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EXPERIENCES OF WOMEN WHO ARE CLASSIFIED AS MAINTAINERS AND TRANSFORMERS FOR EXERCISE

By

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ABSTRACT

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The purpose of this study is to gain a greater understanding of the experiences of women classified as late-in-stage maintainers and transformers for exercise (Cardinal & Levy, 2000). The participants in this study were women 40 years of age or older who were enrolled in a general fitness class at a community college or a chair exercise class for people 50 years of age and older. Ten women were interviewed individually in an attempt to discover how rearing or past experiences with exercise related to stage classification. The concepts that were examined through the interview process included family values and perceptions of exercise, periods of inactivity and the reasons for them, and the role of intrinsic motivation, enjoyment, and ritual in exercise adherence. The analysis did not fully support Cardinal's (1999) Stage of Physical Activity Algorithm. Next, the analysis revealed that childhood experiences, including family-sponsored physical activity and the use of physical activity as a coping mechanism, set a standard for lifetime physical activity. In addition, adaptability in the face of changing circumstances, the process known as "environmental control" (Prochaska et al., 1994), and ritual or routinized behavior played prominent roles in these women's continued engagement in physical activities. Further, although the process known as "helping relationships" was shown in previous studies to be under-utilized by maintainers (Courneya & Bobick, 2000; Fahrenwald & Walker, 2003), the results provide evidence that successful exercisers do use the "helping relationships" process.

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Chapter 1

INTRODUCTION

Life-long physical activity and exercise is encouraged by health and fitness practitioners to promote health, prevent chronic illnesses, and maintain independent living (Center for Disease Control, 2001; U.S. Department of Health and Human Services, 2000). In spite of obvious benefits, a continuum of people's engagement in exercise exists that ranges from sedentary lifestyle to lifelong engagement in regular exercise (Marcus & Owen, 1992). Older women in particular are at risk for developing health issues associated with sedentary behaviors because, according to the Center for Disease Control (1999b) who define recommended physical activity as that which burns at least 150 kcal, 25% of women get no physical activity at all while 60% of women do not meet the recommendations for physical activity. As women age, sedentary behaviors increase dramatically. Forty percent of women over the age of 55 do not engage in any physical activity during leisure time (Center for Disease Control, 2005).

Women, as a cultural group, have a unique set of issues that can become barriers to exercise. A survey done by the National Women's Resource Center (2005) showed that women frequently placed their family's needs ahead of their own health which negatively impacted engagement in exercise. Similarly, O'Brien-Cousins and Keating (1995) found that for some women marriage and child bearing were the "turning point" from physically active to more sedentary lifestyles. In addition, older women from varying ethnic groups indicated that body image issues prevented them from exercising (Heesch, Brown, & Blanton, 2000; King, Castro, Wilcox, Eyler, Sallis, & Brownson, 2000). Furthermore, the Center for Disease Control (1999a) found that older people and

women exercised less frequently when they had strong concerns about neighborhood safety.

In spite of these issues, some women still manage to engage in regular exercise. Within the Stages of Change of the Transtheoretical Model (TTM), there are two stages where women would be identified as "engaging in regular exercise" (Prochaska, Norcross, & Diclemente, 1994): (a) Maintainers - those who have engaged in regular exercise for 6 months to 5 years but are at risk for relapse into sedentary behavior (Prochaska et al., 1994), and (b) Transformers - those who have engaged in regular exercise for at least 5 years but are not at risk for relapse (Cardinal, 1999). For the purpose of this study, transformers and a newly designated sub-category of maintainers titled "late-in-stage maintainers" were considered. The TTM and the stages of change are discussed at length in the next chapter.

"Late-in-stage maintainers" were labeled as such for ease of discussion. They are defined as people who have engaged in exercise for at least 3 years and are still at risk for relapse into sedentary behavior. This redefined group is necessary because logic dictates that issues that might cause a maintainer of 6 months to one year to relapse into sedentary behavior could be dramatically different than those of a maintainer of 3 or more years. For example, weather variations of changing seasons, holiday distractions, and boredom could all serve to derail a new maintainer, but after she has had a few years' experience managing barriers, these types of challenges should no longer be a threat to adherence. Logic also dictates that a maintainer of 3 or more years should possess characteristics more similar to a transformer. Given this, once a woman has persisted in exercise for 3 or more years, what might cause her to cease and what could prevent it? Do major

changes in a woman's life, as O'Brien-Cousins and Keating (1995) suggest, lead to a cessation in exercise? Do women's goals impact adherence? Does upbringing impact long term adherence? Does culture or routine factor into determining adherence?

Late-in-stage maintainers and transformers engage in exercise, in part, because they have goals they are working toward (Prochaska & Marcus, 1994; Prochaska et al., 1994). These goals may include things like reaching a certain performance level, changing physical appearance, or improving health. However, much can change in a woman's life that may impact her ability to reach an exercise goal. For instance, a health issue, a reduction in discretionary income, a marriage or the addition of children (O'Brien-Cousins & Keating, 1995) might cause a woman to cease engagement in exercise either because her priorities changed or because she perceived that time or money were lacking. If life events are the sole cause of behavior change, the difference between women who continue to exercise and those who stop might be as simple as luck. Yet some women suffer great hardships and still continue to do things that they enjoy or are important to them, and other women continue to honor their commitment to exercise after having children. If life changes cannot fully explain the difference between these two groups, possibly the differences can be attributed to the motivation behind the goal.

According to Intrinsic Motivation theories, the source of the goal, e.g., intrinsic or extrinsic, impacts goal completion and adherence (Deci & Ryan, 1985). People who are extrinsically motivated find the inspiration for their goals from an external source, e.g., doctors orders or peer pressure, and are less likely to adhere to their goals (Deci & Ryan, 1985). Intrinsically motivated people set and work toward goals based on an internally focused rationale, e.g., personal challenge or enjoyment, and are more likely to adhere to

their goals (Deci & Ryan, 1985). Given that the complex behavior of human beings rarely fits neatly into one theory, it is unlikely that intrinsic motivation is the only answer. In fact, two issues stand in the way. First, studies exploring intrinsic motivation involved activities that were inherently interesting to the participants (Weiss & Chaumeton, 1992). Weiss and Chaumeton (1992) suggest that if an activity is not inherently interesting to the individual, he or she may need external motivation like rewards, status, or social support in order to initiate participation. Second, the motivation for the goal could shift over time. Because intrinsic motivation can be reduced through the introduction of external rewards (Deci & Ryan, 1985), it is possible that extrinsic motivation could, likewise, be decreased over time. If intrinsic motivation, which is related to adherence, can be decreased and extrinsic motivation, which is related to dropout or relapse, can also be decreased, the initial motivation for goal setting may not greatly impact adherence. The final motivation, however, may play a role in determining long-term adherence.

In addition to intrinsic motivation, another possible reason people persist with an activity may involve personal identity (Cardinal, 1999; Cardinal & Levy, 2000). Avid runners always run because it is "who they are." The weather never deters them nor does any other factor. While some people who are avid runners may be addicted to the activity (Morgan & O'Connor, 1988), others may adhere to running because it, in part, defines who they are. Cardinal (1999) and Cardinal and Levy (2000) suggest that a main factor separating maintainers or long-term maintainers (those who have exercised for more than 5 years but are still subject to relapse) from transformers is self-image as a "role model."

Still other women may engage in daily exercise because it is a ritual behavior. Enjoyment, challenge, and image may not figure into the mix as strongly as simple routine. True daily rituals like showering, brushing teeth, and eating may not require commitment or enjoyment to be performed. Instead, these tasks are performed more or less automatically, i.e., they are done without the need for a motivating factor or conscious effort. Rituals, however, are cultural in their construction. Ethnic background can influence adoption of daily rituals. A study by the Women's Sports Foundation UK (2005) found that Bangladeshi women did not exercise because they could not wear fitness clothing in public and because elders in their community did not value physical activity. Lewis, Szabo, Weiner, McCall, and Piterman (1997) found that language and the ability to do activities with people from their own group were salient to participation for Indo-Chinese, Jewish, Italian, and Greek elderly people. Therefore, the adoption of exercise as a daily ritual may be culturally constructed.

Other cultural issues that may influence women's adherence to exercise may be tied to upbringing and values. Women raised in families where exercise was valued and actively pursued may be more likely to adhere to exercise (Snyder & Spreitzer, 1973). Whereas, women raised to believe that exercise is not appropriate for women, may be less likely to adhere to exercise (Dunlap & Barry, 1999).

Because human behavior is complex and multifaceted, a combination of the above factors likely makes up the difference between late-in-stage maintainers and transformers. The background of individuals and the path they took to get to their current state of adherence may be the most revealing information about adherence.

Understanding the factors underlying the way in which long term adherence to exercise occurs is an important issue to practitioners and educators in health care and fitness. By knowing how people achieve long term adherence, practitioners and educators will be better able to help their clients and students achieve long term adherence to exercise and reap the benefits that a physically active lifestyle brings.

Issues from the Transtheoretical Model

The TTM is a model of behavior change that is defined by six stages of change (Prochaska et al., 1994). The stages range from precontemplation (Prochaska et al., 1994), where the individual has no desire to change, to transformation (Cardinal, 1999), in which the change is fully adopted. Relapse into old behaviors can occur anytime during the first 5 stages, but once the individual reaches the transformed stage the behavior is permanent (Prochaska et al., 1994).

Because relapse can happen at any time during the first 5 stages, there should be recognizable differences between women who have engaged in exercise for 3 years (late-in-stage maintainers) and those who have exercised for 5 years (transformers). However, more recently, Cardinal and Levy (2000) discovered a sub-group of maintainers whom they called "long-term maintainers." Long-term maintainers have exercised for 5 or more years but are not 100% confident in their abilities to continue their exercise behaviors. This discovery indicates that something other than years spent in the activity determines transformation, and it creates further possibilities. If people who have exercised for more than 5 years can still be maintainers, might people also reach the transformed stage prior to the 5-year period? This possibility necessitates further examination of late-in-stage maintainers and transformers.

While few studies have been performed to investigate the properties of the transformation stage, research exploring exercise adherence and participation allows us to deduce that transformers should have the following characteristics: intrinsic type goals (Deci & Ryan, 1985), commitment to the activity (Prochaska et al., 1994), high level of enjoyment derived from the activity (Buonamano, Cei, & Mussino, 1995; Ewing & Seefeldt, 1988; Gill, Gross, & Huddleston, 1983; Gould, Feltz, & Weiss, 1985; Gould, Feltz, Weiss, & Petlichkoff, 1982; Klint & Weiss, 1986; Koivula, 1999; Sapp & Haubenstricker, 1978; Weiss & Chaumeton, 1992; Wold & Kannas, 1993), a sense of self-image tied to the activity, and 100% confidence in their ability to maintain exercise for life (Cardinal, 1999; Cardinal & Levy, 2000). One might also expect that late-in-stage maintainers would exhibit these characteristics to a lesser degree. However, if years spent in the activity is not a reliable measure of adherence as Cardinal and Levy (2000) suggest, then perhaps the transition between maintenance and transformation is more fluid and less incrementally definable. Perhaps the gateway to the final stage transition is best understood experientially.

Marcus, Dubbert, Forsyth, McKenzie, Stone, Dunn, and Blair (2000) recommend that future research on the TTM "investigate factors associated with differential patterns of adoption and maintenance of exercise" (p. 39) principally to discover whether there are critical periods that help make exercise habitual and to discover the natural history of change. Further, they recommend examining the influence of parents, school, and significant others on the promotion of exercise. In addition, O'Brien-Cousins and Keating (1995) point to the need for future research on the "turning points of women at earlier stages of life that determine level of physical activity" (p. 357).

Research Questions

Based on Marcus et al.'s (2000) recommendation and findings from previously conducted studies, this study was designed to answer the following questions concerning older women who are either late-in-stage maintainers or transformers:

1. In what ways do life experiences impact stage placement?
    a. How does the way in which women were raised, e.g., culture, values, social support, and perceptions of exercise or physical activity, influence their current stage placement?
    b. What are the factors or stressors in adult life, such as career, children, health, social support, etc., which impact current stage placement?
    c. How have relapse episodes impacted progress to their current stage?
    d. How does the timetable in which intrinsic motivation was adopted influence stage placement?
    e. How does the timetable in which enjoyment of exercise or physical activity was acknowledged impact stage placement?
2. What is the role of ritual or routine in adherence to exercise or physical activity?
    a. Are women in the transformed or late-in-stage maintenance stages more likely to prefer or better utilize routines and schedules?
    b. How does preference for routine aid adherence to exercise or physical activity?

The answers to these questions may provide valuable information for practitioners and educators who hope to help their patients, clients, and students adopt physically active lifestyles.

Chapter 2

REVIEW OF LITERATURE

The Transtheoretical Model (TTM; Prochaska & Marcus, 1994; Prochaska et al., 1994), as its name indicates, is a hybrid or blend of the systems of change identified within psychoanalysis, behaviorism, cognitive therapy, existential analysis, and humanism. The outcrop from this blend is a model that contains four major components: Stages of Change, Decisional Balance, Self-efficacy, and Processes of Change. While this model can be applied to many different aspects of life, for the purpose of this paper, the focus will be limited to that of adherence to physical activity (Marcus & Simkin, 1993; Marcus & Simkin, 1994; Reed, 1999). The six stages of change indicate a person's level of readiness for and commitment to physical activity while the remaining three components influence the progress of behavioral change.

It is important to note that the TTM was designed around the assumption that there is a negative behavior in need of change. For exercisers, it is assumed that they were once sedentary in order for the model to apply. However, the model itself does not include a test of whether the negative behavior exists nor have researchers studying the TTM for exercise included this type of screening in their studies.

Major Components of the TTM

Stages of Change. There are six stages of change that define a person's behavior during the change process (Prochaska et al., 1994). The behaviors range from unwillingness to change through complete adoption of change. Each stage is associated with a specific set of issues that must be addressed by the individual in order for him or her to successfully transition into the next stage. Table 1 shows the six stages of change

used to identify a person's level of readiness for and commitment to exercise. In depth discussion of the characteristics of the individual stages is presented in the next section.

Table 1

The stages of change for exercise behavior (Prochaska & Marcus, 1994)

Stage	Explanation
Precontemplation	Not intending to exercise
Contemplation	Intending to exercise in next 6 months
Preparation	Planning to exercise in the next month
Action	Actively engaging in exercise for up to 6 months
Maintenance	Sustaining exercise for at least 6 months and less than 5 years
Long-term Maintenance**	5 or more years of continuous exercise involvement but less than 100% confidence in ability to remain physically active for life**
Termination (a.k.a. Transformed*)	5 or more years of continuous exercise involvement and 100% confidence in ability to remain physically active for life*

Note: * Cardinal (1999) **Cardinal & Levy (2000)

Placement into a specific stage has been determined by a number of different instruments over time. Commonly used instruments included either 3-item (Clarke & Eves, 1997), 4-item (Marcus, Selby, Niaura, & Rossi, 1992; Mutrie & Caddell, 1994), 5-item (Christopoulou, McKenna, & Naylor, 1996; Cowen, Logue, Milo, Britton, & Smucker, 1997; Eves, Mant, & Clarke, 1996; Goldberg, Christopher, Aznar, Barnes,

Simmonds, McKenna, Page, & Naylor, 1996; Ingledew, Markland, & Medley, 1998; Juniper, Oman, Hamm, & Kerby, 2004; Marcus, Rossi, Selby, Niaura, & Abrams, 1992; Naylor & McKenna, 1995; Naylor, McKenna, Barnes, & Christopher, 1995; Simmonds, Naylor, Riddoch, & Vellman, 1996), or 32-item, 5-point Likert scale (Barke, & Nicholas, 1990) on which the subjects rated their agreement with statements that related to the various stages. The Kappa index for reliability of the 3-, 4-, and 5-item versions was .78 over a 2-week period (Marcus, Selby et al., 1992). Reliability for the 32-item scale was not reported (Barke, & Nicholas, 1990). From their responses, subjects were placed into the stage connected with the statement they agreed with most strongly. For instance, an individual who responded "strongly agree" to the statement "I currently do not exercise, and I do not intend to start exercising in the next 6 months" (Marcus, Selby et al., 1992) would be classified as a precontemplator.

Another similar instrument used to assess stage placement was a true/false design. With this tool, subjects responded, true or false, to five statements that corresponded with the stages (Cardinal, Engels, & Zhu, 1998; Hellman, 1997; Jue & Cunningham, 1998; Marcus & Simkin, 1993; Titze, Martin, Seiler, Stronegger, & Marti, 2001). For example, if a person responded "true" to the statement "I currently do not exercise" and to the statement "I intend to exercise in the next 6 months," he or she would be categorized as a contemplator (Marcus & Simkin, 1993). The Kappa index for reliability for this tool was .78 over a 2-week period (Marcus, Selby et al., 1992).

A variation of this tool was to have subjects respond to an algorithm of statements that defined their stage (Courneya, Plotnikoff, Hotz, & Birkett, 2001; Kosma, Cardinal, & McCubbin, 2004; Plotnikoff, Hotz, Birkett, & Courneya, 2001; Sarkin, Johnson,

Prochaska, & Prochaska, 2001; Walcott-McQuigg, & Prochaska, 2001). For instance, subjects were first asked if they currently did any vigorous exercise. If the answer was "yes," they were then asked if the vigorous exercise was regular. If the answer was "no," they were placed in the preparation stage (Courneya et al., 2001). The Pearson correlation of stage with energy expenditure was significant (Plotnikoff et al., 2001).

In yet another slight variation from the above designs, the subjects were asked to select one statement, among several, that best described their current exercise status. Their choice equaled their stage placement as each statement corresponded to a specific stage (Booth, Macaskill, Owen, Oldenburg, Marcus, & Bauman, 1993; Boyle, O'Connor, Nicolaas, & Tan, 1998; Burn, Naylor, & Page, 1999; Courneya & Bobick, 2000; Gorely & Gordon, 1995; Kearney, de Graaf, Damkjaer, & Engstrom, 1999; Marcus, Banspach, Lefebvre, Rossi, Carleton, & Abrams, 1992; Nigg & Courneya, 1998; Peterson, & Aldana, 1999). For example, if a person selected "do not exercise regularly and do not intend to start," he or she would be categorized as a precontemplator (Booth et al., 1993). For this tool, there was a significant systematic relationship between stage and activity level (Booth et al., 1993). A modification on this design was to place the statements on a ladder which allowed the subject to circle the number on the ladder that corresponded to the statement of their choice (Cardinal, 1993; Cardinal 1995a; Cardinal 1995b; Cardinal, 1997; Marcus & Owen, 1992; Wyse, Mercer, Ashford, Buxton, & Gleeson, 1995).

In a slightly more sophisticated version of these tools, activity status was measured through recall (Lee, 1993; Nguyen, Potvin, & Otis, 1997; Potvin, Gauvin, & Nguyen, 1997) or an Exercise Participation Questionnaire (Myers & Roth, 1997) and was intersected with a question about intention to exercise in order to place subjects into

stages (Fahrenwald & Walker, 2003; Lee, 1993; Myers & Roth, 1997; Nguyen et al., 1997; Potvin et al., 1997). The overall effect for stage was significant (Lee, 1993).

In order to place individuals into the transformed stage, the method above was modified. In this modification called the Stage of Physical Activity Algorithm, subjects were placed into stages based on their responses to two criteria: how long the exercise behavior had been maintained and how confident the subject was that he or she could maintain the behavior (Cardinal, 1999; Cardinal & Levy, 2000). This modified technique was necessary because no previous tool had incorporated the transformation stage. MANOVA testing showed significant differences between all stages (Cardinal, 1999). Fallon (2004) and Fallon and Hausenblas (2001) used this same method in their studies of transformers, but they eliminated percent of confidence as a factor in categorizing transformers.

Despite the use of a variety of instruments, all studies revealed that subjects, regardless of demographic factors, were represented in each of the five stages. Studies that targeted special populations, such as low socio-economic status women (Fahrenwald & Walker, 2003), people living in rural and inner city locations (Potvin et al., 1997), people with severe disabilities (Kosma et al., 2004), overweight people (Sarkin et al., 2001), older adults (Gorely & Gordon, 1995), African Americans (Heesch, Brown, & Blanton, 2000; Juniper et al., 2004; Walcott-McQuigg, & Prochaska, 2001), Hispanic women (Heesch, Brown, & Blanton, 2000) and Native American/Native Alaskan women (Heesch, Brown, & Blanton, 2000), all showed subjects distributed across the first five stages of change. Even in studies done in other countries including Australia (Gorely & Gordon, 1995; Lee, 1993; Marcus & Owen, 1992), Canada (Nguyen et al., 1997), the

European Union (Kearney et al., 1999), Greece (Christopoulou et al., 1996), and the United Kingdom (Burn et al., 1999; Ingledew et al., 1998; Naylor et al., 1995; Wyse et al., 1995), people were distributed across the stages.

Decisional Balance. One factor that relates to progress throughout the stages is the decisional balance or the weighing of pros versus cons (Janis & Mann, 1977). As a rule, the "pros" steadily increase from precontemplation to maintenance while the "cons" decrease (Marcus & Owen, 1992).

Decisional balance or the "pros" and "cons" are commonly measured by either 6-item (Herrick, Stone, & Mettler, 1997; Marcus, Eaton, Rossi, & Harlow, 1994; Marcus & Owen, 1992), 8-item (Sarkin et al., 2001), 10-item (Eves et al., 1996; Kosma et al., 2004), 16-item (Gorely & Gordon, 1995), or 43-item scales (Fahrenwald & Walker, 2003). In the 6-, 8-, and 10-item scales, half of the items on the scale represented a "con" of exercise, e.g., "Physical activity would take up too much of my time" (Kosma et al., 2004), and the other half of the items represented a "pro", e.g., "I would be healthier if I exercised regularly" (Marcus & Owen, 1992). Internal consistency for the 6-item scale was .70 for pros and .56 for cons (Marcus & Owen, 1992). Internal consistency for the 8-item scale was .87 for pros and .71 for cons (Sarkin et al., 2001). Internal consistency for the 10-item scale was .82 for pros and .57 for cons (Kosma et al., 2004).

In the 16-item scale also known as the Decisional Balance Questionnaire, 10 of the items were related to the "pros" of exercise while the remaining six related to the "cons" (Gorely & Gordon, 1995). Internal consistency for this scale was .95 for pros and .79 for cons. In the 43-item scale also known as the Exercise Benefits/Barriers scale, 29 of the items were related to the "benefits" of exercise while the remaining 14 related to

the "barriers" (Fahrenwald & Walker, 2003). Internal consistency for this scale was .95 for benefits and .89 for barriers. The "pro" and "con" statements were rated by participants in all of the studies on a 5-point Likert scale except for the Fahrenwald and Walker (2003) study in which a 4-point Likert scale was used.

Self-efficacy. Another factor that relates to progress throughout the stages is self-efficacy (Bandura, 1986). As a rule, self-efficacy steadily increases from precontemplation to maintenance (Marcus & Owen, 1992; Marcus, Selby et al., 1992).

Self-efficacy was most commonly measured by a 5-item scale that used either a 5-point (Gorely & Gordon, 1995; Herrick et al., 1997), 7-point (Marcus et al., 1994; Marcus & Owen, 1992), or 11-point Likert scale (Burn et al., 1999; Christopoulou et al., 1996; Marcus, Selby et al., 1992). Internal consistencies ranged from .76 (Herrick et al., 1997) to .85 (Marcus, Selby et al., 1992). Variations on this measure included a 6-item, 5-point scale with an internal consistency of .88 (Sarkin et al., 2001) and a 7-item, 100-point scale with an unreported internal consistency (Juniper et al., 2004). All of the measures assessed subjects' confidence in their abilities to exercise under a variety of conditions such as poor weather, tiredness, time constraints, bad mood, and the like.

The self-efficacy portion of this model is the most controversial. Plotnikoff et al. (2001) argue that self-efficacy is the strongest indicator of the stage of change, and that Prochaska has failed to explain the relationship between self-efficacy and the processes of change (Plotnikoff et al., 2001). However, Prochaska and Marcus (1994) explain that while self-efficacy scores increase linearly across the stages, high self-efficacy does not always equal success. They note that high self-efficacy in the early stages is related to

the high use of the processes of change, whereas high self-efficacy in the later stages is related to low use of the processes of change which increases the risk for relapse.

