Finally, we are interested in knowing to what degree the following feared possible self in the exercise domain might be applicable to you. Please read the following statement and answer the questions that follow it.

“NOT ABLE TO ENJOY LATER LIFE TO THE FULLEST”

1. To what extent does this possible self describe you now?

1	2	3	4	5	6	7
Not at all			Somewhat			Very Much

2. How important is it to you to avoid this possible self?

1	2	3	4	5	6	7
Not at all important			Somewhat important			Very important

3. How capable do you feel of avoiding this possible self?

1	2	3	4	5	6	7
Not at all capable			Somewhat capable			Very capable

4. How likely do you think it is that you will avoid this possible self?

1	2	3	4	5	6	7
Not at all likely			Somewhat likely			Very likely

****please continue on to the next page****

APPENDIX E
Demographic Questionnaire

Age: _____

Name: _____
(please print)

Ethnic group (check one)

- ☐ American Indian or Alaskan Native ☐ Asian or Pacific Islander
☐ Black, Non-Hispanic ☐ White, Non-Hispanic ☐ Hispanic

Level of education completed:

- ☐ Some high school ☐ High school diploma ☐ Some college
☐ College degree ☐ Masters ☐ Doctorate

Current Living Situation (check all that apply):

- ☐ Single ☐ Married/Partnered ☐ Divorced ☐ Widowed
☐ Live with someone ☐ Live alone
Who? __ Spouse/partner
 __ Friend
 __ Relative

Employee Status (check all that apply):

- ☐ Teaching Faculty ☐ Professional Faculty ☐ Classified/Staff
☐ Full-time ☐ Part-time

APPENDIX F

Physical Activity Questionnaire

For any activity in which you participate, complete the chart below according to the following key:

Type of activity: Write one activity per line with sports or exercise such as tennis, walking, or weight training.

Seasonal: Indicate YES if you participate in this activity for only part of the year, NO if you participate most of the year.

Frequency: The average number of hours per week you engage in the activity.

Intensity: Indicate if you perceive the average workout to be low (L), moderate (M), or high (H) intensity.

Experience: Indicate the approximate number of months or years you have been participating.

<u>Activity</u>	<u>Seasonal</u> (yes, no)	<u>Frequency</u> (hrs/week)	<u>Intensity</u> (L,M,H)	<u>Experience</u> (mos, yrs)

****THANK YOU FOR COMPLETING THIS QUESTIONNAIRE. PLEASE RETURN THE ENTIRE PACKET IN THE ENVELOPE PROVIDED.**