Processes of Change. The 10 processes of change are applied to help the individual move into the subsequent stage. In each of the stages, a combination of the processes is used to promote stage transitioning and prevent relapse; however, in no one stage are all the tools used simultaneously. Table 2 lists the 10 processes of change and an explanation of each process. The processes will be discussed as they relate to the stages of change in the next section.

Table 2

The processes of change as defined by Prochaska et al. (1994)

Process	Definition
Commitment (a.k.a. Self-Liberation*)	Choosing and committing to act, or belief in ability to change
Consciousness-raising	Increasing information about self and problem
Countering (a.k.a. Counterconditioning*)	Substitution alternatives for problem behaviors
Emotional arousal (a.k.a. Dramatic Relief*)	Experiencing and expressing feelings about one's problems and solutions
Environmental Control (a.k.a. Stimulus Control*)	Avoiding stimuli that elicit problem behaviors
Environmental Reevaluation*	Consideration and assessment by the individual of how the problem affects the physical and social environment*
Helping Relationships	Enlisting the help of someone who cares
Self-Reevaluation	Assessing feelings and thoughts about self with respect to the problem
Social Liberation	Increasing social alternatives for behaviors that are not problematic
Rewards (a.k.a. Reinforcement Management* or Contingency Management**)	Rewarding self, or being rewarded by others, for making changes

Note: *Marcus, Banspach et al., (1992). **Prochaska & Velicer (1997).

A tool known as the Processes of Change Questionnaire (PCQ; Marcus, Rossi et al., 1992) measures the 10 processes and is composed of 39 items. Each item is rated on

a 5-point Likert scale ranging from 1 (never used) to 5 (repeatedly used). This tool has been used in all studies to date that have examined the processes of change (Courneya & Bobick, 2000; Goldberg et al., 1996; Gorely & Gordon, 1995; Jue & Cunningham, 1998; Marcus, Rossi et al., 1992; Nigg & Courneya, 1998) with one exception. In their study of mothers enrolled in the Women, Infants, and Children (WIC) program, Fahrenwald and Walker (2003) measured nine of the processes with the PCQ but measured the process called "helping relationships" with the Social Support for Exercise Scale (SSE). The SSE includes two subscales for measuring both family and friends' support. WIC is a federally funded program for low income women, infants, and children that provides food, nutrition counseling, and access to health resources/services.

Characteristics of the Six Stages of Change

Studies on the TTM and exercise have identified distinctive differences that characterize each stage. These differences include progressively increased levels across stages in areas like participation in exercise, perceptions of social support, enjoyment of exercise, etc. For each stage, there is a specific set of issues that must be addressed by the individual in order for him or her to successfully transition into the next stage. From contemplation to maintenance, risk of relapse is acknowledged if these issues are not addressed (Prochaska et al., 1994).

Precontemplation. In the first stage, known as precontemplation (Prochaska et al., 1994), people are unwilling to consider, let alone commit to, any regular exercise. They may even deny a problem at all. They view suggestions from others to change as pointless or nagging. The following scenario illustrates the mindset of the precontemplator:

> Tara's doctor and some of her friends talk at length about the importance of daily exercise. She thinks that this concept is designed around people who either don't work or who are rich enough to hire a personal trainer to force them to do exercise or both. She is tired when she comes home from work and believes her reward for a long a day at work is putting her feet up and watching television. She usually changes the channel if there is a commercial on it that promotes exercise.

Studies confirm that precontemplators including those who are low income women (Fahrenwald & Walker, 2003), people with disabilities (Kosma et al., 2004), and college students (Myers & Roth, 1997; Naylor et al., 1995; Wyse et al., 1995) do significantly less exercise than individuals in the other stages (Cardinal, 1995a; Clarke & Eves, 1997; Eves et al., 1996; Fahrenwald & Walker, 2003; Kearney et al., 1999; Kosma et al., 2004; Lee, 1993; Marcus & Simkin, 1993; Myers & Roth, 1997; Naylor et al., 1995; Wyse et al., 1995). Studies also show that precontemplators dislike exercise more than individuals in other stages (Clarke & Eves, 1997; Eves et al., 1996; Ingledew et al., 1998; Nguyen et al., 1997) and have greater perceived barriers to exercise (Hellman, 1997; Juniper et al., 2004; Lee, 1993; Myers & Roth, 1997) including lack of social support for exercise (Clarke & Eves, 1997; Hellman, 1997; Kearney et al., 1999; Lee, 1993; Myers & Roth, 1997).

Precontemplators deny their inactivity is a problem (Prochaska et al., 1994). This response is likely to occur because both adults (Hellman, 1997; Kearney et al., 1999; Lee, 1993; Myers & Roth, 1997) and children (Cardinal et al., 1998) in this stage tend to be less knowledgeable than people in other stages about the benefits of exercise.

Individuals can stay in this stage somewhere between 6 months to forever (Prochaska et al., 1994). The actual time spent in this stage is largely related to movement in the "decisional balance" meaning rankings of pros and cons. People in this

stage are said to rate the "cons" of changing their inactivity behavior much higher than the "pros" in their decisional balance and have low self-efficacy for exercise.

Numerous studies done on the TTM and exercise behavior show that cons heavily outweigh the pros in the precontemplator's decisional balance rankings (Eves et al., 1996; Fahrenwald & Walker, 2003; Gorely & Gordon, 1995; Herrick et al., 1997; Kosma et al., 2004; Marcus et al., 1994; Marcus & Owen, 1992; Sarkin et al., 2001). This finding remained consistent despite low socio-economic status (Fahrenwald & Walker, 2003), severe physical disability (Kosma et al., 2004), or being overweight (Sarkin et al., 2001).

Low self-efficacy scores for exercise in this stage are equally supported across studies (Burn et al., 1999; Christopoulou et al., 1996; Gorely & Gordon, 1995; Herrick et al., 1997; Juniper et al., 2004; Marcus et al., 1994; Marcus & Owen, 1992; Marcus, Selby et al., 1992; Sarkin et al., 2001). This finding remained consistent with African-American women (Juniper et al., 2004) and overweight people (Sarkin et al., 2001).

The processes of change that help people transition from precontemplation to contemplation are "consciousness-raising" and "social liberation" (Prochaska et al., 1994). "Consciousness raising" is defined as increasing one's awareness and increasing the amount of information one has about the issue at hand (Prochaska et al., 1994). Television commercials and other kinds of advertisements that boast the benefits of engaging in exercise serve to help raise the consciousness of precontemplators. The other process of change used in this stage is "social liberation" which is defined as societal support/rejection of specific behaviors (Prochaska et al., 1994). "No Smoking" signs indicate smoking is not an acceptable behavior. "Buckle-up" signs on the highway tell us seatbelt use is an acceptable or required social behavior. In the United States Department

of Agriculture's Dietary Guidelines for Americans 2005, the recommendation to engage in at least 30 minutes of exercise on most days of the week indicates that exercise is a desirable behavior. The desired effect of these two processes of change on the precontemplator is to bring the issue to a conscious level allowing them to move into the next stage.

Research aimed at testing the relationship between the stages of change and the processes of change indicates that while "consciousness-raising" and "social liberation" are used in precontemplation, they are not always the most preferred processes for precontemplators. Table 3 shows where the two processes, prescribed by Prochaska et al. (1994) for precontemplators, ranked in relationship to all 10 processes of change across seven studies.

Table 3

A cross study comparison of rankings from the PCQ for the processes of change as prescribed by Prochaska et al. (1994) for the precontemplation stage

Studies	Subjects	SL	CR
Marcus, Rossi et al., 1992	Worksite study	1	5
Gorely & Gordon, 1995	Ages 50-65	N/R	2
Courneya & Bobick, 2000	College students	1	5
Jue & Cunningham, 1998	Bypass patients	3	3
Fahrenwald & Walker, 2003	WIC mothers	4	3
Goldberg et al., 1996	Ages 12 & 17	1	8
Nigg & Courneya, 1998	HS students	7	8

Note. SL = social liberation; CR = consciousness raising; N/R = not reported.

In the precontemplation stage, where "social liberation" should have consistently ranked first or second, it actually ranked anywhere from first to seventh while "consciousness-raising" ranged in ranking from second to eighth. However, scientific knowledge that the use of certain processes are more beneficial to specific stages does not guarantee that behavior in people. In general, many people fail at transforming their exercise behavior simply because they are unaware of what steps should be taken to make a permanent change. However, people in the precontemplation stage are faced with an additional factor involving the desire to change. Those not wanting to change might avoid processes that could cause them to change. In addition, some of the variation in rankings for use of the processes of change may be due to the age differences between the participants in the various studies.

Another possible explanation for the differences in process of change rankings may have to do with group classification. Cardinal (1998) studied two groups of college students across the first five stages of change. The first group had never relapsed into sedentary behavior but the second group had. "Relapse" was identified by a yes or no response to the statement "I have exercised in the past, but I am not doing so currently." The relapsers were significantly different from non-relapsers in that relapsers did not demonstrate the usual gradient pattern of improvement across the stages. Cardinal (1998) speculated that relapsers might also differ in their use of the processes of change. Therefore, the results from the process of change studies above may be confounded because none of the studies controlled for relapsers. However, it is important to note that the term "relapse" was never operationalized. Intuitively, a person who ceases to engage in physical activity due to an injury but plans to return to activity as soon as they recover is categorically different from a person who ceases to engage in physical activity because they no longer choose to engage. Further, duration of cessation should be considered. Taking a 1-2 week break from physical activity is most likely not a relapse, but ceasing activity for 6 months by choice clearly should be defined as relapse.

In addition to the information in Table 3, two items of note are outside of the table. First, in a study by Jue and Cunningham (1998) of coronary artery bypass graft patients who were 60 years of age or older, "commitment" was the process most preferred by all stages across the board. The heavy emphasis on commitment is likely a product of enduring a life-threatening situation. Second, Fahrenwald and Walker (2003) studied mothers in the WIC program. In this study, Fahrenwald and Walker (2003) measured 9 of the processes with the PCQ but measured a process called "helping

relationships" with the Social Support for Exercise Scale (SSE) which includes two subscales that measure family and friends' support. "Helping relationships" emerged as the most commonly used process by all stages across the board. While this finding is likely resulting from the special tool used to measure this process, it may also be due to the fact that all the women in this study were recipients of WIC assistance and therefore may have been more aware of the importance of "helping relationships" because of their association with WIC.

This information raises the following questions with regard to the current study. If a person was raised in an environment where daily exercise was the norm, did that person ever spend time in the precontemplation stage or did the person skip directly to the preparation or action stage? And if so, are transformers more likely to come from that type of upbringing than people in the last 2 years of the maintenance stage? Lastly, are transformers more or less likely to have relapsed in the past than people in the last 2 years of the maintenance stage, and when they relapsed, did they return to the precontemplation stage or a later stage?

Contemplation. In the second stage called contemplation, people consider committing to exercise (Prochaska et al., 1994). "Considering" fairly well defines the stage. Here people do enormous amounts of thinking, considering, contemplating, and information gathering. They talk at length about their intentions. They gather information from print sources, experts in the field, significant others, and the media. The following scenario describes a contemplator:

> Lately, Tara has stopped changing the channel when an exercise commercial or news report is airing. She is beginning to find them interesting. She thinks that next time she sees the doctor she might strike up a conversation about exercise, figuring it can't hurt to get an expert's

opinion. She also no longer scoffs at her friends who ask her to exercise with them. Instead she tells them she might do that sometime.

Perhaps because of the information gathering done in this stage, children ages 5-11 (Cardinal et al., 1998), cardiac rehabilitation patients aged 65 and older (Hellman, 1997), and college students (Myers & Roth, 1997) in this stage were all shown to view exercise as having more benefits to them than people in the precontemplation stage but less than people in the stages to follow. Information gathering may also soften contemplators' views of the barriers to exercise as people in this stage, including African American college women (Juniper et al., 2004) and older adults (Hellman, 1997; Lee, 1993), have fewer perceived barriers to exercise than precontemplators but more than people in the other stages (Clarke & Eves, 1997; Hellman, 1997; Juniper et al., 2004; Lee, 1993; Myers & Roth, 1997). Similarly, contemplators believe they have more social support for exercise than precontemplators do but less than the following three stages (Clarke & Eves, 1997; Hellman, 1997; Nguyen et al., 1997).

In general, contemplators do not act on any of the information they have gathered until they have transitioned into the next stage which may leave an impression of procrastination. However, contemplators, including those who are overweight (Sarkin et al., 2001), participate in exercise more than precontemplators but participate less than people in the remaining stages, (Burn et al., 1999; Cardinal 1995a; Eves et al., 1996; Marcus & Simkin, 1993; Naylor et al., 1995; Sarkin et al., 2001; Wyse et al., 1995), and they dislike exercise less than precontemplators but more than people in the other stages (Clarke & Eves, 1997; Eves et al., 1996).

The contemplator generally plans to engage in exercise within the next 6 months or so. However in reality, the contemplator can stay in this stage anywhere from 6

months to forever. Contemplators, including low income status women (Fahrenwald & Walker, 2003), severely disabled people (Kosma et al., 2004), and over weight people (Sarkin et al., 2001) still tend to rank the cons of exercise higher than the pros but not as heavily as they did in the previous stage (Herrick et al., 1997; Marcus & Owen, 1992). Self-efficacy for exercise is still low for contemplators, but this too begins to improve over the previous stage (Burn et al., 1999; Christopoulou et al., 1996; Gorely & Gordon, 1995; Herrick et al., 1997; Juniper et al., 2004; Kosma et al., 2004; Marcus, Selby et al., 1992; Marcus & Simkin, 1994; Sarkin et al., 2001). This increase in self-efficacy is consistent across groups including African American college women (Juniper et al., 2004), severely disabled people (Kosma et al., 2004), overweight people (Sarkin et al., 2001), and older adults (Gorely & Gordon, 1995).

The processes of change presumed to help the contemplator move into the next stage are "consciousness raising," "social liberation," "emotional arousal," and "self-reevaluation" (Prochaska et al., 1994). In this stage, "consciousness raising" and "social liberation" are used to continue to increase awareness and provide fodder in the decisional balance. "Emotional arousal," which comes from dramatic, emotionally-charged events, is used for motivation in this stage (Prochaska et al., 1994). "Emotional arousal" for exercise might be the inability to keep up with children or grandchildren or watching a significant other deal with a health problem that is related to inactivity.

The next process of change in this stage is "self-reevaluation" which is the emotional and cognitive appraisal of both one's problem and one's self (Prochaska et al., 1994). During this exercise, people compare the things they value and admire to their current behavior and discover that there are inconsistencies between what they value and

what they do. This realization combined with the information gathered during consciousness raising activities causes people to begin weighing the pros and cons of ceasing their inactivity.

Research designed to test the relationship between the stages of change and the processes of change indicates that contemplators use the prescribed processes more often than in the previous stage, but inconsistencies in degree of reliance on the processes were still present. Table 4 shows where the four processes, prescribed by Prochaska et al. (1994) for contemplators, ranked in relationship to all 10 processes of change across seven studies. The table reveals that "self-reevaluation" ranked well within the top four and "consciousness raising" generally followed that same trend of rankings between studies with two exceptions that may have to do with age/maturity factors. However, "social liberation" and "emotional arousal" had a less consistent trend between studies and the rankings tended to fall outside of the top four.

Again, discrepancies between the actual processes used by contemplators versus those prescribed for contemplators may be due to level of the individual's commitment to change, knowledge of how to change successfully, age differences, or presence of relapsers in the groups (Cardinal, 1998). Inconsistencies may also be an issue of length of time one has been in the contemplation stage. Contemplators who have just transitioned from precontemplation may not yet be using all the processes designated for that stage. The answer is not clear, but what is clear is that when the "pro" list grows and becomes more equally balanced with the con list, the individual is ready to move into the next stage.

Table 4

A cross study comparison of rankings from the PCQ for the processes of change as prescribed by Prochaska et al. (1994) for the contemplation stage

Studies	Subjects	SR	CR	SL	EA
Marcus, Rossi et al., 1992	Worksite study	1	3	4	6
Gorely & Gordon, 1995	Ages 50-65	1	3	N/R	N/R
Courneya & Bobick, 2000	College students	1	3	7	6
Jue & Cunningham, 1998	Bypass patients	2	3	5	9
Fahrenwald & Walker, 2003	WIC mothers	2	4	6	8
Goldberg et al., 1996	Ages 12 & 17	1	6	3	2
Nigg & Courneya, 1998	HS students	1	6	4	7

Note. SR = self-reevaluation; CR = consciousness raising; SL = social liberation; EA = emotional arousal; N/R = not reported.

This information raises the following questions with regard to the current study. First, do people who were raised in an environment where daily exercise was the norm ever spend time in the contemplation stage or do they skip directly to the preparation or action stage? And if so, are transformers more likely to come from that type of upbringing than people in the last 2 years of the maintenance stage? Second, if relapse was accurately measured, are transformers more or less likely to have relapsed than people in the last 2 years of the maintenance stage, and when they relapse, do they return to the contemplation stage or a later one? And finally, how does this relapse pattern impact their use of the processes of change?

Preparation. In this stage, people prepare to take part in exercise, generally within a month's time (Prochaska et al., 1994). During this stage, individuals have trial runs with the activity, engaging in it for short periods of time from 1 day to 1 week. They do extensive planning and set goals for themselves. The time spent exploring issues and obstacles that may cause the individual to fail and finding solutions for them is critically important to preventing relapse. An example of failure due to improper preparation is detailed in the following scenario:

> Tara has decided that she is going to join her friends in their workout program soon. She has even gone out and purchased gym shoes. However she hasn't made any firm plans as to a starting date. Saturday morning she wakes and notices that it is a beautiful sunny day. She decides that today she will start her exercise program by going jogging. After she returns from her run she thinks, "I'm going to do this every morning." On Sunday, she wakes up to find it raining and decides to watch television instead. She doesn't exercise Monday either nor the rest of the week. She is left with a feeling of failure and decides she isn't ready for exercise yet.

In this scenario, Tara failed to do proper planning. In her zeal to begin a fitness program, she forgot to examine the possible barriers to her success. Had she spent time examining potential pitfalls, she would have already had a contingency plan in place for dealing with barriers like inclement weather.

Studies show that preparers, including cardiac rehabilitation patients age 65 and over (Hellman, 1997), college students (Cardinal 1995b; Naylor et al., 1995; Wyse et al., 1995), and overweight people (Sarkin et al., 2001), engage in exercise more frequently and more intensely than precontemplators and contemplators, but less so than actors or maintainers (Cardinal, 1993; Cardinal 1995a; Clarke & Eves, 1997; Eves et al., 1996; Hellman, 1997; Naylor et al., 1995; Sarkin et al., 2001; Wyse et al., 1995). Preparers also dislike exercise less than precontemplators and contemplators but more than actors and

maintainers (Clarke & Eves, 1997, Eves et al., 1995). In addition, they begin to show some commitment to exercise (Prochaska et al., 1994), which could be a monetary commitment like the purchase of gym memberships, equipment, and gear, or a time-related commitment such as scheduling breaks for exercise. This new willingness to commit money or time makes sense because preparers, including children 5-11 (Cardinal et al., 1998), college students (Myers & Roth, 1997), and cardiac rehabilitation patients age 65 and over (Hellman, 1997), all perceived more benefits to exercise than precontemplators and contemplators but less than actors and maintainers. Commitment also makes sense in this stage because the pros and cons for exercise in the preparation stage become more evenly balanced for severely disabled people (Kosma et al., 2004) and the pros tending slightly to outweigh the cons for low income women (Fahrenwald & Walker, 2003), overweight people (Sarkin et al., 2001), and people from the United States and Australia (Marcus & Owen, 1992). In addition, self-efficacy for exercise continues to rise for all subject groups (Burn et al., 1999; Christopoulou et al., 1996; Herrick et al., 1997; Marcus & Owen, 1992; Marcus, Selby et al., 1994) including African American college women (Juniper et al., 2004), older adults (Gorely & Gordon, 1995), severely disabled people (Kosma et al., 2004), and overweight people (Sarkin et al., 2001). Social support for exercise also increases (Clarke & Eves, 1997; Hellman, 1997; Myers & Roth, 1997) while barriers to exercise diminish from the previous stages (Clarke & Eves, 1997; Hellman, 1997; Juniper et al., 2004; Myers & Roth, 1997).

Preparers also set goals and do planning to sort out when, where, and how they will address their goals which is important for preventing relapse (Prochaska et al., 1994). This activity is reflected in the processes of change for this stage. The processes of

change used in preparation are "consciousness raising," "social liberation," "emotional arousal," "self-reevaluation," "environmental reevaluation" (Marcus, Rossi et al., 1992), and "commitment."

In preparation, "consciousness raising" takes a slightly different form. Its primary function is to provide information that will help the individual select the most appropriate course of action, e.g., which type of fitness activity best fits personal interests, time constraints, and expendable income. "Self-reevaluation" is also applied differently in that the individual begins to shift his or her focus to future possibilities rather than on past behaviors, e.g., "I know I don't like to exercise outdoors in bad weather, so I will plan for some indoor alternatives just in case."

The processes of change new to this stage are "environmental reevaluation" and "commitment." In "environmental reevaluation," one assesses the impact of one's behavior on others. For instance, an out-of-shape parent who limits his or her children's engagement in physical activities because that parent tires easily might feel that he or she is negatively affecting the child. Recognizing the impact of one's behavior on another might provide the motivation to become physically fit. The second new process of change for this stage, called "commitment," can come in a number of forms. "Commitment" might be setting a date, e.g., "I will begin exercising next Monday," or making a financial investment in gym memberships. Once a thorough plan is in place, the preparer is more likely to be successful in the action stage.

Research aimed at testing the relationship between the stages of change and the processes of change indicates that preparers use the prescribed processes about as often as in the previous stage with about half of the processes meeting expectations for use.

Table 5 shows where the six processes prescribed by Prochaska et al. (1994) for preparers ranked in relationship to all 10 processes of change across seven studies. The table shows that the expected ratings occurred for "self-reevaluation," "commitment," and largely for "social liberation." However, "consciousness raising," "environmental reevaluation," and "emotional arousal" did not meet expectations. Again, the possible reasons for these inconsistencies include the level of one's commitment to change, length of time one has been in the preparation stage, knowledge of how to change successfully, or presence of relapsers in the groups (Cardinal, 1998).

Table 5

A cross study comparison of rankings from the PCQ for the processes of change as prescribed by Prochaska et al. (1994) for the preparation stage

Studies	Subjects	CM	SR	SL	CR	ER	EA
Marcus, Rossi et al., 1992	Worksite study	2	1	4	3	7	9
Gorely & Gordon, 1995	Ages 50-65	1	3	N/R	5	N/R	N/R
Courneya & Bobick, 2000	College students	2	1	8	6	5	7
Jue & Cunningham, 1998	Bypass patients	1	3	3	7	9	8
Fahrenwald & Walker, 2003	WIC mothers	3	2	5	3	6	9
Goldberg et al., 1996	Ages 12 & 17	2	1	3	8	7	4
Nigg & Courneya, 1998	HS students	1	2	6	7	5	8

Note. CM = commitment; SR = self-reevaluation; SL = social liberation; CR = consciousness raising; ER = environmental reevaluation; EA = emotional arousal; N/R = not reported.

This information raises the following questions with regard to the current study. First, has a person raised in an environment where daily exercise was the norm ever spent time in the preparation stage or did he or she skip directly to the action stage? Ergo, are transformers more likely to be people who never experienced precontemplation, contemplation, or preparation? And if so, has any real change occurred? Second, given that relapsers behave differently than non-relapsers in the same stage and that relapse was correctly identified, are transformers more or less likely to have relapsed in the past than people in the last 2 years of the maintenance stage, and when they relapsed, did they return to the preparation stage or an earlier one? Third, does this relapse pattern impact

the use of the processes of change that are necessary to stage transition? Finally, do the low ratings for the process of change called "environmental reevaluation," in which one assesses the impact of one's behavior on others, indicate the presence of intrinsic motivation, hence rendering the perception that others' opinions are less important?

Action. This stage is busy and unstable with a high risk for relapse, particularly if not enough time was spent in the preparation stage (Prochaska et al., 1994). In this stage, the individual starts to implement the plans made during the previous stage and engages in his or her chosen activity. An example of failure that can occur due to a shortened preparation stage is detailed in the following scenario:

> Tara learned from her past failure and knows now that she needs to have a backup plan for inclement weather. She now plans to work out with an exercise video when the weather is not favorable for outdoor exercise, and she has an exercise partner to help keep her motivated. She begins her exercise program in June and is successful in maintaining regular exercise until August. In August, her exercise partner goes on vacation. Tara struggles to remain motivated while her partner is gone. Upon her return, Tara learns her workout partner broke her leg and will not be returning to exercise for some time. Tara decides she does not enjoy exercising alone and decides to quit her exercise routine until her partner can return.

Although Tara was prepared with tools to combat some of her barriers to exercise, she had not fully considered all the possible issues that could bar her success. More time spent in the preparation stage would have helped her find a social support system that would not derail her work out and would have helped her to establish motives beyond socialization for sustaining exercise.

Studies show that actors, including college students (Cardinal, 1995b; Naylor et al., 1995; Wyse et al., 1995), cardiac rehab patients age 65 and over (Hellman, 1997), and overweight people (Sarkin et al., 2001), engage in exercise more than people in the previous stages but less than people in the maintenance stage (Burn et al., 1999; Cardinal,

1993; Cardinal, 1995a; Eves et al., 1996). All groups studied, including African American college women (Juniper et al., 2004), severely disabled people (Kosma et al., 2004), older adults (Gorely & Gordon, 1995) and overweight people (Sarkin et al., 2001) had higher self-efficacy for exercise than those in precontemplation, contemplation, or preparation (Burn et al., 1999; Christopoulou et al., 1996; Herrick et al., 1997; Marcus & Owen, 1992; Marcus, Selby et al., 1994).

Actors also perceived more benefits to exercise (Cardinal et al., 1998; Hellman, 1997; Myers & Roth, 1997) and fewer barriers to exercise (Hellman, 1997; Juniper et al., 2004; Myers & Roth, 1997) than previous stages. In addition, they enjoyed exercise more than in previous stages (Eves et al., 1996). For all groups studied including low-income women (Fahrenwald & Walker, 2003), older adults (Gorely & Gordon, 1995), severely disabled people (Kosma et al., 2004), and overweight people (Sarkin et al., 2001), the pros simply outweighed the cons for exercise (Eves et al., 1996; Herrick et al., 1997; Marcus & Owen, 1992).

Many tools are needed to help the actor stay focused on his or her goals. The processes of change used in this stage are "social liberation," "commitment," "countering," "environmental control," "rewards," and "helping relationships." In this stage, "social liberation" takes on a confirmatory role, helping to remind the actor that what he or she is attempting is valid and worthwhile. The role of "commitment" changes by becoming more traditional, taking on the form of sheer willpower. In this process, some individuals will have daily, pre-exercise "pep-talks" to remind themselves of their goals and purpose in order to maintain focus and avoid relapse.

The first new process used in this stage is called "countering." "Countering" is used to replace a problem behavior with a healthy response. One example of a problem behavior related to inactivity might be watching television. If an individual identified television watching as one of the biggest barriers to exercising, he or she would want to establish a method for dealing with this temptation. To counter, an individual might employ one of the following options: limit television time or go to the gym directly from work, thereby eliminating the temptation to skip exercise and watch television instead.

The second new process in this stage is named "environmental control." In "environmental control," one attempts to eliminate temptations that might cause a relapse. Using "environmental control," the television issue above might be addressed by disconnecting the cable/satellite service or selling the television. "Environmental control" can also refer to relationships. In this stage, the actor may choose to avoid people who are sedentary or who might criticize attempts at betterment.

The third process used in this stage, termed "reward," is used to reinforce the exercise behavior. "Rewards" also help the individual stay focused on small, readily achievable steps rather than on the potentially overwhelming big-picture.

In the fourth new process, called "helping relationships," significant others become critically important. Here one might ask family members or roommates to ask daily about how the exercise routine is progressing. One might also find a workout partner or personal trainer to help with motivation.

Research aimed at testing the relationship between the stages of change and the processes of change indicates that actors use the prescribed processes much like the previous two stages. Table 6 below shows where the six processes prescribed by

Prochaska et al. (1994) for actors ranked in relationship to all 10 processes of change across seven studies. Again because there are six processes prescribed for this stage, one would expect to find actors ranking their use of each of these six processes somewhere in the top 6 of the 10 total processes, but again only half of the processes met expectations. "Commitment," "countering," and "reward" all met expectations by ranking in the top six of all processes used by actors, but "social liberation," "helping relationships," and "environmental control" did not. Furthermore, "helping relationships" and "environmental control" ranked nearly last among all processes. The ranking of "helping relationships" is particularly perplexing because several studies found that actors believe they have more social support than do precontemplators, contemplators, and preparers (Hellman, 1997; Kearney et al., 1999; Myers & Roth, 1997). The inconsistencies may be related to the length of time one has been in the action stage and knowledge of how to change successfully.

Table 6

A cross study comparison of rankings from the PCQ for the processes of change as prescribed by Prochaska et al. (1994) for the action stage

Studies	Subjects	CM	CT	R	SL	HR	EC
Marcus, Rossi et al., 1992	Worksite study	1	3	5	6	7	10
Gorely & Gordon, 1995	Ages 50-65	2	3	N/R	N/R	N/R	4
Courneya & Bobick, 2000	College students	2	3	4	8	9	10
Jue & Cunningham, 1998	Bypass patients	1	2	5	6	8	9
Fahrenwald & Walker, 2003	WIC mothers	3	4	6	10	1	9
Goldberg et al., 1996	Ages 12 & 17	2	5	4	3	9	10
Nigg & Courneya, 1998	HS students	1	3	4	7	9	10

Note. CM = commitment; CT = countering; R = rewards; SL = social liberation; HR = helping relationships; EC = environmental control; N/R = not reported.

This information raises the following questions with regard to the current study. First, if a person was raised in an environment where daily exercise was the norm, does that person have a different view of "helping relationships"? In other words, are "helping relationships" for exercise so much a part of everyday life for someone who was raised in a household that engaged in daily exercise that those relationships are taken for granted, or does this lack of emphasis on "helping relationships" in some way hint at strong intrinsic motivation? And if so, are transformers more likely to come from a household that engaged in daily exercise than people in the last 2 years of the maintenance stage? Finally, although Cardinal (1998) indicated that relapse could occur in this stage, his conclusions are suspect because in order to be classified as "relapsed" in the action stage,

one must simultaneously agree with the statement "I currently exercise on a regular basis, but have only begun doing so within the past 6 months" which is required to be classified in the "action" stage and agree with the statement "I have exercised regularly in the past, but am not doing so currently" which is required to be considered relapsed. It is not possible for these things to occur at the same time. Hence, we do not know what role relapse might play in the findings.

Maintenance. Once the individual has successfully completed the action stage, he or she is in the maintenance stage (Prochaska et al., 1994). The maintenance stage is a relatively stable stage where people have continually engaged in exercise for a period of time between 6 months to 5 years but are still somewhat susceptible to temptation and, hence, relapse. Here, the individual continues to work on exercise goals until temptation to be sedentary is no longer a threat. An example of failure that can occur due to a shortened preparation stage is detailed in the following scenario:

> Tara has learned from her past failure and knows now that she cannot be reliant on an exercise partner for motivation. As before, she plans to work out with an exercise video when the weather is not favorable for outdoor exercise. She also has set aside a scheduled time each day for her exercise, and although she exercises alone, has social support from both family and friends which helps her stay motivated. She begins her exercise program in April and remains faithful to the plan through November. However, the month of November proves to be mostly inclement which forces Tara to exercise with her video nearly every day. Her video exercises, which at one point provided a nice break from her outdoor exercises, have now become boring to her due to the repetition. She finds herself dreading her planned exercise time. One morning, she decides to quite exercising altogether rationalizing to herself that exercise is over-rated and that she would rather spend her time doing something enjoyable like sleeping in.

Although Tara was prepared with tools to combat the barriers to exercise she had previously encountered, she had not fully considered all the possible issues that could bar

her success. More time spent in the preparation stage would have helped her identify issues of boredom and how to manage them.

Studies show that maintainers, including older adults (Hellman, 1997), college students (Cardinal, 1995b; Naylor et al., 1995; Wyse et al., 1995), and overweight people (Sarkin et al., 2001), engage in exercise more than the previous stages (Burn et al., 1999; Cardinal, 1993; Cardinal, 1995a; Eves et al., 1996). Maintainers who are children (Cardinal et al., 1998), college students (Myers & Roth, 1997), and older adults (Hellman, 1997) also perceive more benefits to exercise than previous stages. In addition, maintainers, including African American women (Juniper et al., 2004) and cardiac rehabilitation patients age 65 or older (Hellman, 1997), perceive fewer barriers to exercise (Kearney et al., 1999; Myers & Roth, 1997). Overall, maintainers enjoy exercise more than previous stages (Eves et al., 1996).

Based on this information, it is no surprise then that, despite low-income (Fahrenwald & Walker, 2003) or severe disability (Kosma et al., 2004), the pros heavily outweigh the cons for maintainers (Gorely & Gordon, 1995; Marcus & Owen, 1992). Nor is it a surprise that self-efficacy for exercise is at its highest in this stage (Burn et al., 1999; Christopoulou et al., 1996; Herrick et al., 1997; Marcus & Owen, 1992; Marcus et al., 1994), which remains true regardless of whether the adults studied were severely disabled (Kosma et al., 2004), overweight (Sarkin et al., 2001), or older (Gorely & Gordon, 1995).

When temptation to relapse is no longer a threat, the exercise behavior is considered to be transformed and therefore permanent. However, some individuals never transition into the transformation stage and are considered to be "long term maintainers"

because they have maintained their engagement in exercise for 5 years or more but are not 100% confident they will always be able to sustain exercise which leaves them prone to temptation for relapse (Cardinal & Levy, 2000).

The processes of change used in this stage are similar to the previous stage with the exception of "social liberation" which is no longer salient. The one major threat to relapse for the maintainer is over-confidence. Maintainers may mistakenly believe their exercise behaviors are permanent and that a break in their routine will have no impact on adherence which can set off a relapse period (Prochaska et al., 1994).

Research aimed at testing the relationship between the stages of change and the processes of change indicates that maintainers use the prescribed processes somewhat more than the previous stages. Table 7 shows where the five processes prescribed by Prochaska et al. (1994) for maintainers ranked in relationship to all 10 processes of change across seven studies. An examination of Table 7 reveals that "commitment," "countering," and "rewards" all received rankings within the top five as expected, but "helping relationships" and "environmental control" both ranked among the least used processes. This phenomenon is most curious. Maintainers should be all but ready to commit to exercise for life, so one would expect them to be using all the processes for this stage with gusto. Instead, two of the prescribed processes rank near the bottom of the list in terms of use.

Table 7

A cross study comparison of rankings from the PCQ for the processes of change as prescribed by Prochaska et al. (1994) for the maintenance stage

Studies	Subjects	CM	CT	R	HR	EC
Marcus, Rossi et al., 1992	Worksite study	1	2	4	7	10
Gorely & Gordon, 1995	Ages 50-65	2	1	N/R	N/R	4
Courneya & Bobick, 2000	College students	2	1	5	8	10
Jue & Cunningham, 1998	Bypass patients	1	2	5	7	9
Fahrenwald & Walker, 2003	WIC mothers	2	4	7	1	9
Goldberg et al., 1996	Ages 12 & 17	1	2	5	9	10
Nigg & Courneya, 1998	HS students	1	2	4	9	10

Note. CM = commitment; CT = countering; R = rewards; HR = helping relationships; EC = environmental control; N/R = not reported.

This information raises the following questions/issues with regard to the current study. First, it appears that maintainers either underestimate the importance of the process of change called "helping relationships," take "helping relationships" for granted, or they are not using this tool to its fullest. The underestimating or taking for granted of "helping relationships" could also mean that maintainers have strong intrinsic motivation and therefore do not view "helping relationships" highly because their internal motives take center stage. Taking "helping relationships" for granted might also indicate that maintainers come from families that supported engagement in exercise. Another possibility is that these maintainers are not ready for transformation or that they are headed for relapse. A further possibility is that because the original stage of change

measure did not screen for transformers, transformers may have been included in the maintainer group. Mis-assignment is possible because inclusion into the maintainer group requires only that one have exercised for more than 6 months. Without a cap on years defining a maintainer, a transformer of 12 years could be included in the maintainer group thereby skewing the rankings. In addition, by failing to provide a cap on the number of years active, the possibility exists that some of the "maintainers" may in fact be physical activity "lifers" who have never been sedentary, never experienced change with regard to physical activity, and should not be included in the maintainer group.

Length of time issues may exist within the accepted years-active range for maintainers as well. For instance, 6-month maintainers may respond differently to the "helping relationship" process than those who have been in the stage for 3-5 years. A final possibility is that the ranking issues regarding "helping relationships" are due to the presence of the long-term maintainers as defined by Cardinal and Levy (2000).

Similar questions can be raised about the process of change called "environmental control." For instance, are maintainers who forgo the use of this process over-confident and hence headed for relapse? Or are low rankings for "environmental control" also an indicator of the length of time maintainers have been in their stage or evidence of long-term maintainers or transformers within the group? One of the reasons we do not know the answers to these questions is that no study on exercise and the TTM has reflected on the progress of an individual as they transition through the stages into maintenance and transformation.

Finally, although Cardinal (1998) indicated that relapse could occur in this stage, his conclusions are questionable because in order to be identified as a maintainer who had

relapsed, one must agree with the statement "I currently exercise on a regular basis, and have been doing so for longer than 6 months" which is required to be classified as a maintainer and while at the same time agreeing with the statement "I have exercised regularly in the past, but am not doing so currently" which is required to be considered relapsed. Clearly, these two statements cannot occur at the same time. Hence, we do not know what role relapse might also play in these results.

Long-term maintenance. Cardinal and Levy (2000) found that people who had exercised for 5 or more years were not automatically transformers. The key issue in transformation of a behavior is that it becomes permanent and is unchangeable. This permanence was measured by the degree of confidence one had in his or her ability to maintain exercise behaviors for life. Transformers should be 100% confident that they can maintain exercise behaviors for life. However, Cardinal found that some people who had exercised for 5 years or more were not 100% confident in their ability to maintain exercise behavior.

Cardinal and Levy (2000), using Cardinal's (1999) participants, reclassified individuals to reflect an additional stage called long-term maintainer. The criteria for inclusion in this new stage was that the individuals had exercised for 5 or more years, but were not 100% confident in their ability to maintain exercise behavior. Cardinal and Levy (2000) concluded that this group was in fact a new stage group because the group differed significantly from both maintainers and transformers in role modeling attitude, and they differed from maintainers in their self-perceived fitness level and BMI. An example of a long-term maintainer is offered in the following scenario:

> Tara has learned from her past failures and has a plan to combat all barriers in her path. She has been exercising for 11 years, yet she still

> feels like she has to force herself to meet her commitment to exercise. She scoffs at co-workers who are impressed with her exercise record because she does not feel successful. In truth, she does not believe she can continue to exercise for the rest of her life, nor is she sure she wants to. She says jokingly to her friends that when she retires she will quit exercising and eat cheesecake. Deep inside she thinks this sounds like a pretty good plan.

Although Tara is prepared with tools to combat the barriers to exercise she had previously encountered, she is not fully committed to life-long exercise nor does she view herself as a role model which under Cardinal and Levy's (2000) method require her to be labeled a long-term maintainer.

Transformation. The term "transformation" (Cardinal, 1999) will be used in place of "termination" (Prochaska et al., 1994) in this discussion because "termination" does not accurately describe the permanent adoption of exercise. People in the transformation stage are said to regularly engage in exercise and will never relapse (Prochaska et al., 1994). According to Prochaska et al. (1994), the characteristics of transformers include a new self-image, no temptation of any kind to relapse into their old behaviors, strong self-efficacy, and a generally healthier lifestyle. However, very few studies have investigated exercisers in the transformation stage. An example of a transformer is offered in the following scenario:

> Tara learned long ago how to combat barriers to exercise adherence. Now those potential barriers are no longer an issue. That is because she loves exercising and believes it is a part of "who she is" as a person. She has been exercising for 8 years, and gladly gives advice to others who are struggling to adhere. She looks forward to retirement so that she can spend more time engaging in exercise activities.

Tara has successfully transformed because she used the correct processes of change at the appropriate times which helped her move through the stages of change and become a successful adherent to exercise.

Some studies that have focused on exercisers in the transformed stage (Cardinal, 1999; Cardinal & Levy, 2000) also suggest that transformers have accepted a new self-image as a role model. This idea was tested through a modified version of the Stage of Physical Activity Algorithm (Cardinal, 1999) which included all six stages of change defined by Prochaska et al. (1994). This new version was needed because the transformed stage had been excluded from previous stage algorithms. The participants in Cardinal's (1999) study were 551 members of a state specific sub-group of the Association for Health, Physical Education, Recreation, and Dance (AHPERD), more than half of which were female (61.6%), and were, 40.2 (SD=11.4) years of age. Cardinal (1999) measured the transformed stage based on Prochaska et al.'s (1994), characteristics of transformers which included new self-image, no temptation of any kind to relapse into sedentary behaviors, strong self-efficacy, and a generally healthier lifestyle. To reflect the lack of temptation and strong self-efficacy aspects of transformed behavior, Cardinal (1999) added a question to an existing stage of change algorithm about the percent of confidence the exerciser had that he or she could maintain his or her current level of physical activity for the remainder of his or her life. Peripheral to the algorithm, Cardinal (1999) tested the exercisers' attitude toward role modeling as it related to Prochaska et al.'s (1994) criterion for transformers of a "new self image." Because Cardinal's (1999) study was conducted with a state level group of AHPERD members, he used a tool to measure role-modeling attitudes as it related to them professionally. Cardinal (1999) found that there was a significant difference between maintainers and transformers in exercise METS and role modeling attitudes. In contrast, Kearney et al. (1999) found that precontemplators were more likely to label themselves

as "not the sporty type" or "too old" to engage in exercise which in turn lends credence to the role that self-image might play in the transformed stage.

This issue of transformed behavior was later examined in two other studies. These studies did not use "percent of confidence" to categorize transformers (Fallon, 2004; Fallon & Hausenblas, 2001). The results of these studies showed that transformers had significantly higher levels of confidence to overcome barriers to exercise than did maintainers (Fallon, 2004; Fallon & Hausenblas, 2001) and less temptation not to exercise (Fallon, 2004). In addition, transformers engaged in significantly more strenuous (Fallon, 2004; Fallon & Hausenblas, 2001) and total exercise (Fallon & Hausenblas, 2001) and had lower Body Mass Index (BMI) than maintainers (Fallon & Hausenblas, 2001).

One fault with all 4 of the studies that researched the transformed stage was that none of them provided any assurance that the people they were measuring as "transformed" actually changed from sedentary into active lives. This is a problem because if one was raised in an environment where daily exercise was the norm and never ceased to be physically active, it is difficult to determine when or whether any real "change" occurred. Certainly non-smokers are not transformed for smoking, nor are non-drinkers transformed for alcoholism. Therefore, proven "lifers" for physical activity adherence should not be included in the transformed category.

Bandura (1997) argues that true stage theories show transformation across stages that are invariant in sequencing and nonreversible. Cardinal (1999) countered that if a true transformed stage exists from which individuals would never relapse, the nonreversibility issue would no longer be valid. Cardinal (1999) and Cardinal and Levy

(2000) offer evidence that a true transformed stage does exist. This stage, classified by involvement in exercise for 5 years or more and 100% confidence in the ability to maintain that activity for life, was significantly different from the maintenance stage for both Exercise METS and role modeling. These studies also show that while exercise transformers are a small segment of the population, 16.6% (Cardinal, 1999) and 15.1% (Cardinal & Levy, 2000), the percentages for exercise transformers are consistent with those for other behavior changes, e.g., 15% for smoking cessation and 17% for overcoming substance abuse (Prochaska & Markus, 1994).

Relationships: The Transtheoretical Model and Intrinsic Motivation

While the majority of the studies using the TTM fit nicely into "stage of change" discussions, a handful of studies are more clearly interpreted outside of the "stage" discussions. These studies do not fit into the previous "stage of change" discussions because the studies used the "stages of change" framework for testing other theories. The advantage of testing other theories in the "stages" framework is that it highlights limitations of strict adherence to any one model (Nguyen et al., 1997).

Intrinsic Motivation. Intrinsic motivation theories, like Cognitive Evaluation Theory, have been studied at length and have provided some answers to the question of adherence to exercise. According to Deci and Ryan (1985), individuals engage in activities to satisfy their need for competence and self-determination. Competence is tested and proven when people engage in activities that are optimally challenging. Activities are deemed optimal challenges if engaging in them helps to correct incongruities in a person's existence. This concept applies to general fitness activities in the following manner. If an individual desires to live a healthy, independent life and he

or she knows that physical fitness is required to reach this goal but he or she does not engage in physical fitness, an incongruity exists for that person. If the individual chooses to address the incongruity via engagement in physical activity, he or she should be intrinsically motivated to do it because engagement in physical activity will help to reduce the incongruity, thereby proving competence. However, there is no guarantee that initiating a behavior aimed at reducing incongruity will automatically lead to intrinsic motivation because the need of self-determination must also be satisfied. Self-determination is a person's need to have control/choice over their decisions/actions.

Several studies indicate that when a person believes that he or she controls his or her choices, intrinsic motivation is stronger than if an individual believes he or she has no choice (Deci & Ryan, 1985; Swann & Pittman, 1977; Zuckerman, Porac, Lathin, Smith, & Deci, 1978). Choice may be salient to individuals engaging in general fitness activities because many of them may be motivated by extrinsic reasons. For instance, an individual may participate in an activity per a doctor's order, due to the cajoling of a significant other, or to follow a peer group. Any of these scenarios could leave an individual feeling like he or she had no true choice, hence eroding intrinsic motivation and long term participation.

However, Weiss and Chaumeton (1992) argue that, in many of the initial studies on intrinsic motivation, participants were given activities that were inherently interesting to them i.e., children doing puzzles. They further suggest that if an activity is not inherently interesting to the individual, he or she may need external motivation like rewards, status, or social support in order to participate (Weiss & Chaumeton, 1992).

Studies on intrinsic motivation and the stages of change illustrate some interesting relationships between the two theories. First, Mullan and Markland (1997) found that actors and maintainers were significantly more self-determined than precontemplators/contemplators and preparers. Ingledew et al. (1998) found that preparers and actors were motivated by Appearance/Weight, which was equated with extrinsic motives, while maintainers were motivated by Enjoyment/Revitalization, which was equated with intrinsic motives. This finding indicates that there is a relationship between intrinsic motivation and stage progression.

This information raises some interesting questions with regard to the current study. Did people in the transformation stage always have intrinsic motivation? If not, when, how, and why did it change? Investigating the background of maintainers and transformers and determining whether they have always been intrinsically motivated is important to fully understanding how transformation of exercise evolves.

Conclusion

The TTM and the studies that have sprung from this theory have provided a detailed account of the activities that take place while people are attempting to modify their exercise behaviors, but few studies have investigated exercisers in the transformation stage, the final stage of change occupied by those who have no temptation to relapse into sedentary behaviors (Prochaska et al., 1994). From other research on exercise adherence and participation, one can infer that transformers should have the following characteristics: intrinsic type goals (Deci & Ryan, 1985), commitment to the activity (Prochaska et al., 1994), and a high level of enjoyment derived from the activity (Buonamano et al., 1995; Ewing & Seefeldt, 1988; Gill et al., 1983; Gould et al., 1985;

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Gould et al., 1982; Klint & Weiss, 1986; Koivula, 1999; Sapp & Haubenstricker, 1978; Weiss & Chaumeton, 1992; Wold & Kannas, 1993).

From studies done on the TTM, we know that transformers have a sense of identity tied to the activity (Cardinal, 1999; Cardinal & Levy, 2000). We also know that maintainers are intrinsically motivated (Ingledew et al., 1998; Mullan & Markland, 1997), are committed to the activity (Courneya & Bobick, 2000; Fahrenwald & Walker, 2003; Goldberg et al., 1996; Gorely & Gordon, 1995; Jue & Cunningham, 1998; Marcus, Rossi et al., 1992; Nigg & Courneya, 1998), and derive a high level of enjoyment from the activity (Eves et al., 1996). In addition, we know that maintainers tend to under-use two important processes of change: "helping relationships" (Courneya & Bobick, 2000; Goldberg et al., 1996; Jue & Cunningham, 1998; Marcus, Rossi et al., 1992; Nigg & Courneya, 1998) and "environmental control" (Courneya & Bobick, 2000; Fahrenwald & Walker, 2003; Goldberg et al., 1996; Jue & Cunningham, 1998; Marcus, Rossi et al., 1992; Nigg & Courneya, 1998).

What we do not know about maintainers and transformers is whether they began the change process with intrinsic goals and likewise, whether they always enjoyed their activity. In addition, there is no indication from any of the research whether personal upbringing impacts transformation or whether ritualization is an issue in transformation. Further, we do not know whether the under-use of "helping relationships" and "environmental control" impacts transformation.

Chapter 3

METHODS

The design of this study was phenomenological. Phenomenology holds that truth and understanding can emerge from examining people's lived experiences (Byrne, 2001). Phenomenological methods are used to "discover the shared lived experiences of one quality or phenomenon in others" (McCaslin & Wilson-Scott, 2003, p. 450). The phenomena of interest were the exercise behaviors of older women in the stages of maintenance and transformation. Because this study was about influence of life experiences on long-term exercise adherence, women across several decades of life were studied.

Participants

A total of 10 women who were classified as either late-in-stage maintainers or transformers, per Cardinal and Levy's (2000) criteria, for physical activity were selected for interviews. All of the women engaged in exercise at the current United States government recommended rate, i.e., 30 minutes of exercise on most days of the week (United States Department of Agriculture's Dietary Guidelines for Americans, 2005). "Most days of the week" is interpreted as 4 to 7 days a week. This criterion is consistent with Cardinal's (1999) and Cardinal and Levy's (2000) studies of transformers. The women's ages ranged from 40 to 80 years of age. All the women in the study were Caucasian, homeowners with a minimum of a high school education. All of the women in the study were volunteers. Table 8 provides details on all the demographic data that were assessed.

Table 8

Demographic information

ID	Age	Education	Job	$	HH size	Marital status	Children	Own/ rent
D14	40s	Assc.	Skilled trade	50,000-79,999	2	Married	None	Own
K04	40s	Assc.	Clerical	80,000+	2	Married	2	Own
L06	40s	MS	Admin	50,000-79,999	2	Sig. other	None	Own
S15	50s	J.D.	Admin	80,000+	5	Married	2 + 1 grand child	Own
C01	50s	Bach. +	Educ.	80,000+	4	Married	2	Own
L19	60s	MS	Admin	80,000+	2	Married	2	Own
N10	60s	MS	Admin	N/R	2	Married	None	Own
B31	70s	HS	Retired clerical	35,000-49,999	2	Married	3	Own
M27	70s	Nursing school	Retired RN	35,000-49,999	2	Married	Yes qty N/R	Own
M32	80s	Some college	Retired teller	25,000-34,999	1	Widow	3	Own

Note. Assoc. = Associates degree, Bach. + = Bachelors degree plus some masters degree credits, HH size = Household size, HS = High school diploma, J.D. = Jurist Doctorate, MS = Masters degree, N/R = Not reported

The participants were selected from two different fitness groups. One group of participants was obtained from a fitness class that is unusual in its structure. This fitness class is held in two fitness centers of a Midwest community college. Often, students will enroll in this class for repeated semesters over several years. The students meet their attendance requirement by coming to either of the two fitness centers during any of the open hours. Their workouts in the fitness centers are individualized and students work with instructors on an individual basis. Hence, there is not a regular class time where the instructor meets with the students as a group. During the fall semester, from which the participants were recruited, the centers were open from 6:30 am until 9:00 pm and one of them was also open on weekends. Enrollment in the course for the fall semester was 700 students.

In order to cover the classroom hours, an average of 15 instructors are assigned to this course, one of which is the lead faculty for the course. The lead faculty is in charge of coordinating grading, creating written assignments, and handling student issues. Because of the great number of instructors and variety of times to attend class, an instructor might never meet a number of the students. The researcher in this study was formerly an instructor for, and currently substitute teaches in, this course. Because of this relationship with the participants, only audit status students were asked to participate in the study. There were 187 audit students in the fall semester: 103 females, 84 males. Of the 103 women, 34 of them were removed from the pool because they did not meet the age criteria for the study. Of the remaining group of 69 women ages 40 and older, 23 women agreed to participate in the study. This group of 23 women was further narrowed to those who were either late-in-stage maintainers or transformers leaving a group of 13

from which to select. Four of this group of 13 women were in their 40s; one was a transformer, and three were late-in-stage maintainers. Four of the 13 women were in their 50s; one was a transformer, and the other three were late-in-stage maintainers. Five of the 13 were in their 60s; two were transformers and three were late-in-stage maintainers. From each of these age and stage groups, one woman was selected for an interview so that stage and age would both represented in the analysis. Later after the interviews had begun, one additional late-in-stage maintainer in her 40s was selected for interview in the hopes that she might be a "true" late-in-stage maintainer. This late-in-stage maintainer was added because statements made by the other late-in-stage maintainers during the course of interviewing did not support that they were "true" late-in-stage maintainers. A total of 7 women from the fitness center were selected for interviews. The process of recruitment is discussed in the procedures' section.

In addition, because women 70 years of age were not among the auditing members of the fitness center class, another study site was included. This site, a morning, chair-exercise class offered to people 50 years of age and older, was located in an area mall. The exercises range from activities that improve flexibility and strength to cardiovascular endurance. All exercises are performed in or around a chair. The class meets 3 times per week in the mall food commons before regular shopping hours begin. The class is provided free of charge by the local university as a public service. No grades were given nor was formal attendance taken. The researcher of record was also a former instructor for this class. The number of students in this class varies from day to day, but the average head count was around 40 students. Approximately half of the class was female. The pool of chair exercisers was narrowed to women who were ages 70 and

older. From this group, 11 women agreed to participate in the study. Later, one woman declined due to other commitments and another could not be reached. The final pool was 9 women ages 70 and older. This group of 9 women was further narrowed to those who were late-in-stage maintainers. No transformers were identified in this group. This left a group of 6 from which to select. Four of the 6 women were late-in-stage maintainers in their 70s. Two of the 6 women were late-in-stage maintainers in their 80s. Two of the women in their 70s and one woman in her 80s were selected for interviews. Although there were no transformers from which to select, two of women in their 70s had a wide gap between their confidences scores: 60% and 80%. The decision was made to select these two women in the hopes that their testimonies about physical activity would be dramatically different and somewhat akin to the difference between late-in-stage maintainers and transformers. This method was also to be applied to the selection of women in their 80s. However, the confidence scores of the two women in their 80s were so similar that it was determined that only one woman was needed to represent age and stage from this group. Therefore, a total of 3 women from the chair exercise class were interviewed. The process of recruitment for this group is discussed in the procedures' section.

Instrumentation

Stage of Change Measure. Stage of change was determined by using a modified version of the Stage of Physical Activity Algorithm (see Appendix A) (Cardinal, 1999). Test re-test reliability for the unmodified version was reported in an earlier study and was adequately demonstrated (r_s = .93-1.00) (Cardinal, 1997). The questionnaire derived from this algorithm consists of 3 questions (see Appendix B). In this questionnaire,

participants were asked to respond to the following criteria questions: (a) Do the participants meet the recommendations for exercise participation? (b) How long has the exercise behavior been maintained? (c) How confident are the participants that they can always maintain the behavior? Classification into groups is described in the procedures' section.

Demographic Survey. In the demographic survey, participants were asked to categorize themselves in terms of age, gender, ethnicity, economic status, vocation, household size, home ownership, and education level. They were also asked to indicate the types of physical activities in which they engaged (see Appendix C).

Interview. Once participants were identified and placed into stage groups, they were scheduled for an "one-on-one" interview. The guided interview consisted of 14 open-ended questions, and was approximately one hour in duration. Participants were given a copy of the interview questions a few days prior to the interview (see Appendix D). This step was important because the participants were asked to recall thoughts and experiences from their pasts. The rationale for providing a preview of the interview questions was that people often find it difficult to recall great detail from the past within an hour's time, but given time to reflect, people are more likely be able to provide greater and more accurate details. The interviews were recorded by audio recorders and later transcribed. Notes were taken during the interview as a backup to the audio recorders.

Procedures

University Committee on Research Involving Human Subjects (UCRIHS) approval to conduct the study was obtained before initiating any of the data gathering procedures (see Appendix E). Prior to recruiting the participants from the community

college fitness center class, verbal permission to recruit was requested from both the college and department offering the class. This was especially important because the study was conducted with students in a fitness class for which the researcher is a former instructor and currently a substitute instructor. Because of the direct involvement of the researcher, only audit status students were asked to participate. Once permission to conduct the study was granted from the college and the department, the researcher requested, from the lead instructor, a list of the names, e-mail addresses, and mailing addresses of the 69 female audit students who were 40 years of age or older. Once this list was obtained, potential participants were contacted for recruitment into the study by an informational letter sent through the mail (Appendix F). The participants were asked to indicate their interest in joining the study by emailing or calling the researcher. Procedures for the selection of the participants were discussed previously in the participants' section.

Because the fitness center pool did not include any women in their 70s, UCRIHS approval to add a new pool of participants was obtained before initiating data gathering procedures for the additional group (see Appendix E). The second group of exercisers were members of a fitness class held in an area mall. Details about this group were provided in the participants' section of this chapter. Prior to recruiting the participants from the mall chair exercise class, verbal permission to recruit was requested from the college offering the class. Once permission to conduct the study was granted from the college, the researcher recruited a class member (a woman who had the responsibility of setting up the holiday exercise schedule for the class and frequently made announcements to the class) to announce the following: "There is a study being conducted on women

ages 70 and older and our group is being asked to participate." The class member then read the recruitment letter (see Appendix F) to the class and recorded the names and phone numbers of 11 women who were interested in participating in the study. Procedures for the selection of the participants were discussed previously in the participants' section.

Once the recruits from both groups had confirmed their interest in participating in the study, they were mailed an informed consent form (Appendix E), a demographics survey (Appendix C), and the modified Stage of Physical Activity Questionnaire (see Appendix B). The forms and surveys were returned to the researcher in an enclosed self-addressed stamped envelope that was mailed to the researcher's home address. Of those solicited from the two groups, a total of 32 candidates agreed to participate.

Based on their responses to the Stage of Physical Activity Questionnaire (Appendix B), the candidates were placed into one of three groups: transformers, late-in-stage maintainers, and does not meet criteria. The transformer group was defined as people who have engaged in exercise for 30 minutes a day, 4 to 7 days a week for 5 years or more and are 100% confident that they can continue this level of exercise for life. The late-in-stage maintainer group was defined as people who have engaged in exercise for 30 minutes a day, 4 to 7 days a week for 3 or more years but are not 100% confident that they can continue this level of exercise for life. All of the women who did not meet the criteria of the above two groups were placed in the "does not meet criteria" group.

Of the 32 candidates, 10 were selected for interviews. The selection process is described in the participation section. Each of the 10 women selected was contacted by phone to set up the day and time of the interview. The interviews were approximately

one hour in duration. Participants were given a copy of the interview questions a few days prior to the interview (Appendix D). The interviews were recorded by audio recorders and later transcribed. Notes were taken by the interviewer during the interview process. The interviews for the fitness center women were held in one of several conference rooms on the college campus. The interviews for the exercise class women were held in classrooms in an area senior center. All participants who completed the interview were offered a $25 gift certificate to a local sporting goods store. Two participants declined the certificates. Emails with follow-up questions about their perceived status as role models and individual questions in other areas, which needed further clarification, were sent to five of the women a few days after the interview. One of the five women did not respond to the follow-up email. She was contacted a second time by e-mail to no avail.

Data Analysis

A professional transcriber transcribed the data from the interview tapes verbatim except in instances where using exact words might jeopardize confidentiality. For example, one woman named the street and the town in which she lived and others named their husbands or children. In these instances, suitable substitute words like "husband," "son," or "daughter" replaced the names. In presenting the results, alias names were given to each of the participants to personalize their statements without revealing identities. For instance, the participant coded as B31 was given the alias name "Amy." In the results' section, each participant is referred to by her alias and her code. However in the tables, only the participant codes were used due to field size issues within the tables.

Because the thrust of this research was to discover phenomena that were unique to either maintainers or transformers, it was first necessary to confirm the participants belonged in the stage assigned to them through the Stage of Physical Activity Algorithm (see Appendix A) (Cardinal, 1999). In order to do this, the lead investigator and another investigator, with background in qualitative studies, reviewed the participants' testimonies about concepts relative to stage placement to determine if these matched the criteria for the stage to which they were assigned. For instance, the women who were classified as maintainers should have made statements that reflected the following characteristics: (a) engagement in physical activity for less than 5 years, (b) less than 100% confidence in ability to continue physical activity for life, (c) does not view one's self as a role model, and (d) susceptible to relapse into sedentary behaviors. In contrast, women who were classified as transformers should have shown evidence of these characteristics in their statements: (a) engagement in physical activity for more than 5 years, (b) 100% confidence in ability to continue physical activity for life, (c) views one's self as a role model, and (d) no risk of relapse into sedentary behaviors.

The analysis of the interview data was done via a method known as "ad hoc meaning generation" wherein no one standard technique of analysis is used for all the material (Kvale, 1996). This method is particularly useful to draw out connections when interview data "lack an overall sense at the first reading" (Kvale, 1996, p. 204). The techniques embraced by this method include, but are not limited to, "noting patterns, clustering, counting, making contrasts/comparisons, noting relationships between variables, and building a logical chain of evidence" (Kvale, 1996, p. 204). Using the techniques called "noting patterns" and "making contrasts/comparisons" revealed that not

everyone matched the criteria for the two categories above and lent support for Cardinal and Levy's (2000) sub-stage known as "long-term maintainer." In addition, one more sub-stage, which will be referred to as "realistic" transformer, and an anomaly of under-reporting of years active were identified. Based on these stages, sub-stages, and anomalies, the two investigators independently analyzed the data using the "ad hoc" techniques listed above (Kvale, 1996).

The two investigators then compared their results and looked for areas of disagreement. In some cases, patterns and relationships undiscovered by one or the other investigator were blended into the analysis (Kvale, 1996). The findings were then organized based on theoretical implications (Rubin & Rubin, 1995) or as they related to the research questions.

Chapter 4

RESULTS AND DISCUSSION

The purpose of this study was to discover the ways in which life experiences and personal characteristics relate to the phenomena of stage placement, as defined by Cardinal (1999), for physical activity or exercise in older women. First, the analysis did not fully support Cardinal's (1999) Stage of Physical Activity Algorithm (see Appendix A). Next, analysis of the interview data revealed that childhood experiences, including family-sponsored physical activity and the use of physical activity as a coping mechanism, set a standard for lifetime physical activity. In addition, adaptability in the face of changing circumstances, the process known as "environmental control" (Prochaska et al., 1994), and ritual or routinized behavior played prominent roles in these women's continued engagement in physical activities. Further, though a process known as "helping relationships" was shown in previous studies to be under-utilized by maintainers Marcus, Rossi et al., 1992; Gorely & Gordon, 1995; Courneya & Bobick, 2000; Jue & Cunningham, 1998; Fahrenwald & Walker, 2003; Goldberg et al., 1996; Nigg & Courneya, 1998), the results provided evidence that successful exercisers do use the "helping relationships" process.

Issues with the Stage of Physical Activity Algorithm

Analysis of the interview data collected for the current study, in conjunction with stage and demographic data collected prior to the interviews, suggested that the differences between maintainers, long-term maintainers, and transformers may not be as tidy as Cardinal (1999) and Cardinal and Levy (2000) suggest. Examples of women who

deviate from the classifications Cardinal (1999) and Cardinal and Levy (2000) described are to follow.

Long-term Maintainers or Realistic Transformers?

The first set of women, whose testimonies cast doubt on Cardinal and Levy's (2000) model, possess most of the characteristics of transformers except their confidence level. This, however, may have more to do with realism or modesty than with lagging confidence. One example is Faith (L19), a married woman in her 60s, who raised two children while working and earning her master's degree. She has been engaging in physical activity for at least 50 years, and although she is reluctant to admit it, she is a role model for physical activity as is made evident by the following statements about role modeling. When asked an indirect question about role modeling, specifically whether she thought her physical activity has left an impression on others, Faith (L19) responded as follows:

> Oh, yeah. Especially my daughter the 32-year-old. She plays ball now, and she's active and works out pretty regularly. Even my son the 30-year-old, he likes to run. When he gets a chance, he likes to work out.

In contrast when she was asked a follow-up question that directly pointed to her status as a role model, she responded more humbly:

> Maybe a little, because I know *waay* too many 60 year olds who have basically "hung it up" and are willing to sit and read or knit or watch TV all the time. One the other hand, some of the 60 year olds I know from softball and from around the fitness center and swimming are role models for ME – especially those who are retired and have time to exercise like I'd like to!

Although she has had a number of injuries to her feet that required her to cease engaging in her favorite activity, jogging, she has persevered and found substitute activities, like swimming and Nordic-track, that accommodate her physical constraints.

She engages in some form of exercise 5 or more days per week, yet she is cautious about the future:

> ... I worry that at some point, the injuries are going to get the best of me, and then I'm not quite sure what I'm going to do. Now, I've always morphed into something, which is why I'm 90% sure that someway, somehow, I'll still wriggle a finger here or there. (chuckles) Because, otherwise, shoot me now. It wouldn't be good for me. I'll always do something...

While she has concerns about her physical capabilities in the future, clearly she will find a way to remain active because she believes she must. She views it as critical to her survival, and as a part of who she is:

> I don't have an option. I don't feel good. I don't think well. I don't sleep well. Nothing works as it should when I'm not active. When I have to take a week off, if I'm sick or if I'm gone – the two weeks that I was in California – the only thing I did was play ball, and then didn't do one damn thing. I came home, and I was wound up like a top. I cannot – it's an anathema to my body to not be active. It's just wrong.

Despite the evidence that she has been physically active for the majority of her life and cannot conceive of life without physical activity, her status as a role model and clear evidence that she will find a way to be active in the future, the simple fact that she recorded 90% confidence about her ability to maintain her level of physical activity for life requires her, per Cardinal and Levy's (2000) method, to be categorized as a long-term maintainer who is still at risk for relapse into sedentary behaviors.

A similar case is found in Emily (L06), a woman in her 40s. She has exercised for 33 years, and considers herself to be a role model saying, "I would, actually [consider myself a role model]. I would, because I do it enough and because it is a part of my life." Like Faith (L19), she has suffered from severe injuries, including back surgery, that make her cautiously optimistic about her ability to maintain physical activity:

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> Is anything 100%? If everything goes along as it would go along right now, then, yes, I will be active for the rest of my life. I'm confident of that. But I also know my body parts are wearing out.

She too has modified her activities to conform to changing opportunities and abilities:

> When I first started, it was very much the organized sports. I'd play whatever kind of team sport was available at the time to me. Basketball, volleyball, softball, and I did that through college. As I got older, that wasn't there, so I ran, biked, all kinds of things. I did marshal arts for a while. And now being of the age that I am and my body is not as happy with me, I'm doing a lot more lower impact exercise.

She also views physical activity as a part of her life and believes she would suffer greatly without it saying, "...But I don't think there was ever a point where I thought I'd have to give up exercising in general. I'm not sure I would do very well." There seems little doubt that this woman will continue her exercise behaviors for life, but again, because she reported 90% confidence, under Cardinal and Levy's (2000) standards, she must be categorized as a long-term maintainer.

Then there is Gwen (M27), a married woman in her 70s. Although moderately physically active all her life: raising children and maintaining a 3 acre garden while working part-time, she reports that she has been exercising for 11 years. She believes herself to be a role model for physical activity, as well she should. Weekly, she engages in 1.5 hours of walking and weight machines on Tuesdays, Thursdays, and most weekends, and 6 hours of several different types of activities on Mondays, Wednesdays, and Fridays. Unlike Faith (L19) and Emily (L06), she is not cautious about the future because of past experiences with injury or serious illness; she has never had either. She, however like Emily (L06), believes that one never knows what the future will hold:

> Well, why not 100% -- if vision goes and you are not able to drive....And, if your mental – dementia or Alzheimer's or something set in, you

> wouldn't be able to do it. But I told my kids, if you have to place me anyplace, make sure they have some exercise things going on.

Even if she had to be placed in a nursing home for Alzheimer's Disease, she wants to be sure that she can still exercise, and if anything did happen to her vision, she also has a plan:

> Well one thing, I think it would have to be an apartment maybe close to [my gym] so that I could walk. Or we do have various types of transportation and I do have my son [who] lives nearby and his family and I think my daughter is going to be moving back from California in a year, a year and a half – she's retiring from there. She's got plans of moving back, so family, also [could drive me].

But again, because she's only 80% confident she can maintain her exercise behaviors, under Cardinal and Levy's (2000) model, she would be classified as a long-term maintainer.

These women, classified by Cardinal and Levy's (2000) model as long-term maintainers, are most likely transformers who suffer from realism. They may also be afflicted with humility, modesty, or low self-worth depending upon one's perspective. This may be due to the fact that these women all have one further thing in common. In spite of the considerable time these women spend exercising, they do not place themselves as their first priority.

When asked where they placed themselves among all the other priorities in their lives, they responded as follows:

> Faith (L19): I'd love to lie and say first, but it's not true. I think far too often work is first in terms of time commitment on a daily basis (and that's embarrassing to admit, because I really would like it to be my husband who comes first. Of course, my husband and my kids/kids-in-law would be first if there were anything serious to attend to: illness, (babies!), etc. I think I'm in here someplace with my friends and co-workers, softball organizational stuff, and Choral Union. That's about it.

> Gwen (M27): Physical activity I would say is third....Family would be number one, and my religion would be number two.
>
> Emily (L06): At this point in my life, I would say that I would place myself pretty high among my priorities. I would give that a 7 on a 1-10 scale (where 10 equals - I am my only priority). I figure if I don't or can't take care of myself, there is no way that I can help others.

There are several ways one could interpret their priorities. One possibility is that the tendency of these women to be self-sacrificing impacts their confidence level. Placing other's needs ahead of their own might cause them to be less confident about adherence simply because they always want to be available when they get the "call to duty" to care for a family member (National Women's Resource Center, 2005). Others might view these statements as evidence of humility or modesty because despite their claims of placing others ahead of themselves, all of these women invest a considerable amount of time in themselves via the physical activities in which they engage. Whatever the reason, the Cardinal and Levy (2000) model does not appear to work for these women.

One possible explanation as to why the model seems to have failed may be that the 100% confidence criteria is faulty. Fallon and Hausenblas (2001) and Fallon (2004) believe that 100% confidence is not realistic. These studies suggest that the only measurement needed to place individuals into the transformed stage is evidence of adherence to exercise or physical activity for more than 5 years. This is because the researchers doubt that there are people with 100% confidence to continue exercise for life which is, in part, because in Fallon's (2004) study, there was only 1 person, out of 121 people who were classified as transformers, who was 100% confident. However, 4 of the

individuals interviewed in the current study were 100% confident, and 1 of them was a maintainer (based on reported years of physical activity).

Classic Transformers

The next set of women to be discussed are transformers who are 100% confident in their ability to continue physical activity for life. While the stories of the transformed women do not differ greatly from those of the "realistic transformers" above, there are some interesting variations. In addition to devoting themselves to physical activity and serving as role models - reluctant or otherwise, this next set of women all have clearly defined goals with regard to their confidence statements and resoundingly place themselves as their first priority among all the other priorities in their lives. For example, Ingrid (N10), a married woman in her 60s, has been injury free and physically active for most of her life. Though she exercises 6 days per week, she too is a reluctant role model. Like Faith (L19), when asked indirectly about her status as a role model, she was more comfortable with her role model status than when asked directly. The statement below is in response to a question about whether she believed co-workers looked up to her with regard to exercise:

> Some of them might, but I don't know that all of them do because I generally, on my lunch hour, come over here and work out. Other people choose to use their lunch hours differently. What they think of that I'm not sure, but I just go do my own thing. I just figure whatever's going on will be there when I get back. I just do my thing. It's hard to know if you've inspired anyone or not because they don't usually come and tell you, although some people have occasionally. And I think I have inspired a couple of people in my work group to be active, to be more physically active. There is sort of a transfer effect on some level.

Yet, when asked directly whether she viewed herself as a role model, she recanted saying "No, not really. I exercise for my own needs."

However, in contrast to the realistic transformers, she placed her "health and well-being as number 1 priority" in her life, and when it comes to being 100% confident about continuing physical activity, she is clear and has a goal in mind:

> Well, I enjoy it. I know I need to do it for my health and fitness. And I want to maintain my physical independence as I get older. .... I want to croak in my swimming pool at 91. That's my plan. (laughter)

Some people, in talk around the water cooler, suggest that people who place their health in high priority are selfish, but for Brenda (C01), a woman in her 50s, this does not seem to be the case. She's raised 2 children, been a devoted and attentive daughter, and worked together with her husband on numerous home projects. In addition, she's earned a master's degree, had a cesarean birth, two hemorrhoid surgeries - one with serious complications, and problems with her knees that required surgery, yet she has sustained an exercise program for 20 years. She exercises nearly every day, and is more comfortable with her status as a role model:

> Uh, maybe. Yeah. I just hadn't thought about it. But many of the students know my age and know all the things I do. I would want to model positive things for my students as far as their lives and their career, and their health and their happiness....

She is also comfortable with her commitment to physical activity for life and 100% sure she will stay active:

> ... because of past history... now, that's barring that I got some hideous disease or got run over by a truck or something. But my mother is almost 82, and has had physical things happen, etc., and we raked leaves Sunday. We shoveled snow when I was a kid. We had a mile long driveway at the farm. There just wouldn't be anything that would stop me. And, like I said, someday, when I retire, I'll take a yoga class regularly....And the NIA (Neuromuscular Integrative Action) stuff I just started a couple of

> years ago. If I could do that every semester, that would just really be great. ... If I had more time, there would be a lot more that I would do.

She also knows why she places herself first. "... I've got to say that if you live in your body, you always come first. I can't do things for other people if I'm not taking care of myself."

Another example of a classic transformer is Diane (K04), a married women in her 40s who has 2 children who do not live with her. She has exercised for 22 years, and modestly considers herself a role model for physical activity:

> I think, in some people's eyes, perhaps. I mean I don't preach it, and maybe I am and I don't realize it. I don't try to be. I'm just who I want to be. If people do view me as that, that's okay. But I don't promote that.

She has had back surgery and at one point could barely walk, and this has required her to become involved in different activities than she did in her youth. "I don't play softball anymore because I don't run so well anymore. I pretty much like to do aerobics, treadmill, the elliptical machine, the bike, Pilate's. Total body fitness. That sort of thing. Strength training." Yet in spite of changes and challenges, she has clear goals that guide her in her belief about why she will continue physical activity for life:

> I want to be in good condition when I get into my older years. That's really important to me. ... I want to be active. I want to enjoy my life to the fullest. I mean now, I want to enjoy it, but as I grow older, I still want to be able to enjoy, and not be someone that's sitting on the sidelines wishing that I could do that stuff. I want to be in there... I want to be strong. I want to be going places. I want to be traveling. I want to do stuff. I want to be able to enjoy the rest of my life actively.

This set of women would be considered truly transformed according to Cardinal and Levy's (2000) model. They differ from the "realistic" transformers or long-term maintainers in that they make firmer statements about their futures as exercisers, and they rank themselves first relative to all their other priorities. Perhaps these differences are

merely indicators of personality. The women who are 100% confident may share personality characteristics like being driven, bold, or willful, whereas the "realistic" women might share characteristics like concrete reasoning, openness to change, or worry (Russell, & Karol, 1993). On the other hand, these women who rank themselves first among their priorities may have been raised under a different set of social norms than those who rank themselves lower. Regardless of the reason, the real question is do these differences indicate that the 100% confidence women will persevere and the "realistic" women will not? The testimony of the "realistic" women gives one legitimate reason to doubt that they will cease physical activity, and would lend support for Fallon's (2004) argument that 100% confidence is not realistic were it not for one last set of women that aggravate the confidence argument.

One potential problem with Fallon and Hausenblas' study (2001) and Fallon's study (2004) is that individuals were categorized as transformed prior to testing for confidence. This very likely gave them an inflated sample. In Fallon and Hausenblas (2001), 65% of participants were classified as transformers while in Fallon (2004), 45% of the participants were in the transformed stage. Yet the expected norm for the transformed stage is that it will be a small segment of the population. For example in exercise behavior, Cardinal (1999) found 16.6% were transformed while Prochaska and Markus (1994) reported 15% transformed for smoking cessation and 17% for overcoming substance abuse. By failing to screen for confidence before categorizing people as transformed, they likely included people who were not truly transformed. It should be noted that in discussing her study, Fallon (2004) states that transformers should have high efficacy, but does not indicate what percent would be required.

Long-term Maintainers

In the current study, 2 people who more closely matched Cardinal and Levy's (2000) criteria for long-term maintainers would have been counted as transformed using Fallon's (2004) method. One example is Amy (B31), a married woman in her 70s, who has exercised for 11 years. She has had a number of different surgeries that have required her to go through physical therapy. She does not consider herself to be a role model for physical activity saying, "No. I don't sit up on the front row [of class]. No, I wouldn't consider myself a role model. I am probably better than some but not near as good as some." But unlike the women in the previous two sets, she does not exude commitment to physical activity or talk about physical activity in terms of the pinnacle role it plays in her life. In fact, she sometimes has a difficult time attending her exercise classes particularly when her husband cannot join her, and she has an even harder time getting motivated to do her exercises at home.

> Yeah, I've had, over this 11 year period, I've had periods where it was difficult for me to walk so I'd use a cane or I'd hang onto my husband or something, so if he wasn't going [to exercise class], I could talk myself into staying home, it was easier ...and what am I going to do if I stay home? Am I going to get in there and ride on the exercycle and do the balance ball and all this sort of thing? Maybe not. I'll find an excuse to do something else ...

She is 60% confident she can maintain her exercise routine for life, and while it seems she meets the criteria to be considered a long-term maintainer, she is clearly not transformed. Yet, under Fallon's (2004) standards she would have been classified as a transformer.

Another example is Heidi (M32), a widow in her 80s, who has been injury-free and moderately physically active for most of her life. She reported that she has been

exercising for 6 years, and does not consider herself to be a role model. When asked about strategies she uses to motive herself to exercise when the weather or other factors are unfavorable, she replied "I stay home." Clearly she is no "Jack LaLanne," and there is reason to doubt her commitment to physical activity. Even so she reported 80% confidence that she can maintain her exercise behaviors, and again under Fallon's (2004) model, she would be considered a transformer.

Maintainers

In the midst of all the confusion of classifying transformers and variations thereof, one woman in the study was shown to be a plain and simple maintainer. Maintainers are defined as having engaged in physical activity for more than 6 months but less than 5 years. They are susceptible to relapse into sedentary behavior, are less than 100% confident in their ability to maintain physical activity for life, and do not consider themselves a role model for physical activity. Cindy (D14), a married women in her 40s, engaged in regular physical activity for 4 years, but does not consider herself to be a role model. She is only 70% confident that she will be able to maintain physical activity for life. Her confidence rating is no surprise because she struggles even to maintain her current workout schedule saying, "There is a fight of time management each day. Things get busy, and I can't get to the gym, and I know it's prioritizing things." When asked to explain her confidence level rating she replied with the following:

> One, would be if something happened to me physically, if I couldn't continue some sort of activity. Another one would be – I don't know what type of older woman I will grow to be. Will health still be as important to me today as it is tomorrow? I'm not sure I can keep the same mindset. I don't know who I'll be when I'm 80.

Her statement of uncertainty about the future of her physical activity adherence combined with the number of years she has been engaged in physical activity and the difficulties she faces adhering to her workout schedule make her a classic example of a maintainer for physical activity

Under-reported Years Active Transformer

There is one last issue at play with regard to the stage classification. During the interview process, several of the women revealed that they were engaging in physical activity for longer periods than were reported on their Stage of Physical Activity Questionnaire. For instance, Jenny (S15), a married woman in her 50s, said that she had a regular jogging routine through her 20s and into her late 30s and then she was inactive until her 50s when she joined the fitness center. Based on this, she reported her years of physical activity as 3.5 years. The following is a discussion of the physical activities she engaged in when she was "inactive":

> ...we have 4 ½ acres out in the country, and before that we had like 12 acres on the river, ... but we never had a riding lawn mower, and I mowed lawn four hours a week. One of our neighbors is a tree guy, and he dumps all his wood chips at my house, so for my upper body, I move wood chips around. One summer I moved 100 yards of wood chips around. So, I'm very active with yard work, and I have a huge flower garden that takes a lot of my time ...we grow a lot of our own food and can it, etc.... Cross-country skiing [around the property].

When asked why she reported 3.5 years of physical activity, she responded: "All of those other things I never considered to be exercise (laughter). Intellectually, of course, I know that they are... So, I was doing a lot of things,... but it wasn't a formal exercise program." Hence, the 3.5 years signifies time in a formal exercise program that averages 2 hours of exercise per day 7 days per week. In addition, she still does gardening, mowing, moving wood chips, and

skiing. Because she only included formal exercise in the years she reported, she is categorized as a maintainer, but she is more likely a transformer because she is both 100% confident she can continue exercise for life and because she considers herself a role model for physical activity.

Although it did not effect their stage placement, there were others who viewed themselves inactive at certain periods when the evidence suggests otherwise. One example is Gwen (M27), who has been a member of a gym since 1976. From 1976 until 1994, she balanced time at the gym with raising children, doing housework, tending a half-acre vegetable garden that was started in 1959, and working part-time as a nurse. She does not count these years as physically active because "I didn't get in it as steady as I have within the last 11 years [since retirement] because of the working situation and the family." "Steady like the last 11 years" amounts to 7 days per week, 1.5 to 6 hours per day which is an achievement few women with jobs and families could attain. Her statements provide strong evidence that she has been physically active for longer than her reported 11 years.

The statements provided by these two women suggest that changes need to be made to the Stage of Physical Activity Questionnaire in order to make it more effective in determining stage. Specific language about what constitutes physical activity as well as examples of physical activities need to be made a standard part of the questionnaire so that years engaged in physical activity is not under-reported.

The above five categories of women, 100% confident transformers, "realistic" transformers, long-term maintainers, maintainers, and under-report years transformer, demonstrate that which has long been known; human beings are complicated. It is

evident that a more complex and sophisticated method for discovering transformed exercisers needs to be developed. While years committed to a behavior is a good starting point for determining transformed status, some refinements need to be added. First, the Stage of Physical Activity Questionnaire needs to be modified to reduce errors in reported years of physical activity. Next, while the findings from this study suggest that confidence is an important factor in transformed behavior, they also indicate that 100% confidence may not apply to all transformers. The confidence tool needs to be modified either to reflect a realistic person's views about aging, i.e., How confident are you that you will be able to maintain *some form* of physical activity for the rest of your life?, or to encompass a range of acceptable confidence levels. In addition to this, another modifier, like role modeling attitudes, self-worth assessments or both, is needed to confirm the exerciser's place among the truly transformed. Table 9 is provided as a quick reference guide to the various stages and sub stages discussed in this section.

Table 9

Stage and sub-stage definitions

Stage	Definition
M	Sustaining physical activity for at least 6 months but less than 5 years; Susceptible to relapse into sedentary behavior (Prochaska et al., 1994).
LTM	Sustaining physical activity for at least 5 years; Susceptible to relapse into sedentary behavior; Less than 100% confidence (Cardinal & Levy, 2000).
LSM	Sustaining physical activity for at least 3 years - also classified as M or LTM; Susceptible to relapse into sedentary behavior; Less than 100% confidence in ability to continue physical activity for life.
T	Sustaining physical activity for at least 5 years; No risk of relapse into sedentary behavior; 100% confidence; Role model for physical activity (Cardinal, 1999).
RT	Sustaining physical activity for at least 5 years; No risk of relapse into sedentary behavior; Less than 100% confidence; Role model for physical activity.
URT	Identical to T, but under-reported years engaged in physical activity.

Note. M = Maintainer, LTM = Long-term maintainer, LSM = Late-in-stage maintainer, T = Transformer, RT = "Realistic" transformer, URT = Under-reported years transformer

Childhood Issues and Influences

In order to understand how adult women developed into late-in-stage maintainers and transformers for physical activity, it is necessary to understand something of the history of women's lives. Therefore, during the interviews, questions were asked about childhood physical activity such as how old they were when they first began engaging in physical activity and what sorts of things prompted or motivated them to engage in physical activity (see Appendix D). These questions were designed to address questions "In what ways do life experiences impact stage placement?" and "How does the way in which women were raised, e.g., culture, values, social support, and perceptions of exercise or physical activity, influence their current stage placement?".

Analysis of the interview data revealed that all 10 women engaged in physical activity at a young age. Some of the women indicated specific ages, between 4 and 10 years old, where they remembered being physically active. Others recalled that they were always active as children and could not name an age, as was the case in the following examples:

> Brenda (C01): I grew up on a farm, so there is not a clear memory of anything but being active. Swinging on ropes in the haymow. If you're a farm kid, everybody pitches in. So, getting burrs in my hair and braids. Having my mother having to cut off part of my hair. (laughter) So always active.

> Faith (L19): I don't know. I was young enough that I don't remember. I just spent the better part of my young kid's life outdoors or pounding things. There was no time that I remember not being on a bike, or being outside. I just don't know.

While all women engaged in physical activity at a young age, they did so for different reasons. Like many children, some of the women engaged in physical activity because they thought it was fun, or they engaged to be with their friends. Others engaged

because it was necessary as a mode of transportation. For instance, Heidi (M32) said "...And then I had a long walk to school, a long walk to school....Oh goodness, 2 miles, in all kinds of weather" while Jenny (S15) said " ... But I had always walked to school as a kid. I walked every day over two miles from grade school right through high school." However, none of these motivators were exclusive to either maintainers or transformers. This finding is consistent with previous research which showed that engagement in physical activity during youth was not an influencing factor on adult women's exercise behavior patterns as both inactive and active adult women were active in childhood (O'Brien-Cousins & Keating, 1995).

Family Life Impacts Stage

Although, engagement in physical activity during youth was not a predictive factor in adult women's exercise behavior, youth activity, in conjunction with other modifying variables like family dynamics, provided some answers regarding the ways in which life experiences, and rearing in particular, impact stage placement.

Family dysfunction. Some of the women interviewed used physical activities as a means of escape from family tensions or to establish independence. Three women, one in her 50s and two in their 60s, engaged in physical activity as a means of coping with family tensions and/or to establish their independence as children:

> Faith (L19): ...I didn't like spending time inside. I never wanted to be inside. Part of that might have been – I think there was a certain tension in our household. And I think part of it was me escaping from my family's tension. But that kind of awareness didn't come until later.
>
> Ingrid (N10): My father's passing and relationship with my mother (we did not get along well after his death either) mostly focused me on my need to be personally responsible for myself. I did some bike riding, etc. partly because I enjoyed it, but also wanted to be out of the house.

> Jenny (S15): ... When I was real young, in grade school, I did it because it was something I could do to be independent from my parents. Even to walk three miles to a friend's house, I'd walk it. ... So, I guess you could say I did it to get out of the house then, too. Because I had a pretty crazy household with 12 kids....As one of 12 kids, I've always NEEDED to pull myself away and have some private time.

The women, who used physical activity as a coping mechanism for dealing with family tensions, continued to apply this coping skill to deal with daily stressors throughout their lives. Their responses below provide some answers to the question "What are the factors or stressors in adult life, such as career, children, health, social support, etc., which impact current stage placement?". :

> Faith (L19): Having little kids at home, I was a stay at home mom at that time, and it was really tough. That's why I kind of got into the running because I could do it when my husband got home from work. It didn't take a lot of time, and it was time for me. I go out and run my two miles and be back home in 20-25 minutes. It was quick and it felt so good, and I could be a mom again.

> Ingrid (N10): Stress. Whatever's troubling me that day, big or small. And anything that goes wrong, I GO to the pool! Whenever there's trouble, I swim. Or I walk the dog. But usually I swim.

> Jenny (S15): ... But I worked fulltime. I had these little kids. I had a big job at the hospital. I was a manager in radiology. It was a very stressful hospital job, and I just needed to decompress when I got home. I usually did it [jogged] right before dark.

The three women who engaged in physical activity as a means of escaping their families came either from the classic transformer category, the under-reported category, or the "realistic" transformer category. This suggests that lessons learned at an early age about the value of physical activity as a stress coping tool have lasting power. Clearly, the women, who came from families where tensions ran high, learned that physical activity was an effective way to cope with life's stressors and continued using this coping mechanism throughout their lives.

Parental involvement. While negative aspects of rearing were related to stage placement, positive aspects of rearing also exerted influence over stage placement. Five of the women interviewed were raised in families where either both of the parents or the father alone engaged in physical activities together with the children. In farming families, typically all members of the family unit engage together in the various physical activities required for farming as was the case for Gwen (M27), a woman in her 70s. The following women, Diane (K04), a woman in her 40s, and Brenda (C01), a woman in her 50s, also came from active families where both parents engaged in physical activities with the children:

> Diane (K04): We played softball in the backyard and stuff like that. And we had a pool, so we were always out there swimming, things like that. And family bike rides after supper. Everybody would get their bikes out, and we would ride around town and then come home.
>
> Brenda (C01): ... We always had a garden, ... But working in the garden as a family was actually fun. Maybe at the time I'd complain about it, but we had some pretty good tomato fights! (laughter) ... we had very, very active vacations. We would go places where we would do a day hike type of thing...Water skiing. We were just always very, very active together.

Two of the women, Faith (L19), a woman in her 60s and Emily (L06), a woman in her 40's, came from families where only the father engaged in physical activity with the children.

> Faith (L19): My dad was an avid gardener. A very active gardener. So, he was outdoors most of the time in the garden. I spent a lot of time with him. My dad always watched football on TV, and I watched football with him because I enjoyed it. And I enjoyed playing it. My dad taught me how to throw -- I used to play catch with my dad.
>
> Emily (L06): He [dad] and I actually played a lot together when I was a kid. He was very supportive. But never did really any organized exercise. We were always busy doing something...my dad, my sister, and I would do things together, and my dad and I would do things together.

The five women who engaged in physical activity as a family group with both parents or with their fathers were members of either classic transformers or "realistic" transformers. This commonality suggests that lessons learned at an early age about the value of physical activity have lasting power. Clearly, the women, whose family rearing included regular engagement in physical activities with the children by one or more parent, learned that physical activity was a normal, expected part of daily life and continued to be active into adulthood. Table 10 displays the connections between motives for engaging in physical activity and factors related to transformed behavior as described in the previous section.

Table 10

Motives for childhood physical activity as it relates to stage placement.

ID	Escape	Parent(s) active w/kids	Role model	Years active	Confidence	New Stage
D14			no	4	70%	M
B31			no	11	60%	LTM
M32			no	6	80%	LTM
M27		yes	yes	11	80%	RT
L19	yes	yes	yes	50	90%	RT
L06		yes	yes	33	90%	RT
S15	yes		yes	3.5	100%	URT
N10	yes		yes	40	100%	T
K04		yes	yes	22	100%	T
C01		yes	yes	20	100%	T

M = Maintainer; LTM = Long-term maintainer; RT = "Realistic" transformer; URT = Under-reported years transformer; T = Transformer

Adult Life

Enjoyment and Variety of Activities Relevant to Stage

While children often engage in physical activity because it is enjoyable (Buonamano et al., 1995; Ewing & Seefeldt, 1988; Gill et al., 1983; Gould et al., 1985; Gould et al., 1982; Sapp & Haubenstricker, 1978; Wold & Kannas, 1993), this is not necessarily true of adults. Although all of the participants enjoyed some of the activities in which they engaged, there was sharp contrast in both the quantity of activities and

enjoyment of those activities between the women who were categorized in either of the maintainer categories and the women categorized in any of the transformer categories. Although timetable information was not revealed, this finding answers aspects of the question "How does the timetable in which enjoyment of exercise or physical activity was acknowledged impact stage placement?".

Maintainers. Maintainers and long-term maintainers engaged in fewer activities and/or did not enjoy all the activities they did. For instance, Amy (B31) is a long-term maintainer in her 70s. She engages in a chair exercise class at a mall, and at home, she works out with an exercycle and an exercise ball. She struggles with attending the mall exercise class if her husband cannot also go. She does not enjoy all of her activities saying, "Yeah. Actually, I enjoy the class and those exercises the most. The others [exercycle, exercise ball] I do it because I think I should." She also notes that she engages in the exercises at home on an infrequent basis because there are other things she would rather do.

Another maintainer who does not enjoy her activities is Cindy (D14), a true maintainer in her 40s. She frequently engages in walking outdoors and exercises on the treadmill or the elliptical, and does weight training in a fitness center. Occasionally, she does step aerobics. She enjoys walking outdoors, but is not that fond of the rest of the activities:

> That's the hardest question. I enjoy walking, and I can do a fast brisk walk, and I can do it by myself or with somebody. That I enjoy. I've been trying to get my heart rate up and keep it up and do those kinds of things. And sometimes it takes everything I have to do it. When I am done, I'm like, that's a good feeling. Driving to the fitness center and getting in there, it's like, oh, I could do so many other things. So, I still struggle with getting over and doing it. When I am done, or when I'm doing it, I feel good about what I'm doing because it's a positive thing. So, in that

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> way, I like it. But do I like lifting weights and the pain of it all? Maybe not (chuckles) or it would be easier for me to get there.

When asked a clarifying question about disliking weight lifting, Cindy (D14) responded with further activities she did not favor.

> Right. Or like I do the treadmill or the ones that are low impact on your joints. I try to do them for 1/2 hour as intense as I can get. That might not be the most fun thing to do.

When further clarifying questions about her dislikes, Cindy (D14) provided criteria as to her likes and dislikes.

> But a nice three-mile walk, and I can do a nice steady pace and I'm not winded. And I can do that fast walk because I do the other thing, too. Sacrifice one to do the other. So, I do a little bit of everything. And if it's cold outside – right now, the weather's changed, I will start doing it. But I'd rather be outdoors doing it than indoors. But when the weather switches like this, I've got to get acclimated. But, usually when I take my brisk walk, by the time I get back, I'm warm and sweating. I've just got to get motivated to go and do that. So, I'm indoors now. I enjoy [outdoors] because I'm not breathing hard; I'm not focused on the fatigue, because I'm not fatigued when I'm doing that. The other, I'm fatigued and then focused on getting the fatigue out of my mind and keep going. And the walking, I'm not fatigued, so, therefore, I can kind of walk fast and do the arms. But I'm also looking at – if I do it at our cottage, it's woodsy, it's beautiful; I'll probably run across a deer or some wild turkeys, that sort of thing. It's just peaceful, helps the stress, etc. But the biggest thing is I'm fighting fatigue, and I'm doing a brisk walk.

The unifying factor for these maintainers is that while they acknowledge the importance of physical activity in their lives, maintaining regular fitness routines is a struggle for them because they did not enjoy many of the activities in which they engaged.

Transformers. In contrast, all women in the three transformer categories enjoyed essentially all the activities they did, and all engaged in a variety of 5 or more activities. For example, Emily (L06), a realistic transformer in her 40s, enjoyed all the activities in

which she engaged including swimming, elliptical, exercise ball class, weights, and teaching a cardiac rehab class 3 times per week. Her response to a question about enjoyment of physical activity is below:

> Yes, I do very much, actually. I really do. And one of the things that I found for me is I only do things I like to do. Because it really is the only way that I will continue to do them. And I also cannot do the same thing all the time. I have to do variety because I need variety in my exercise routine. So, yeah, I really actually enjoy it. [pause] Well, for one thing, the swimming piece I'm enjoying for three reasons: one, it doesn't hurt me. It gives me a new exercise challenge. And I guess what goes with that, it also kind of helps with the little bit of competitiveness that I have with myself. Being an athlete all of my life, there's obviously competitiveness and I needed that, so swimming does that for me, because I compete all the time with myself. The other things: the elliptical because it was something I could do at home, and I like doing it at home. The ball class that I do, I do with friends. And it's just a great time. We work hard and we have fun! So, it is very different and, yet, it works really well for me.

Another transformer who relishes variety is Jenny (S15), an "under-reported years of exercise transformer" in her 50s. At the fitness center, she does the treadmill, stair climber, elliptical, exercise bike, rowing machines as well as weights. She also takes a yoga class and a core conditioning class. At home, she does calisthenics, walking, and yard work including gardening. She also rides her bicycle and does cross country skiing. Her response to a question about enjoyment of physical activities is below:

> Yeah. The beauty of it for me is the variety. You don't get sick of it. If I had to go in and walk on that treadmill everyday, or if I knew I was going to do 30 minutes on the stepping machine everyday, I'd go crazy because it's so boring. The hardest part for me, in fact, is the bike. And a lot of days I'll warm up for 10 minutes on the bike, and it's the worst 10 minutes of my day. For some reason, I really dislike the bike. But I like a real bike. I get on a bike all the time with my kids. Just to mix it up, when I do my cardio now, I try and do a different machine every time I do it.

Table 11 shows the distinct difference in both number of activities engaged in and enjoyment of those activities by all groups of maintainers and transformers.

Table 11

Number of activities engaged in versus number of activities enjoyed by stage

ID	Stage	# Activities	# Enjoyed
D14	M	5	1
B31	LTM	3	1
M32	LTM	3	3
M27	RT	5	5
L06	RT	5	5
L19	RT	7	7
C01	T	7	7
K04	T	7	7
N10	T	6	6
S15	URT	13	12

Note. LTM = Long-term maintainer, M= Maintainer, RT = Realistic transformer, T = Transformer, UR = Under-reported years transformer.

Although previous studies indicated that enjoyment of physical activity increases progressively from precontemplation through maintenance (Clarke & Eves, 1997; Eves, et al., 1996; Ingledew et al., 1998), level of enjoyment has not been considered as a criteria for transformed behavior. Testing for "enjoyment," in conjunction with the stage algorithm to determine the transformed stage, may be a valid option for future studies. In addition, people who engage in a wide variety of activities may be less likely to relapse into sedentary behaviors when faced with issues like back surgery, in the case of Emily (L06) and Diane (K4), that force them to cease engagement in a given activity

.because they already possess alternative activity choices. Hence, identifying the number of activities in which an individual engages may also be useful in identifying transformers.

Routine Adherence, Adaptability, Environmental Control and Stage

One way to understand how adult women develop into late-in-stage maintainers and transformers for physical activity is to examine the role of "routines" in their lives. Therefore, during the interviews, questions were asked about preference for routine (see Appendix D). These interview questions were designed to address the question "What is the role of ritual or routine in adherence to exercise or physical activity?" and "Are women in the transformed or late-in-stage maintenance stages more likely to prefer or better utilize routines and schedules?".

Transformers and adaptable routines. While all the women in this study identified themselves as following a more routinized lifestyle, they did not all strictly incorporate physical activity into their routines. One characteristic that was unique to all categories of transformers was that physical activity was a priority to which they strictly adhered as a part of their daily routine. An example of this is Gwen (M27), a realistic transformer in her 70s. In her discussion of her exercise time, it is clear that she both prioritizes physical activity in her daily routine and that she strictly adheres to this routine:

> You get in the routine of it. This is my routine. I get up, try to get up between 7 and 7:30 in the morning, and then it's at least an hour there, and then it's about time for the exercise classes there. And the days that they don't have exercises classes I'm usually there by 7, 7:30 and then do my walking and things and then I can go on about my things on Tuesdays and Thursdays. That's when I usually end up volunteering afterwards in the places I do that. Tuesdays and Thursdays I'm usually home by 9:00 unless I go out.

> On Monday, Wednesday and Friday, I usually start by 7:30 and end at 2:00. [pause] But there's transportation in there, too. Let's see, I do my walking which takes an hour, and then the exercise goes to 9:30. And then I usually go hit the book store for a little bit between 9:30 or 10 o'clock or just visit with someone for a little while and then by 10 o'clock or so why I go to the spa and take my time up there until 1:00 and then on Mondays and Fridays when we start yoga.

Gwen (M27) also indicated that she continued her exercise activities on the weekend, and laughed as she noted that she had conditioned her children not to call her at home until after 3pm when her exercise routine was completed.

Jenny (S15), an under-reported years transformer in her 50s, also demonstrates strict adherence to an exercise routine:

> I think I'm a victim of routine. I know that when my kids were young, they did better when they had routine that they followed everyday. But I'm the same. When I get ready for bed at night, I do the same things. I guess there's comfort in routine. [Exercise is] one of those routines that I have to do.

In addition to strict adherence to routine, transformers demonstrate adaptability when circumstances bring about change or challenge, i.e., location, illness, injury, time constraints. Adherence to routine with the ability to adapt to changing environments is demonstrated by Brenda (C01), a transformer in her 50s:

> Well, it's [exercise] something I look forward to, so you kind of make appointments – plan what you're going to do. And if you can't, like I said, have some sort of alternative. Like if I go to conferences, etc. I'm active in our union. I am the State secretary, so I travel a lot with that. But I hate sitting in meetings. I would never be able to be an administrator. So, if there's a lunch break or something, I'll eat and then go out and walk. Or, sometimes if it's at a hotel, and you can plan after the meetings a time to go and use their exercise room.

Strict adherence to routine is also clear in this first statement by Ingrid (N10), a transformer in her 60s, and in her second statement, she shows the ability to adapt and modify her behavior under circumstance of illness:

> Oh, I'm very structured. That maybe helps with this kind of thing. My husband says I could be happy in the military – get up the same time and go to bed the same time. I like doing my same routine. I try to be flexible, but I'm not all that flexible. I'm just very structured, so getting into an exercise program isn't hard for me. I just stick with it because it's the kind of nature I have.
>
> If I truly have a bad cold – there was a time in my 40s when I got a lot of bronchitis, and when that would strike, if I didn't feel too sick, I'd do the weights. But if I was really beyond that, I'd just lay low. Sometimes you just have to know when it's time to let your body rest and heal. It wasn't much a decision of choosing not to exercise as it was choosing to lay low so you could heal up so you CAN exercise. Using basic common sense and lay low if you have to.

Emily (L06) demonstrates adaptability in the changing circumstances of opportunity and injury:

> When I first started, it was very much the organized sports. I'd play whatever kind of team sport was available at the time to me. Basketball, volleyball, softball. And I did that through college. As I got older, that wasn't there, so I ran, biked, all kinds of things. I did marshal arts for a while. And now being of the age that I am and my body is not as happy with me, I'm doing a lot more lower impact exercise.

Faith (L19) demonstrates adaptability in planning her physical activity around the time conflicts of a demanding schedule:

> That part of the routine, I think, is good. I mean, the knowledge that it's Monday morning and I need to get out of bed and do something is good. And right now, because I don't have time to lift weights in the morning, I also lifted weights last night. So, I did a couple hours yesterday. Thirty minutes on the Nordic track of stretching in the morning, and then I did probably an hour of weights last night and some stretching. This morning I swam. Tonight I'm going with a friend to the batting cages because we have a tournament this weekend. Tomorrow morning I'll get up and do [Nordic track and stretching]. Wednesday night I can't. Thursday morning I'll get up and swim. Thursday night I can't. Friday morning will be [teaching] cardiac [rehab], etc. So, I have a knowledge that if I

> don't front-load the week, I'm not going to make it into what I want to make it. It won't be the same. But the routine – that part of the routine, I think, is essential. Because there has to be some discipline that goes with that. What's inside those workouts should be varied for me. I get bored. I don't want to do the same thing I did two days ago.

Another take on adherence with adaptability comes from Diane (K04), a transformer in 40s, who implies that rigid adherence to exercise programs, without the ability to adapt, may be unhealthy:

> Everybody has routines in their life that they have to do. Structure is important, but I won't let it control my life. I've been there, done that in the past, and it's like you miss out on a lot of things. But I know that – everybody has some kind of routine, structure in their life. There are some things that you have to do everyday, but if something comes up and I'm not able to – it kind of gets you out of your routine, that's okay. Because I know that I'll get back on track the next day.

To clarify that she adhered to an exercise "routine" rather than exercising in a "hit or miss" fashion, Diane (K04) was asked whether she had a set time of day when she exercised to which she replied, "After work, on my way home." To further clarify her meaning when she stated now she might skip her routine if "something came up" which was not something she would have done in the past, the interviewer paraphrased her statement above.

> Right. I would say 'Oh, I can't do that because I have to go work out. I don't want to get bad.' And I've learned that it's important to exercise, but it's important not to let it control your life. Because there are other things out there other than just working out.

Following the sense of her statement, the interviewer inquired whether K14 thought she may have been "addicted" to exercise at any point.

> Oh, yeah. Absolutely. But now, it's okay if [I] miss a day. It's all right. It's okay if [I] put on a few pounds, because I think it's important to branch out and do other things. But exercise is important. But you can't let it interfere with your life, with living, with doing other things.

By acknowledging her addiction to exercise, she provided evidence of that strict adherence to routine, without adaptability, is critical to healthy behavioral change denoted as transformed behavior.

Being adaptable is important to these transformers to help keep them physically active even when circumstances change. Strict adherence with adaptability may be easier for these transformers because, per the previous section, they have numerous activities they enjoy. This gives them an advantage in adherence because they have a wide variety of options from which to choose when they have location changes or time crunches. This variety may also be helpful to them when recovering from illness or injury because they are able to quickly switch into a new activity better suited to their changing needs.

Transformers and "environmental control." Transformers in this study also showed that they had a keen understanding of themselves and used this understanding to inform their exercise habits in ways that led to success. This skill is an aspect of the process of change known as "environmental control" (Prochaska et al., 1994). In "environmental control," one attempts to eliminate temptations that might cause a relapse (Prochaska et al., 1994). Adherence to routine through "environmental control" is demonstrated by Emily (L06), a realistic transformer in her 40s, through the realization that if she does not have a scheduled exercise "appointment," she is less likely to initiate the behavior:

> Oh yeah, [routines are] very important. I don't like change. (chuckling) Yeah, routine is really important to me. One of the reasons I take the swimming class here – one of the biggest reasons – is that I know that on two mornings a week, I will get up and go. One of the reasons I'm not very successful with the fitness center is that I don't have a set time to do it. And so, having that routine, I know that's what I'm going to do and that's what I have to do. And I get myself geared up for that. But if I don't have that routine where I say, 'Today I'll do this at this time,' I

won't do it. I tend to just go, 'Okay, I'm done for the day. I'm going to sit down.' So, yeah, routine is incredibly important because I have to factor it in to my life. As much as [exercise] is important to me, I also know that it's something that if I don't, it will go away.

Faith (L19), a realistic transformer in her 60s who had earlier described the importance of routine with regard to scheduling physical activity, also expressed the need to have a variety of activities and work out routines within that schedule to manage boredom. Knowledge of her needs and her realization of the consequences that a repetitive workout would bring demonstrates her ability to use "environmental control" to achieve success in adherence to physical activity.

> Well, one of the things I discovered about myself over the last two years is that I don't want a routine. I want variety. I think I respond better to variety, so I try to just – when I'm doing weights, for example, I don't do the same things. I try to say, 'Okay, I'm going to do this today for my biceps.' In general now. When I get later on down the road, I'll probably split this up and do legs one day and arms and trunk the next. But right now I just kind of try to hit major muscle groups and because I need to keep it more interesting, different exercises for each one each day. And then, just depending on how I feel, adjusting the number of reps and sets with the weights what I feel I want to do. Some days I'll go fewer reps, and some days I don't feel like doing reps; I'll do more reps with the lighter weights.

Like Faith (L19), Brenda (C01), a transformer in her 60s, manages boredom via "environmental controls" saying "that's sometimes why I multi-task - I'll sit there with my iPod on or the TV on, or I'll be drying my hair with the close captioning on, on the exercise bike - because I could get bored."

Jenny (S15), an "under-reported years transformer" in her 50s, exerts "environmental control" by refusing to shower on the weekends until she has exercised in her first statement and by refusing to exercise with others in her second statement:

> People say, 'You don't do [exercise] on the weekends?' I say, 'Yeah, I do.' And the way I do it on the weekends is I don't take my shower until

> I've got my workout done. Sometimes it's 1 o'clock in the afternoon, and I'm still padding around in my bathrobe. Because once you take a shower, it's all over. You're not going to work out. Just to sweat again. At least, that's what I've found.
>
> I'm a singular exerciser. I don't want to wait for someone to show up before I start exercising. If you call in sick, I'm not going to use that as an excuse to not exercise. So, people would see me taking off my shoes and leaving at lunch, and say, 'Are you going to go running? [or] Oh, can I start walking with you?' I said to my husband that I don't want to walk with anybody else. It's not just for the exercise of walking, it's the mental time... And I've got a really busy household, and so private time is a big part of it. I don't mind doing it a day or two a week, just to be social. But if I've got an hour for lunch, and you're not going to be ready for 10 minutes, I don't want to wait for you. Because that means I've only got 50 minutes. I'm very conscious of what I want to accomplish everyday, and I don't want anyone holding me back.

Maintainers. In contrast to the strict adherence of exercise practices by transformers, the maintainers in this study had more difficulty sticking to exercise routines. In particular, they had difficulty adapting to changing variables. Heidi (M32), a long-term maintainer in her 80s, engages in physical activities offered at her local mall. She describes herself as being a very routinized person, but seems to have no qualms about breaking her exercise routine. This contradiction becomes clear in her dialog with the interviewer. When asked about strategies for motivation for going to the mall for exercise when conditions are unfavorable, she replied "I stay home." As a follow-up to confirm preference for routines, the interviewer asked whether routines in general were important to Heidi (M32). She answered, "Very. I'm a routine person. Dull as all get out."

Amy (B31), a long-term maintainer in her 70s, also found it difficult to stick to her routine especially when breaks in her schedule were imposed on her or when her husband was not available to go to the mall with her. In previous statements, she had

asserted her preference for routine. The interviewer then asked Amy (B31) whether "routine" was related to her exercise behavior. She responded saying, "Yes, because I get myself maybe mentally prepared for doing the exercises." The interviewer probed further asking her to reflect on an earlier statement she had made about her inability to continue her exercises if they were not a scheduled and structured part of her day, i.e., attending a class at a set time of day as opposed to self-initiated exercise. She responded with the following:

> Yeah, I would procrastinate and find something else to do, but if I know, with a routine, well it's like in the winter when we have that month that we can't use the mall and we can use another facility, let's see this time I think we had it for 7 or 9 sessions but there was over probably 10 days that we didn't have any class or anything at all. I was just kind of lost. Yeah, I should be able to find other things to do to take up that time, but no. And we all said that when we got to the mall and got back into, not all but most of us, said, Oh, we are glad to be back to a routine.

Following this same track, the interviewer asked about her ability to maintain exercise when conditions are unfavorable.

> Yeah, I've had over this 11 year period I've had periods where it was difficult for me to walk so I'd use a cane or I'd hang onto my husband or something, so if he wasn't going, I could talk myself into staying home, it was easier. But, then again, you just have to keep at it and keep trying and know that you just can do better.

Amy (B31) demonstrates her inability to adapt to changing circumstances in several ways. First, she is not able to create a way to be physically active while the class is on holiday break. She also has a difficult time attending class when her husband is unable to go, and does not find an alternative activity to do at home when she chooses not to attend class.

Cindy (D14), a maintainer in her 40s, has similar issues of inability to adapt when multiple tasks create time issues for her. In addition, while she appears to understand

herself in terms of some of her "environmental control" factors, she is not able to use this knowledge in ways that contribute to her success:

> There is a fight everyday of time management. Things get busy and I can't get to that gym, and I know it's prioritizing things, or if I would get up when my husband would do it – because there's nothing to do at 6 o'clock in the morning but exercise – then I could fit it in the day. But there are times – like if you're preparing to go on vacation and you've got to get all this done. There was the closing on the house, or we were doing construction that I couldn't go over there because I had to go do those things. I have gone a couple of weeks without exercising, and I get really angry that I can't go do it. It's like, 'All I'm asking is one hour out of every day to go do something.' And the fact that I can't go do it can make me angry. But not ever doing exercise – and why I said 80% continue it is for any health reasons.
>
> I focus better on routine. If I have a routine, I'm a little better. My exercises – where a lot of people like variety, I go do the same things over and over. Mostly because I can measure myself okay. I can do more reps by measuring myself more. But I go to the gym and do the same thing over and over and over again, where a lot of people like to have the variety and the same thing bothers them.
>
> I do better in mid-afternoon. Probably around 2:00. I've been going over there more on my way home – I used to be able to make it over here on lunch, but the job is getting a little bit so I can't. So on my way home, I'll probably stop. It takes a little more for me to do it after 5:00. And then in the morning, I'm just not a morning person where my husband is. I will hate it if I have to do it in the morning. I will dread it more. So, I won't even attempt to do it, because I don't want to hate it, hate it. So, I'm best at 2:00 in the afternoon, if I could go do it then. And it is kind of a pick-me-upper, too. And it actually suppresses my appetite.

The transformers in this study showed that the following skills were key to their success in exercise adherence. First, they must possess the ability to prioritize physical activity as a daily routine and to adhere to that routine. At the same time, they must be able to adapt to changing circumstances and utilize "environmental control." According to Prochaska et al. (1994), evidence of the use of the "environmental control" process by successful exercisers should not be surprising, but in the review of literature, 7 studies which examined the use of the processes of change all showed that the "environmental

control" process was not being well used by maintainers (Courneya & Bobick, 2000; Fahrenwald & Walker, 2003; Goldberg et al., 1996; Gorely & Gordon, 1995; Jue & Cunningham, 1998; Marcus, Rossi et al., 1992; Nigg & Courneya, 1998). In this study, maintainers also under-used the "environmental control" process, but transformers, on-the-other-hand, did appear to use it. From this study's review of literature chapter, the following questions were raised about "environmental control." Do maintainers forgo the use of "environmental control" because they are overly confident and hence headed for relapse, or are low rankings for "environmental control" an indicator of the length of time maintainers have been in their stage? As all of the subjects in this study had been exercising at least 4 years, we cannot assess whether maintainers who are new to the stage are more or less likely to use "environmental control" than those further into the stage, nor was there any indication that over confidence was an issue with any of the maintainers. Nevertheless, the curious fact remains that the transformers, rather than maintainers in this study, were the ones to use this process. If successful exercisers use "environmental control" and if the use of "environmental control" is critical to transitioning into transformed exercisers (Prochaska et al., 1994), then one of two issues are at play. One possibility with regard to the low use of "environmental control" by maintainers may be that the tool used to measure "environmental control" does not reflect the way exercisers use the process of "environmental control" and therefore needs to be modified. Another possibility is that lack of use of "environmental control" is due to either over-confidence with regard to their need to enact "environmental control" or lack of knowledge of the process and may be an indication that exercise practitioners need to educate students and clients about this process.

Helping Relationships

In the process called "helping relationships," significant others become critically important. The process, which is one of five prescribed for maintainers, is defined as "enlisting the help of someone who cares" (Prochaska et al., 1994). In a review of the literature, maintainers were shown to be less dependent on this process than most of the other five processes recommended for transitioning from maintained to transformed behavior, (Courneya & Bobick, 2000; Fahrenwald & Walker, 2003; Goldberg et al., 1996; Gorely & Gordon, 1995; Jue & Cunningham, 1998; Marcus, Rossi et al., 1992; Nigg & Courneya, 1998) but it was unclear why this was so. The following finding on "helping relationships," in part, answers the question "What are the factors or stressors in adult life, such as career, children, health, social support, etc., which impact current stage placement?"

In the review of literature chapter of this study, several ideas were discussed in an attempt to explain why maintainers might not be using the "helping relationships" process. The first suggestion was that maintainers might underestimate the importance of or take for granted "helping relationships." The interview data indicate that some women were very aware of the importance of "helping relationships." Two women, Amy (B31), a long-term maintainer in her 70s and Faith (L19), a "realistic" transformer in her 60s, discussed the pinnacle role their spouses played in encouraging them to be active:

> Amy (B31): ... we thought it would be kind of fun just to go and check it out. Well, we did, and we knew one gal in the [exercise] class and she encouraged us, you know, to come back. And I was a little hesitant. I thought, uh I don't know if I want to come again and my husband said, no I think it will be good for us. And I know that he meant it will be good for ME, which was very true. So, he more or less kind of pushed a little bit, but then after I got into it I realized that it really did help me – in the social as well as the physical way of life....sometimes he's busy doing other

things so he encourages me to go anyway and I usually do unless there's some reason that I can't. So yeah, he's been very supportive. Like I say, he's the one who talked me into continuing with the class. Now I don't know what I'd do without it...

Faith (L19): ... I found a [ball] glove on the playground, and it was the only glove I ever owned until my husband bought me one....And then, when I got out of school and got married, I married a man who saw the athletic side of me. I married him because we could play 'king of the mountain' on the telephone pole in my parents' driveway, and it was a good thing. And I married him because he saw me for who I am, because it was so important to me. I mean, sometimes life gives you what you really need and, in the guy that I married, I have what I need. I needed, especially then, to realize that I didn't have to be what anybody else wanted me to be. We did a lot of stuff together. We played tennis together. We went to the beach. He doesn't swim, but I would swim. We played football. We just did – it fed a side of me that I had missed for close to 15 years. Even when I was active, it just fed a side of me that just said, 'Damn! I can do this stuff, and I can have fun, and he doesn't think less of me for a woman. I'm still a woman.' So, when he bought me my first glove, it was like, 'Holy shit!' I didn't know I could do that. It was almost like permission, again, to be in touch with who I really have in my core, which is a really active, much more vibrant human being than I had been for 15 years.

Other women indicated that their husbands engaged in physical activities with them, again indicating a presence of "helping relationships." Like Faith (L19) and Amy (B31) above, Brenda (C01), a transformer in her 40s, and Heidi (M32), a long-term maintainer in her 80s, talked about activities in which they participated with their husbands.

Brenda (C01): ...my husband, is really, really supportive of anything that I want to do. We partner well together. Our house is really homemade. We sided it, we did all the floors – hardwood floors, and I participate just as much as he does. It's not like there's women's work and men's work at my house.

Heidi (M32): I think [my husband and I] walked around the mall a lot – We got bikes with big tires and different people kidded us about them, and we'd just very leisurely ride them.

Still other women demonstrated the presence of "helping relationships" in that they were not held back or prevented in any way from engaging in physical activity by their significant others. Diane (K04), a transformer in her 40s, Emily (L06), a "realistic" transformer in her 40s, and Ingrid (N10), a transformer in her 60s, discussed their significant other's attitudes toward their involvement in physical activity:

> Diane (K04): [my husband thinks physical activity is] important for your well-being. Pretty much point blank.
>
> Emily (L06): Seeing there are only 2 women in my household, we view a woman's physical activity as extremely important as both of us engage in some form of exercise.
>
> Ingrid (N10): Spouse is supportive. He's not a physical exerciser himself. He lets me do it for both of us. He's very supportive of whatever I do.

Finally, some women demonstrated the existence of "helping relationships" through their instructors. Two women, Jenny (S15), a woman in her 50s who had under-reported years active and Ingrid (N10), a transformer in her 60s, indicated that support from their instructors was important to them.

> Jenny (S15): And the first day I went in there, I got this great instructor and he stepped me up on a program. He was so wonderful. I was nervous, and I think most women are like that. They're very nervous about going into the fitness center and all those machines. You feel very awkward and out of your element, especially a woman, I think. And so, for this instructor to be so nurturing – a great big guy and so nurturing ... And then following up on my progress and making me so welcome. That was so important to me being comfortable there.
>
> Ingrid (N10): I'm kind of getting used to the weight stuff. It takes a while. Actually, one of the instructors at the college, last summer, when the total fitness room is closed down, one of the male instructors in there taught me how to do free weights. And he was very, very helpful. And once you know what you're doing, you develop a liking for it. And somebody's there to watch you so you're not going to injure yourself. Very important. He was very helpful.

From these statements it seems clear that "helping relationships" are not only present, but, in some cases, they are profoundly important to success in maintaining physical activity. This stands in stark contrast to the seven studies (Courneya & Bobick, 2000; Fahrenwald & Walker, 2003; Goldberg et al., 1996; Gorely & Gordon, 1995; Jue & Cunningham, 1998; Marcus, Rossi et al., 1992; Nigg & Courneya, 1998) discussed in the review of literature where maintainers were not using helping relationships. If maintainers and transformers use the "helping relationships" process as this data implies, it calls into question the effectiveness of the Processes of Change Questionnaire (PCQ) (Marcus, Rossi et al., 1992) in accurately reflecting the way an exerciser in the maintenance or transformed stage utilizes "helping relationships." However, given that only one of the maintainers in the current study was a "classic" maintainer, meaning that she had exercised for less than 5 years and was less than 100% confident in her ability to maintain exercise, opens the interpretation to other possibilities as well. For instance, the low rankings for "helping relationships" in the previous studies may indicate the length of time the maintainers have been in their stage. It is possible that long-term maintainers and transformers would respond differently to questions about the "helping relationship" process than those who are "classic" maintainers.

Another suggestion from this study's review of literature chapter was that maintainers might take "helping relationships" for granted due to high intrinsic motivation. This still remains a possibility as the women studied reported more intrinsic motivational sources than extrinsic sources throughout their adult lives. However, there appear to be no differences in the reporting of intrinsic motivational sources between maintainers and transformers. Although no timetable finding could be discerned, these

results answered the stage placement aspect of the question "How does the timetable in which intrinsic motivation was adopted influence stage placement?".

Tables 12, 13, and 14 catalog the major motives for engaging in physical activity during major time periods for each of the women. These tables present some puzzling findings. For instance, Ewing and Seefeldt (1988) found that youth sports participants were motivated by a wide variety of largely intrinsic factors. However, Table 12 shows that, for all 10 women in the current study, a small number of mainly extrinsic motivators were prominent during their youth. The reason for this difference may be due to differences in data collection. The subjects in the Ewing and Seefeldt (1988) study were asked questions about their current motivation whereas the women in this study were answering questions about youth motivation retrospectively. Also, the subjects in the youth sport study were given a series of motivation options to rank. Given a list of options, the women in the Ewing and Seefeldt's (1988) study may have recognized more motivating factors than through the self-discovery method used in the current study. Finally, Ewing and Seefeldt's (1988) study reported motives of youth sport participants. Motives for children enrolled in sports programs simply may not be comparable with the motives of children who engaged in general, informal physical activity.

Another interesting phenomenon is revealed in the comparison of the three tables. In examining the three tables, a pattern emerges that reveals an increase in reliance on intrinsic motives during "work/child rearing life" (see Table 13) and then a decrease in use of intrinsic motivators and a decrease in the variety of motivators during "retired life" (see Table 14). One possible explanation for the increase in the number of intrinsically motivating factors identified during "work/child rearing life" (see Table 13) may again

have to do with retrospective reporting for youth motives. Another possibility is that the adult women discovered new reasons to engage in physical activity once it was no longer a requirement of "family time" as it was in their childhood. The puzzling decrease in motivators during "retired life" (see Table 14) may be due to the low number of participants in that age range. However, these findings are consistent with those of a study done on older adult mall walkers where the major motivating factors were health, providing a daily purpose/routine, and social opportunity (Duncan, Travis, & McAuley, 1995). It is possible that in addition to downsizing and simplifying their households in retirement, older adults simplify their needs as well.

Table 12

Major trends in motivation for young life: 4-21 years of age, n=10

Extrinsic motivation				Intrinsic motivation			
Socialize	Family time/ time with dad	Necessity: travel or work	PA as coping mechanism for stress	Identity	Physical health	Fun	Appearance
K04	C01	B31	L19	L19		B31	
L06	K04	C01	N10			D14	
L19	L06	D14	S15			K04	
M32	L19	M27				L19	
S15	M27	M32				N10	
		S15				M27	
						M32	

Table 13

Major trends in motivation for work/child rearing life: 20-60 years of age, n=10

Extrinsic motivation				Intrinsic motivation			
Socialize	Family time/ time with dad	Necessity: travel or work	PA as coping mechanism for stress	Identity	Physical health	Fun	Appearance
D14	B31	M27	B31	C01	B31	B31	D14
L06		M32	C01	K04	C01	D14	C01
M32			D14	L06	D14	L06	K04
			L06	L19	K04	M32	M32
			L19	M32	L19		N10
			N10		M27		S15
			S15		N10		
					S15		

Table 14

Major trends in motivation for retired life: 60-80 years of age, n=3

Extrinsic motivation				Intrinsic motivation			
Socialize	Family time/ time with dad	Necessity: travel or work	PA as coping mechanism. for stress	Identity	Physical health	Fun	Appearance
B31					B31		
M32					M27		
M27					M32		

The last two conclusions from this study's review of literature could neither be supported or refuted. Although several of the women came from active families, there was no evidence to suggest that this rearing caused the women to take "helping relationships" for granted, nor was there evidence to suggest that the women who did not indicate the existence of "helping relationships" were headed for relapse. However these findings do suggest a need for further research.

Unanswered Questions

Although the interview questions were designed to answer the research questions, one question "How have relapse episodes impacted progress to their current stage?" bore no fruit in the interview process. A greater focus on this topic with more in-depth questions may shed light on this issue. Two other research questions, "How does the timetable in which intrinsic motivation was adopted influence stage placement?" and "How does the timetable in which enjoyment of exercise or physical activity was acknowledged impact stage placement?," were only partially answered as the timetable aspect of these questions did not come to light. Again greater focus on this topic with more in-depth questions may draw out these answers.

What if my Parents weren't... and I'm not.....?

The previous discussions about experiences unique to transformers could leave women reared in functional families with parents who did not engage in activity with them feeling like their exercise aspirations are hopeless. Having discussed what experiences and characteristics separate maintainers from transformers, it is important to also reflect on what they have in common because

both groups have experienced success with adherence to physical activity. One area these women have in common is a "never say die" type of attitude with regard to physical activity. Regardless of the circumstances that may cause them to be temporarily inactive, they all returned to physical activity. The following women suffered severe injuries that caused them to cease activity for a time, but they all found solutions that allowed them to return to some form of physical activity. Of the 10 participants in this study, 6 of them had injuries or surgeries that took them away from their physical activities for extended periods, and all of them returned to some form of physical activity.

One example is Amy (B31), a long-term maintainer in her 70s. She has had several surgeries that have forced her to become inactive for a while, but each time she has found a way to come back:

> Well, it would be temporary physical problems, then therapy, then I was back into the exercising. Then I had carpal tunnel surgery last summer so he said "No exercising at all for...", I can't remember maybe six weeks or so, but then I got so I would go to class and I would gradually start doing some things until I could work back into it gradually. I really missed it, having that time off and not exercising, I really missed it and I could tell when I went back. I thought whoa, how come it's so hard to do this?

Another example is Diane (K04), a transformer in her 40s. When asked whether she had ever had times where she could not continue to exercise, she responded:

> Probably when I was recuperating from my back surgery. I was in physical therapy, but I couldn't go to the gym and workout. It was probably 9 months later when I started going back to the gym. And kind of slowly getting back into it. And I remember the first time I went on my two-mile walk again, and it was really hard but I made it. It seemed like after that it got easier and easier again. I wasn't going to let it get me down. I had to keep going.

A further example comes from Emily (L06), a realistic transformer in her 40s who also had back surgery:

> Yup. When I don't feel well, I won't exercise. When I had my back surgery, that was probably the longest period of time when I didn't really do much of anything. But I got to the point where I said, 'Okay. It's now time. I have to get up and do something.' But for truly very short periods of time will I do that, because I can tell, in my own self, when I haven't exercised.

The Transtheoretical Model (Prochaska et al., 1994) originally was used to explain smoking cessation, and drug and alcohol rehabilitation. These are all behaviors that have high incidences of relapse, and because of this, catch phrases have been created to help those who fail to maintain behavioral change get back on track. When smokers fail, they are told "Don't quit quitting" (Henry Ford Health System, 2006). A similar saying is associated with alcoholism "if you fall off the wagon, get back on" (Conley, 2003). However, failure to maintain exercise behaviors has not been regarded so sympathetically. But perhaps it should be. As these 10 women have all demonstrated, when circumstances like children, injuries, illness, or time conflicts caused them to take brief breaks from their activities, they did not give up hope and quit for good. Instead, they returned to physical activity as soon as they could. The lesson and possibly the slogan that these women leave with us is "don't stop starting."

Chapter 5

SUMMARY AND IMPLICATIONS

The purpose of this study was to discover the ways in which life experiences and personal characteristics relate to the phenomena of stage placement for maintainers and transformers, as defined by Cardinal (1999), for physical activity in older women. While the results of this study lent support for the existence of a sub-stage known as "long-term maintainer" (Cardinal & Levy, 2000), the results also shed doubt on both Cardinal's (1999) and Fallon's (2004) criteria for transformers, and suggest that future studies are needed to fine-tune the criteria used in identifying female transformers. One area of the Stage of Physical Activity Questionnaire that requires further study is the confidence portion of the questionnaire. Cardinal (1999) suggests that all that is needed to determine transformed behavior is evidence of 5 or more years of engagement in physical activity and 100% confidence in one's ability to maintain the behavior. On-the-other-hand, Fallon (2004) suggests that confidence rankings should be removed from the criteria for transformers and only the years active criteria should remain. The results of this study clearly indicate that these simplistic approaches are not effective in accurately identifying transformers. Studies are needed to determine whether confidence levels for transformers should be modified either to reflect a more "realistic" view of activity and aging, i.e., "How confident are you that you will be able to maintain *some form* of physical activity for the rest of your life?", or to establish an acceptable range of confidence levels for the transformed stage. Additional research is also needed to explore the experiences of men in these two stages to determine if men also have difficulty identifying with 100% confidence, and hence, whether the Stage of Physical Activity Questionnaire needs to be

modified for both genders or a separate tool is needed to reflect women's views of long-term adherence.

In addition to research on confidence levels, other variables including role-modeling attitudes, self-worth assessments, enjoyment of physical activities, variety of physical activity interests, routinized exercise behavior, adaptability to changing circumstances, and "environmental control" need to be studied to determine their role in identifying transformed behavior. Also, because this study was performed with women who were either childless or had a parenting partner, a similar study directed at the experiences of single mothers is needed. Single mother's face special challenges with regard to free time to address their exercise needs (National Women's Resource Center, 2005). Research that examined the strategies and coping skills that single mothers use to maintain exercise behavior is needed to broaden our understanding of how women achieve long-term adoption of exercise.

A further area for future research is to study the Stage of Physical Activity Questionnaire to determine how it might be successfully modified to reduce errors in reported years of physical activity. These modifications might include specific language about what constitutes physical activity and/or examples of qualifying physical activities.

In conjunction with clarifying years of physical activity reported, future studies need to address how to differentiate between transformers, i.e., people who were once sedentary but have now transformed into permanent adherers to physical activity, and physical activity "lifers," i.e., people who have always engaged in physical activity all their lives and therefore have not changed or transformed. This is an important issue because the TTM was created to help individuals "transform" negative behaviors into

positive ones, e.g., smokers become non-smokers and sedentary people become active. Therefore, true measurement of transformed behavior for physical activity must begin with the assertion that a transformer for physical activity was once a sedentary person. This presents a further issue because the concept of sedentary behavior has not been operationalized. Issues that need to be addressed are the length of time one must be sedentary in order to meet the criteria for sedentary status and whether extenuating circumstances should be considered in the determination of sedentary status. For instance, if one takes a two-week vacation and does not engage in physical activity, should he or she be classified as sedentary? Further, if one took a three-month break from physical activity for back surgery, would he or she be considered sedentary? In addition, future studies need to determine what duration, frequency, and type of activities qualify a person as active or sedentary. These same types of questions need to be addressed to operationalize and validate the concept of "relapse."

The issue of sedentary status introduces a limitation to the current study. Although some of the interview questions addressed sedentary status, e.g., "Have you ever had a time or times where you were unsure of your ability to continue to be physically active or to exercise?" and "Did you become inactive during that time?," lack of an established definition of sedentary or relapsed behavior made it impossible to classify the participants as such. Therefore, it is possible that some of the individuals classified in any of the transformed categories may instead be a "lifer" for physical activity.

Another measurement tool of the TTM appears to need some modification as well. The results of this study shed doubt on the effectiveness of the Processes of Change

Questionnaire (PCQ) (Marcus, Rossi et al., 1992) in measuring the processes known as "helping relationships" and "environmental control" for maintainers in physical activity. Studies that pair responses to the Processes of Change Questionnaire (PCQ; Marcus, Rossi et al., 1992) for the "helping relationships" and/or the "environmental control" process with interview questions designed to get at issues salient to these processes should shed light on any problems with the measurement of the "helping relationships" and "environmental control" processes for physical activity in maintainers.

As this study was performed with women who were either childless or had a parenting partner, a similar study directed at the experiences of single mothers is needed to broaden our understanding of the role "helping relationships" plays in exercise adherence for women. Additional studies directed at the exercise experiences of men are needed to determine whether the "helping relationships" process is faulty and in need of modification for both genders or whether special modifications are necessary for women only. As the older adult population grows, another important area of research in "helping relationships" and exercise adherence for women is the impact that the death of a spouse has on adherence.

Practitioners of physical activity can also benefit from the knowledge of the role "helping relationships" play in adherence. For instance, while the majority of the women in this study worked out regularly without the benefit of a work out partner, they all provided statements that suggested that "helping relationships" in the form of moral support and babysitting were extremely important to their success. This means that, rather than encouraging that their exercise clients find work out partners as a means of

addressing "helping relationships," practitioners should focus on verbal encouragement of their clients exercise behaviors and provide day care within their facilities.

In addition to offering direction for future research, the results also revealed some important information for parents. Many of the women in this study who successfully adhered to physical activity routines did so in part because either both of their parents or their fathers alone engaged in physical activities with them when they were children. This means that it is important for parents, who are concerned about their children's future health, to make a regular habit of doing physical activities with their children so that their children will learn that daily physical activity is a valuable and expected part of daily life. This finding may be of particular concern to single mothers as the finding suggests that fathers, rather than mothers, heavily influence their daughter's decisions about engagement in physical activity. Single mothers may fear that their daughters will ignore physical activity without the presence of a father in the home. Further studies are needed to determine whether there is something special about the father/daughter relationship that promotes involvement in physical activity, e.g., does engagement in physical activity with the father send a message to young girls that physical activity is accepted by males in society?, or whether the fathers' role in their daughter's adoption of physical activity is simply an issue of spare time, i.e., father plays in yard with children while mother cooks, cleans, etc.

Further, society needs to make parent/child engagement in physical activity easier for parents in the following ways. Schools and community groups need to provide more opportunities for parents and children to engage in physical activity together by offering a wide variety of parent/child classes that involve physical activity. In addition, schools

that require "homework" for their Physical Education classes should encourage the parents to do the physical activities with their children, working along side them as they might with other types of homework. Gyms and fitness centers can also help influence exercise behavior in young people by providing "junior" gyms where children can "workout" at the same time as their parents in a safe environment.

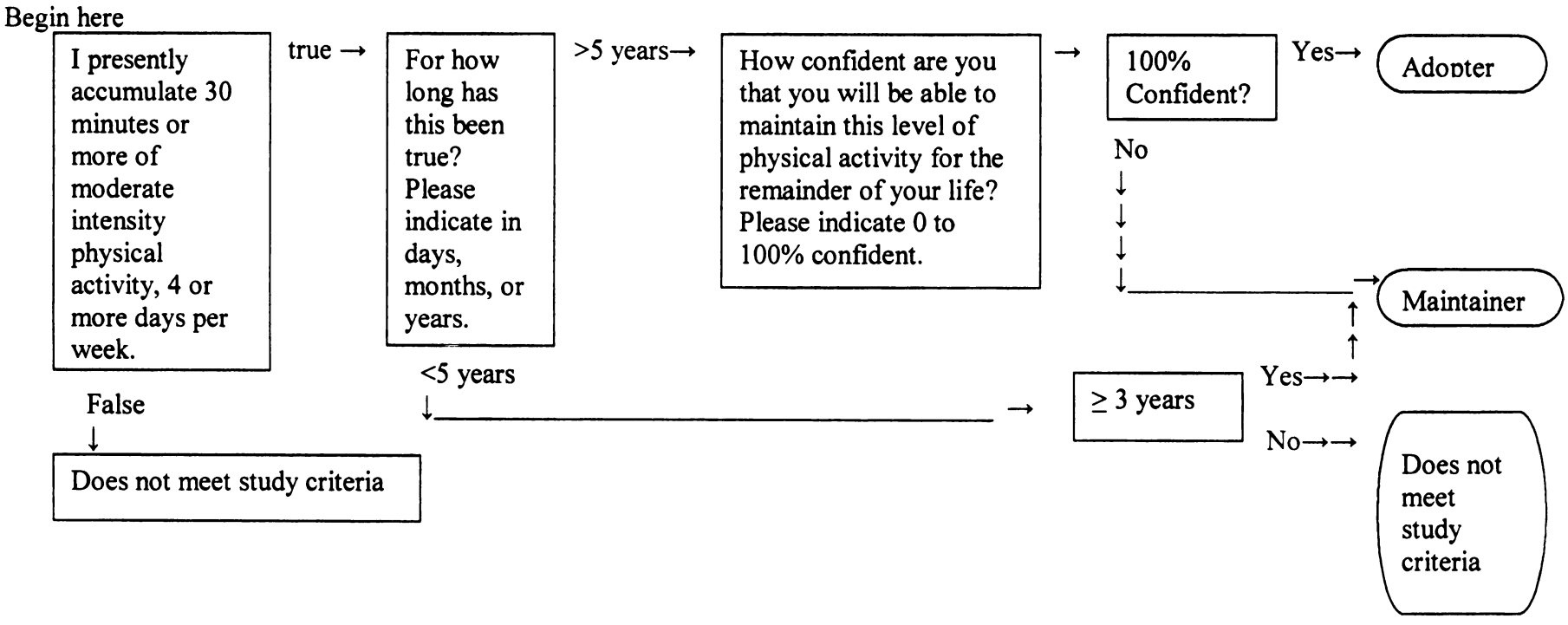
The findings of this study present questions as to the future exercise habits of today's young people. The women in this study generally engaged in unstructured physical activity during their childhood. In today's society, many children fall into two extreme categories of engagement in physical activity. They are either heavily scheduled in formal physical activities, i.e., soccer, karate, dance class, or they are tied to inactive digital entertainment, i.e., television, computer, video games. Given these two extremes, will future generations be able to make the connection between exercise and stress reduction or in the case of the over-scheduled children, will exercise be equated with stress and hence, impact their ability to enjoy physical activity?

On the other end of the age spectrum are some questions about engagement in physical activity by menopause-aged women. One topic related to this group, which presented itself in the data but was not found to relate to stage adoption, was the particular challenges women face with regard to exercise adherence during and post menopause. Several women discussed how much more difficult it was for them to maintain their fitness levels after menopause. Others discussed increasing their levels of physical activity due to menopause related health concerns. Again, as the older adult population grows, studies that increase our understanding of the exercise experiences of older women will be beneficial in helping practitioners best serve their clients.

APPENDICES

APPENDIX A

Modified Stage of Physical Activity Algorithm (Cardinal, 1999)


Begin here
I presently accumulate 30 minutes or more of moderate intensity physical activity, 4 or more days per week.
true →
For how long has this been true? Please indicate in days, months, or years.
>5 years→
How confident are you that you will be able to maintain this level of physical activity for the remainder of your life? Please indicate 0 to 100% confident.
→
100% Confident?
Yes→
Adopter
No
Maintainer
<5 years
≥ 3 years
Yes→
No→
False
Does not meet study criteria
Does not meet study criteria

APPENDIX B

Stage of Change for Physical Activity Questionnaire

Name_____

This survey is designed to assess level of participation in moderate to vigorous physical activity. According to the Rate of Perceived Exertion Scale (Borg, 1983). Moderate intensity physical activity is that which is somewhat hard for you to do meaning that your rate of breathing should increase slightly and you may begin to sweat lightly. Vigorous intensity physical activity is that which is hard for you to do which would include a breathing rate higher than the one associated with moderate exercise and increased sweating.

1. For the following statement, please indicate whether the statement is true or false as it pertains to you:

   I presently accumulate 30 minutes or more of moderate to vigorous intensity physical activity, 4 or more days per week. (please circle one choice below)

   a. **True**

   b. **False**

   If you answered "true," continue to question 2.

   If you answered "false," please stop here.

2. In the spaces provided below, indicate how many months or years have you been continuously engaged in physical activity or exercise for 30 minutes or more, 4 or more days per week without stopping.

   _____months _____years

3. How confident are you that you will be able to maintain this level of exercise for the remainder of your life? (please circle the percentage that best describes your level of confidence)

0%	40%	80%
10%	50%	90%
20%	60%	100%
30%	70%	_____other %

APPENDIX C

Demographic Survey

Code_____

For the following items, please circle the response that best describes you.

1. Are you:

   Male

   Female

2. Which racial or ethnic group best describes you?

   African American

   Asian American

   Latino/Hispanic

   American Indian/Alaskan Native

   White

   Other_____

3. Which age group are you?

   18-19

   20-29

   30-39

   40-49

   50-59

   60-69

   70-79

   80-89

4. Which of the following best describes your highest level of education?

High school graduate or GED

Trade school

Some college

Associates degree

Bachelor's degree

Master's degree

Ph.D.

Other_____

5. Do you currently work outside of the home?

Yes (go to question A)

No (go to question B)

A. Which best describes your current vocation?

Educator

Administrator/Manager

Clerical

Skilled trade

Business owner/Self-employed

Other (please specify)_____

B. Did you ever work outside the home?

Yes (go to question a.)

No (go to question 6)

a. Which best describes your former vocation?

Educator

Administrator/Manager

Clerical

Skilled trade

Business owner/Self-employed

Other (please specify)_____

b. Why did you leave your former vocation?

Children

Retired

Other (please specify) _____

6. Which best defines your annual household income level?

Less than $25,000

$25,000-$34,999

$35,000-$49,999

$50,000-$79,999

$80,000 and up

7. How many people currently live in your household?_____

8. What is your current martial status?

Single

Live with significant other

Divorced

Married

Widowed

9. Do you currently have children under your care in your home?

Yes (how many?_____)

No (go to question A)

A. Did you ever have children under your care in your home?

Yes (how many?_____)

No

10. Do you currently own a home or rent?_____

11. In the space provided below list the types of exercise you currently do.

12. Which of those activities listed in question 11 do you most frequently engage in?_____

13. Which of those activities listed in question 11 is your favorite?_____

14. Please check the best way to contact you for an interview:

___phone (enter your preferred phone number in the space provided)_____

___e-mail (enter your preferred e-mail address in the space provided)_____

___mail (enter your preferred mailing address in the space provided)_____

_____

_____

APPENDIX D

Interview Questions

1. How old were you when you first became involved in physical activity or exercise?

   (for the purposes of this interview, physical activity is defined as any activity that requires an exertion of energy that is moderate to vigorous in its intensity meaning that engaging in the activity causes your rate of breathing to increase and should involve some sweating)

2. What or who prompted you to become involved in physical activity or exercise?

3. When you were growing up, did your family engage in physical activity or exercise together as a group?

   a. Did any of the members engage in physical activity or exercise on their own?

      i. If yes, how were family members who engaged in these activities viewed by other members of the family?

4. What were your views of physical activity or exercise for women when you were growing up?

5. What were your parents' and/or siblings' views of physical activity or exercise for women when you were growing up?

6. What were your friends' views of physical activity or exercise for women when you were growing up?

7. What views were reflected by your school and/or teachers about physical activity or exercise for women when you were growing up?

8. How do your current household members view physical activity or exercise for women?

9. What do you believe is the value of physical activity or exercise for women?

    a. What or who has influenced these values?

10. Have you always engaged in the same kinds of physical activities or exercises?

    a. If no, why did you change activities?

11. Do you enjoy the physical activities or exercises you currently engage in?

    a. If no, what about these activities do you dislike?

    b. If yes, what about these activities do you enjoy?

        i. Have you always enjoyed these activities?

            -If no, when and why did you begin enjoying them?

12. What are your main motivators for engaging in daily physical activity or exercise?

    a. When you first began to be active, were you motivated by the same things that motivate you now?

        i. If no, when and why did this change?

13. Have you ever had a time or times where you were unsure of your ability to continue to be physically active or to exercise? (If yes, go to 14. If no, go to 15)

14. Did you become inactive during that time?

    a. If yes,

        i. How many times has this happened?

        ii. How long did it take you to return to regular exercise or physical activity?

iii. What facilitated or convinced you to return to regular exercise or physical activity?

b. If no, why not?

i. What kept you from becoming inactive?

ii. What strategies did you use to prevent this from happening?

iii. What advice would you give others who are struggling to persist?

15. When conditions for physical activity or exercise are less than ideal, i.e., poor weather, illness, tiredness, what strategies do you use to prevent "skipping" a day?

16. How important are "routines" in your life?

17. How would you describe yourself in terms of the role physical activity plays in your life?

18. How would others describe you in terms of your relationship with physical activity or exercise?

19. On the survey you completed prior to being invited to interview, you indicated that your were ____% confident that you could continue physical activity or exercise for life. What factors make you ____% confident?

APPENDIX E

Participant Consent Form

Participant Consent Form

You are being asked to participate in a study being conducted by Heather Kesselring, a doctoral student, under the supervision of Dr. Martha Ewing from Michigan State University. The purpose of this study is to broaden the understanding of long-term exercise participation.

As a part of this study, you will be asked to complete two brief questionnaires (approximately 5 minutes each), and if you meet the study criteria, you may be asked to participate in an interview. Upon the completion of the interview, you will receive a $25 gift certificate to Playmakers. If a partial interview is completed, arrangements will be made to schedule another time to complete the interview. However, if the interview cannot be completed, the gift certificate will not be awarded. The interviews will be scheduled for one hour, however individual interviews may go over the allotted time period depending on the volume of information each individual has to share. The questions in the interview will be specific to your experience as an exercise participant. The interview will be audio taped and transcribed. If you wish, you can refuse to have the interview audio taped. You can also ask that the audio tape be turned off at any point during the interview. Audio tapes will be erased once the study is completed. After the interview, you may be contacted to clarify your responses to the questions.

Your responses to the interview will be kept confidential; no one except the primary investigators will have access to these responses. Results will be based on the responses given by all the participants as a group insuring confidentiality of individual responses. Group-based findings will be made available to those who are interested. Your privacy will be protected to the maximum extent allowable by law.

Your participation in this study would be greatly appreciated. However, please know that you may withdraw from participation at anytime without penalty. Furthermore you may refuse questions on the questionnaire and/or interview that you feel uncomfortable answering and still be a part of the study. If you have any questions concerning your participation this study, please contact the principle investigator Dr. Martha Ewing at (517) 333-4652 or Heather Kesselring at (517) 267-5906 or kesselrh@lcc.edu. If you have any questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact-anonymously if you wish- Peter Vasilenko, Ph.D., Chair of the University Committee on Research Involving Human Subjects (UCRIHS) by phone: (517) 355-2180, fax: (517) 432-4503, e-mail: ucrihs@msu.edu, or regular mail: 202 Olds Hall, East Lansing, MI 48824.

Thank you for your time and cooperation,

Martha E. Ewing — 11/1/05

Dr. Martha Ewing, Principle Investigator — Date

Heather A Kesselring — 11/1/05

Heather Kesselring, Graduate Student — Date

Your signature below indicates your voluntary agreement to participate in this study.

_____ _____

Participant Signature — Date

UCRIHS APPROVAL FOR
THIS project EXPIRES:

JUL 2 8 2006

SUBMIT RENEWAL APPLICATION
ONE MONTH PRIOR TO
ABOVE DATE TO CONTINUE

APPENDIX F

Recruiting Letter

Date

Heather Kesselring
108 S. Elm
Ithaca, MI 48847

Participant name
Participant address

You are receiving this letter because you are enrolled in an exercise course and are being asked to consider participating in a research study about participation in exercise. Your participation in this study will help to further broaden our understanding of exercise participation.

Should you decide to become a part of this study, you will be asked to sign a consent form and complete two short written surveys, one with 3 questions and one with 14 questions. If you are selected for participation in this study, you will also be asked to participate in an interview that could last approximately an hour in duration.

Following the completion of that interview, you will receive a $25 gift certificate to Playmakers. If you are interested in participating in this opportunity, please contact Heather Kesselring at 517-267-5906 or kesselrh@lcc.edu.

Sincerely,

Heather Kesselring

REFERENCES

Bandura, A. (1986). *Social foundations of thought and action.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). The anatomy of stages of change. *American Journal of Health Promotion, 12(1)*, 8-10.

Barke, C. R. & Nicholas, D. R. (1990). Physical activity in older adults: The stages of change. *Journal of Applied Gerontology, 9(2),* 216-223.

Booth, M. L., Macaskill, P., Owen, N., Oldenburg, B., Marcus, B. H., & Bauman, A. (1993). Population prevalence and correlates of stages of change in physical activity. *Health Education Quarterly, 20(3),* 431-440.

Borg, G. (1983). Perceived exertion: A note on history and methods. *Medicine and Science in Sport Exercise, 5*, 90-93.

Boyle, R. G., O'Connor, P. J. Nicolaas, P. P., & Tan, A. (1998). Stages of change for physical activity, diet, and smoking among HMO members with chronic conditions. *American Journal of Health Promotion, 12(3),* 170-175.

Buonamano, R., Cei, A., & Mussino, A. (1995). Participation motivation in Italian youth sport. *The Sport Psychologist, 9*, 265-281.

Burn, G. E., Naylor, P. J., & Page, A. (1999). Assessment of stages of change for exercise within a worksite lifestyle screening program. *American Journal of Health Promotion, 13(3),* 143-145.

Byrne, M. M. (2001). Understanding life experiences through a phenomenological approach to research. *Association of periOperative Registered Nurses Journal, April,* Research Corner. Retrieved June 30, 2005 from http://www.aorn.org/journal/2001/aprrc.htm

Cardinal, B. J. (1993). Validation of a stages of exercise adoption scale. *Research Quarterly for Exercise and Sport, 64(1 supplement)*, A-50-A-51.

Cardinal, B. J. (1995a). The stages of exercise scale and stages of exercise behavior in female adults. *Journal of Medicine and Physical Fitness, 35*, 87-92.

Cardinal, B. J. (1995b). Behavioral and biometric comparisons of the preparation, action, and maintenance stages of exercise. *Wellness Perspectives: Research Theory, and Practice, 11(3)*, 36-43.

Cardinal, B. J. (1997). Predicting exercise behavior using components of the transtheoretical model of behavior change. *Journal of Sports Behavior, 20(3),* 272-283.

Cardinal, B. J. (1998). Interaction between stage of exercise and history of exercise relapse. *Journal of Human Movement Studies, 34,* 175-185.

Cardinal, B. J. (1999). Extended stage model of physical activity behavior? *Journal of Human Movement Studies, 37,* 37-54.

Cardinal, B. J., Engels, H. J., & Zhu, W. (1998). Application of the transtheoretical model of behavior change to preadolescents' physical activity and exercise behavior. *Pediatric Exercise Science, 10,* 69-80.

Cardinal, B. J., & Levy, S. S. (2000). Are sedentary behaviors terminable? *Journal of Human Movement Studies, 38,* 137-150.

Center for Disease Control. (1999a, Feb 26). Neighborhood safety and the prevalence of physical activity in selected states, 1996. *Morbidity and Mortality Weekly Report, 48 (7),* 143-146. Retrieved October 8, 2005 from http://www.cdc.gov/mmwr/preview/mmwrhtml/00056582.htm

Center for Disease Control. (1999b, Nov 17). *Physical activity and health: A report of the Surgeon General.* Retrieved October 8, 2005 from http://www.cdc.gov/nccdphp/sgr/women.htm

Center for Disease Control. (2001, Jun 20). *The effects of physical activity on health and disease.* Retrieved February 12, 2005 from http://www.cdc.gov/nccdphp/sgr/pdf/chap4.pdf

Center for Disease Control. (2005). *Health, United States, 2005 with chartbook on trends in the health of Americans.* Retrieved February 12, 2005 from http://www.cdc.gov/nchs/data/hus/hus05.pdf

Christopoulou, M., McKenna, J., & Naylor, P. J. (1996). Assessing self-efficacy and the stages of exercise behavior change. *Journal of Sports Sciences, 14(1),* 23-24.

Clarke, P., & Eves, F. (1997). Applying the transtheoretical model to the study of exercise on prescription. *Journal of Health Psychology, 2(2),* 195-207.

Conley, T. (2003, May 24). Behavioral Health Articles: Relapse. *Mount Regis Center.* Retrieved April 26, 2006 from http://www.mtregis.com/display_article.asp?article=6635

Courneya, K. S., & Bobick, T. M. (2000). Integrating the theory of planned behavior with the processes and stages of change in the exercise domain. *Psychology of Sport and Exercise, 1*, 41-56.

Courneya, K. S., Plotnikoff, R. C., Hotz, S. B., & Birkett, N. J. (2001). Predicting exercise stage transitions over two consecutive 6-month periods: A test of the theory of planned behavior in a population-based sample. *British Journal of Health Psychology, 6,* 135-150.

Cowen, R., Logue, E., Milo, L., Britton, P. J. & Smucker, W. (1997). Exercise stage of change and self-efficacy in primary care: Implications for intervention. *Journal of Clinical Psychology in Medical Settings, 4(3)*, 295-311.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York, NY: Plenum Press.

Duncan, H. H., Travis, S. S., & McAuley, W. J. (1995). An emergent theoretical model for interventions encouraging physical activity (mall walking) for older adults. *Journal of Applied Gerontology, 14 (1),* 64-77.

Dunlap, J, & Barry, H. C. (1999). Overcoming exercise barriers in older adults. *The Physician and Sportsmedicine, 27(11),* 69-75.

Eves, F., Mant, S., & Clarke, P. (1996). Barriers to exercise at different stages of exercise behavior. *Journal of Sports Sciences, 14(1),* 29.

Ewing, M. E., & Seefeldt, V. (1988). *Participation and attrition patterns in American agency-sponsored and interscholastic sports – An executive summary.* East Lansing, Michigan: Michigan State University, Institute for the Study of Youth Sports.

Fahrenwald, N. L., & Walker, S. N. (2003). Application of the transtheoretical model of behavior change to physical activity behavior of WIC mothers. *Public Health Nursing, 20(4),* 307-317.

Fallon, E. A. (2004). Transtheoretical Model: Is termination applicable to exercise? *American Journal of Health Issues.* Retrieved October 2, 2005 from http://www.findarticles.com/p/articles/mi_m0CTG/is_1_19/ai_n60720216/print

Fallon, E. A., & Hausenblas, H. A. (2001). Transtheoretical model of behavioral change: Does the termination stage exist for exercise? *Journal of Human Movement Studies, 40,* 465-479.

Gill, D. L., Gross, J. B., & Huddleston, S. (1983). Participation motivation in youth sports. *International Journal of Sport Psychology, 14*, 1-14.

Goldberg, J. M., Christopher, M. R. J., Aznar, S., Barnes, J. K., Simmonds, G. J., McKenna, J., Page, A., & Naylor, P. J. (1996). The processes of exercise behaviour change used by years 7 and 12 adolescents. *Journal of Sports Sciences, 14(1)*, 30.

Gorely, T., & Gordon, S. (1995). An examination of the transtheoretical model and exercise behavior in older adults. *Journal of Sport and Exercise Psychology, 17*, 312-324.

Gould, D., Feltz, D., & Weiss, M. (1985). Motives for participating in competitive youth swimming. *International Journal of Sport Psychology, 16*, 126-140.

Gould, D., Feltz, D., Weiss, M., & Petlichkoff, L. (1982). Participation motives in competitive youth swimmers. In T. Orlick, J. T. Partington, & J. H. Salmela (Eds.), *Mental training for coaches and athletes*. Champaign, IL: Human Kinetics.

Heesch, K. C., Brown, D. R., & Blanton, C. J. (2000). Perceived barriers to exercise and stage of exercise adoption in older women of different racial/ethnic groups. *Women & Health, 30 (4),* 61-76.

Hellman, E. A. (1997). Use of the stage of change in exercise adherence model among older adults with a cardiac diagnosis. *Journal of Cardiopulmonary Rehabilitation, 17,* 145-155.

Henry Ford Health System. *Factors that can be changed or controlled: Cigarette smoking.* Retrieved April 28, 2006 from http://www.henryford.com/body.cfm?id=45497

Herrick, A. B., Stone, W. J., & Mettler, M. M. (1997). Stages of change, decisional balance, and self-efficacy across four health behaviors in a worksite environment. *American Journal of Health Promotion, 12(1),* 49-56.

Ingledew, D. K., Markland, D., & Medley, A. R. (1998). Exercise motives and stage of change. *Journal of Health Psychology, 3(4),* 477-489.

Janis, I. L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice and commitment.* New York: Free Press.

Jue, N. H., & Cunningham, S. L. (1998). Stages of exercise behavior change at two time periods following coronary artery bypass graft surgery. *Progress in Cardiovascular Nursing, 13(1)*, 23-33.

Juniper, K. C., Oman, R. F., Hamm, R. M., & Kerby, D. S. (2004). The relationship among constructs in the health belief model and the transtheoretical model among African-American college women for physical activity. *American Journal of Health Promotion, 18(5)*, 354-357.

Kearney, J. M., de Graaf, C., Damkjaer, S., & Engstrom, L. M. (1999). Stages of change towards physical activity in a nationally representative sample in the European Union. *Public Health Nursing, 2(1),* 115-124.

King, A. C., Castro, C., Wilcox, S., Eyler, A. A., Sallis, J. F., & Brownson, R. C. (2000). Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of U.S. middle-aged and older women. *Health Psychology, 19 (4),* 354-364.

Klint, K. A., & Weiss, M. R. (1986). Perceived competence and motives for sports: A test of Harter's Competence Motivation Theory. *Journal of Sport Psychology, 9,* 55-65.

Koivula, N. (1999). Sport participation: Differences in motivation and actual participation due to gender typing. *Journal of Sport Behavior, 22,* 360-380.

Kosma, M., Cardinal, B., & McCubbin, J. A. (2004). Predictors of physical activity stage of change among adults with physical disabilities. *American Journal of Health Promotion, 19(2),* 114-117.

Kvale, S. (1996). Interviews: An introduction to qualitative research interviewing. Thousand Oaks, CA: Sage Publications.

Lee, C. (1993). Attitudes, knowledge, and stages of change: A survey of exercise patterns in older Australian women. *Health Psychology, 12(6),* 476-480.

Lewis, M. V., Szabo, R. A., Weiner, K. R., McCall, L., & Piterman, L. (1997). Cultural barriers to exercise among the ethnic elderly. *Internet Journal of Health Promotion.* Retrieved October 8, 2005 from http://www.rhpeo.org/ijhp-articles/1997/4/

Marcus, B. H., Banspach, S. W., Lefebvre, R. C., Rossi, J. S., Carleton, R. A., & Abrams, D. B. (1992). Using the stages of change model to increase the adoption of physical activity among community participants. *American Journal of Health Promotion, 6(6),* 424-429.

Marcus, B. H., Dubbert, P. M., Forsyth, L. H., McKenzie, T. L., Stone, E. J., Dunn, A. L., & Blair, S. N. (2000). Physical activity behavior change: Issues in adoption and maintenance. *Health Psychology, 19(1 supplement),* 32-41.

Marcus, B. H., Eaton, C. A., Rossi, J. S., & Harlow, L. L. (1994). Self-efficacy, decision-making, and stages of change: An integrative model of physical exercise. *Journal of Applied Social Psychology, 24*, 489-508.

Marcus, B. H., & Owen, N. (1992). Motivational readiness, self-efficacy, and decision making for exercise. *Journal of Applied Social Psychology, 22*, 3-16.

Marcus, B. H., Rossi, J. Selby, V. C., Niaura, R. S., & Abrams, D. B. (1992). The stages and processes of exercise adoption and maintenance in a worksite sample. *Health Psychology, 11(6)*, 386-395.

Marcus, B. H., Selby, V. C., Niaura, R. S., & Rossi, J. S. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly for Exercise and Sport, 63*, 60-66.

Marcus, B. H., & Simkin, L. R. (1993). The stages of exercise behavior. *The Journal of Sports Medicine and Physical Fitness, 33*, 83-88.

Marcus, B. H., & Simkin, L. R. (1994). The transtheoretical model: Applications to exercise behavior. *Medicine and Science in Sports and Exercise, 26*, 1400-1404.

McCaslin, M. L., & Wilson-Scott, K. (2003). The five-question method for framing a qualitative research study. *The Qualitative Report, 8*, 447-461. Retrieved June 30, 2005 from http://www.nova.edu/sss/OR/QR8-3/mccaslin.pdf

Morgan, W. P., & O'Connor, P. J. (1988). Exercise and mental health. In R. Dishman (Ed.), *Exercise adherence: Its impact on public health* (pp. 91-121). Champaign, IL: Human Kinetics.

Mullan, E. & Markland, D. (1997). Variations in self-determination across the stages of change for exercise in adults. *Motivation and Emotion, 21(4)*, 349-362.

Mutrie, N., & Caddell, C. (1994). Stages of exercise behaviour change in corporate employees. *Journal of Sport Sciences, 12(2)*, 202-203.

Myers, R. S., & Roth, D. L. (1997). Perceived benefits of and barriers to exercise and stage of exercise adoption in young adults. *Health Psychology, 16(3)*, 277-283.

National Women's Resource Health Center. (2005, May 4). *First annual health survey: Women talk.* Retrieved October 8, 2005 from http://www.healthywomen.org/womentalk/05042005_02.html

Naylor, P. J., & McKenna, J. (1995). Stages of change, self-efficacy and behavioural preferences for exercising among British university students. *Journal of Sport Sciences, 13(1)*, 68-69.

Naylor, P. J., McKenna, J., Barnes, K., & Christopher, M. (1995). Decision balance and self-reported physical activity levels: Validating the stages of change for exercise in British university students. *Journal of Sport Sciences, 13(1),* 68-69.

Nguyen, M. N., Potvin, L., & Otis, J. (1997). Regular exercise in 30- to 60-year-old men: Combining the stages-of-change model and the theory of planned behavior to identify determinants for targeting heart health interventions. *Journal of Community Health, 22(4),* 233-246.

Nigg, C. R., & Courneya, K. S. (1998). Transtheoretical model: Examining adolescent behavior. *Journal of Adolescent Health, 22,* 214-224.

O'Brien-Cousins, S., & Keating, N. (1995). Life cycle patterns of physical activity among sedentary and active older women. *Journal of Aging and Physical Activity, 3,* 340-359.

Peterson, T. R., & Aldana, S. G. (1999). Improving exercise behavior: An application of the stages of change model in a worksite setting. *American Journal of Health Promotion, 13(4),* 229-232.

Plotnikoff, R. C., Hotz, S. B., Birkett, N. J., & Courneya, K. S. (2001). Exercise and the transtheoretical model: A longitudinal test of a population sample. *Preventive Medicine, 33,* 441-452.

Potvin, L., Gauvin, L., & Nguyen, N. M. (1997). Prevalence of stages of change for physical activity in rural, suburban and inner-city communities. *Journal of Community Health, 22(1),* 1-13.

Prochaska, J. O., & Marcus, B. H. (1994). The transtheoretical model: Applications to exercise. In R. K. Dishman (Ed.), *Advances in exercise adherence* (pp. 161-180). Champaign, IL: Human Kinetics.

Prochaska, J. O., Norcross, J. C., & Diclemente, C. C. (1994). *Changing for good: A revolutionary six-stage program for overcoming bad habits and moving your life positively forward.* New York: Avon Books.

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion, 12,* 38-48.

Russell, M., & Karol, K. (1993). *16 PF fifth edition administrators manual.* Champaign, IL: Institute for Personality and Ability Testing, Inc.

Reed, G. R. (1999). Adherence to exercise and the transtheoretical model of behavioral change. In S. J. Bull (Ed.), *Adherence Issues in Sport and Exercise* (pp. 19-45). Chichester, England: John Wiley & Sons Ltd.

Rubin, H. J., & Rubin, I. S. (1995). Qualitative interviewing: The art of hearing data. Thousand Oaks, CA: Sage Publications.

Sapp, M., & Haubenstricker, J. (1978, April). *Motivation for joining and reasons for not continuing in youth sports programs in Michigan.* Paper presented at the American Alliance for Health, Physical Education, Recreation and Dance National Conference, Kansas City, MO.

Sarkin, J.A., Johnson, S. S., Prochaska, J. O., & Prochaska, J. M. (2001). Applying the transtheoretical model to regular moderate exercise in an overweight population: Validation of a stages of change measure. *Preventive Medicine, 33,* 462-469.

Simmonds, G. J., Naylor, P. J., Riddoch, C. J., & Vellman, G. (1996). Stage-based counseling for exercise in primary care: A controlled trial. *Journal of Sports Sciences, 14(1),* 45-46.

Snyder, E. E., & Spreitzer, E. A. (1973). Family influence and involvement in sports. *Research Quarterly, 44 (3),* 249-255.

Swann, W. B., & Pittman, T. S. (1977). Initiating play activity of children: The moderating influence of verbal cues on intrinsic motivation. *Child Development, 48,* 1128-1132.

Titze, S., Martin, B. W., Seiler, R., Stronegger, W., & Marti, B. (2001). Effects of a lifestyle physical activity intervention on stages of change and energy expenditure in sedentary employees. *Psychology of Sport and Exercise, 2,* 103-116.

United States Department of Agriculture. (2005). *Dietary guidelines for Americans 2005.* Retrieved January 14, 2005 from http://www.health.gov/dietaryguidelines/dga2005/document/html/executivesummary.htm

United States Department of Health and Human Services. (2000). *Healthy people 2010.* Retrieved February 12, 2005 from http://www.healthypeople.gov/LHI/

Walcott-McQuigg, J. A., & Prochaska, T. R. (2001). Factors influencing participation of African American elders in exercise behavior. *Public Health Nursing, 18,* 194-203.

Weiss, M. R., & Chaumeton, N. (1992). Motivational orientations in sport. In T. S. Horn (Ed.), *Advances in sport psychology* (pp. 61-99). Champaign, IL: Human Kinetics.

Wold, B., & Kannas, L. (1993). Sport motivation among young adolescents in Finland, Norway and Sweden. *Scandinavian Journal of Medicine and Science in Sports, 3,* 283-291.

Women's Sports Foundation UK. (2005). *Research into the barriers that prevent young mothers from participating in physical activity: The final report.* Retrieved October 8, 2005 from http://www.cre.gov.uk/sportingequals/spa_research.html

Wyse, J., Mercer, T., Ashford, B., Buxton, K., & Gleeson, N. (1995). Evidence for the validity and utility of the stages of exercise behavior change scale in young adults. *Health Education Research, 10(3),* 365-377.

Zuckerman, M., Porac, J., Lathin, D., Smith, R., & Deci, E. L. (1978). On the importance of self-determination for intrinsically motivated behavior. *Personality and Social Psychology Bulletin, 4,* 443-446.