

THE EFFECTS OF A POSSIBLE SELVES INTERVENTION ON SELF-
REGULATORY EFFICACY AND EXERCISE BEHAVIOUR

IMAGINING THE POSSIBILITIES: INVESTIGATING THE EFFECTS OF A
POSSIBLE SELVES INTERVENTION ON SELF-REGULATORY EFFICACY AND
EXERCISE BEHAVIOUR

By

ELISA CHRISTINE MURRU, B.A.

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AUTHOR: Elisa Christine Murru, B.A. (Simon Fraser University)

SUPERVISOR: Dr. K. A. Martin Ginis

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Abstract

The present study was conducted to determine the effect of a possible selves intervention on self-regulatory efficacy and exercise behaviour. Participants were 19 men and 61 women (M age = 21.43, SD = 3.28) who reported exercising less than 3 times per week. Participants were randomly assigned to a control condition, a hoped-for possible selves intervention condition, or a feared possible selves intervention condition. Participants in the hoped-for and feared possible selves conditions completed an activity where they imagined themselves in the future as either healthy, regular exercisers or unhealthy, inactive individuals, respectively. Participants in the control group completed a quiz about physical activity. Measures of self-regulatory efficacy (scheduling, planning, goal-setting, and barrier self-efficacy) were taken immediately before and after exposure to the intervention. Participants who received a possible selves intervention reported greater exercise behaviour 4 weeks post-intervention than participants in the control group ($p = .05$). Furthermore, planning self-efficacy was found to partially mediate the effect of the possible selves intervention on exercise behaviour. These findings suggest that possible selves may play a role in increasing exercise behaviour among inactive individuals. Future research is warranted to examine the role of possible selves interventions in increasing exercise behaviour and to determine which other variables may mediate this intervention-exercise behaviour relationship.

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Literature Review

Physical inactivity is a modifiable risk factor for various illnesses such as type two diabetes and heart disease (Public Health Agency of Canada, 2003). Despite this fact, 51% of Canadian adults remain inactive (Canadian Fitness and Lifestyle Research Institute [CFLRI], 2004). In order to increase participation rates, it is necessary to examine factors within a theoretical framework that influence exercise participation so that these factors may be targeted for intervention.

There is a large body of research dedicated to implementing and evaluating the effectiveness of interventions to increase exercise behaviour using a wide range of social psychological theoretical frameworks. However, psychosocial theories of behaviour change account for less than 30% of variability in exercise behaviour (Baranowski, Anderson, & Carmack, 1998). Consequently, reviews of the efficacy of exercise behaviour change interventions (Baranowski et al., 1998; Kahn et al., 2002,) recommend further research exploring the role of additional psychological variables (i.e., variables outside of the most commonly used theoretical frameworks) that may contribute to the development of more comprehensive models for predicting and changing exercise behaviour.

Possible Selves

One psychological construct that may be useful for predicting and changing exercise behaviour is the concept of *possible selves* (Markus & Nurius, 1986). Possible selves are future-oriented self-conceptions that represent individuals' ideas of who they want to become (hoped-for selves; e.g., the healthy self, the regular exerciser self), as

well as who they fear or aim to avoid becoming (feared selves; e.g., the overweight self, the sedentary self). Possible selves are related to one's self-concept; they serve as the "experience of a future, tentative working self-concept" (Erikson, 2007, p. 353). Markus and Ruvolo (1989) state that possible selves serve as a "bridge of self-representations between one's current state and one's desired or hoped-for state" (p. 211). Possible selves provide a link between an individual's self-concept and motivation for behaviour by acting as self-images to be achieved or avoided. Possible selves are more than abstract fears or expectations about the future; they are concrete visions or conceptions of the self in the future, and have personal meaning (Erikson, 2007). For example, completing a marathon represents an abstract goal or expectation; whereas a distinct image or experience of what it would be like (and what it would mean to the self) to complete a marathon represents a possible self.

Individuals possess a number of feared and hoped-for possible selves. These various possible selves may cover different roles and identities. Possible selves also vary in vividness – some possible selves may be rich in detail of how and when a certain possible self will be achieved, whereas other possible selves may be vague (Oyserman & James, 2008). Possible selves may also be linked to specific strategies for achieving or avoiding those possible selves. Detailed possible selves that contain strategies for attainment (or avoidance) are more likely to lead to self-regulation of behaviour (the ability to change oneself and exert control over one's inner processes; Baumeister & Vohs, 2004; Oyserman & James). The relationship between possible selves and behaviour has been studied across a variety of behavioural contexts including education

(Oyserman, Terry, & Bybee, 2002), career counseling (e.g., Chalk, Meara, & Day, 1994), and health behaviour (e.g., Hooker & Kaus, 1994).

Possible Selves and Health Behaviours

A few studies have examined the relationship between health-related possible selves and various health behaviours (e.g., Hooker & Kaus, 1992; Hooker, 1992; Hooker & Kaus, 1994; Black, Stein, & Loveland-Cherry, 2001) and taken together, provide support for a relationship between health-related possible selves and health behaviours. For example, in a sample of older adults, those who identified a health-related possible self (e.g., being healthy in body and mind, losing one's health) as their most important possible self were more likely to report engaging in an inventory of several health behaviours (e.g., exercising, stress management, medical checkups, weight control). Having a most important health-related possible self was also a stronger predictor of health behaviors than were global health values (Hooker & Kaus, 1992). Another study found that feared health-related possible selves (e.g., being a stroke victim, having a bad heart, having cancer) were related to increased adherence to mammography screening (Black et al., 2001).

Possible Selves and Exercise Behaviour

A few studies have also examined the relationship between exercise-related possible selves and exercise behaviour (e.g., Harju & Reed, 2003; Whaley, 2003). Harju and Reed asked a sample of college students to list three hoped-for exercise-related possible selves and three feared, or non-exerciser possible selves. Examples of commonly listed hoped-for exercise-related selves included being fit, being healthy, and being attractive. Some commonly listed feared non-exerciser selves were being unfit,

unattractive, and failing with exercise goals. Harju and Reed found that those participants who believed that they had already achieved their hoped-for exercise-related possible selves reported higher levels of self-efficacy for achieving their hoped-for selves, workouts, and fitness, compared to those who believed they had not yet achieved a hoped-for exercise-related self. Whaley (2003) found that among a sample of middle-aged women, those who reported being non-exercisers were more likely to describe hoped-for and feared possible selves related to body image compared to participants who described themselves as occasional, short-term, or long-term exercisers. Additionally, long-term exercisers reported a greater number of hoped-for and feared possible selves related to health and physical activity compared to non-exercisers. It should be noted that both studies used cross-sectional designs, therefore the direction of the relationship between possible selves and physical activity levels cannot be determined. Nevertheless, taken together, these studies suggest that the possible selves construct may be important in understanding exercise behaviour.

To date, only one published study has employed a possible selves intervention aimed at increasing physical activity behaviour (Ouellette, Hessling, Gibbons, Reis-Bergan, & Gerrard, 2005). The researchers were interested in examining the impact of exercise-related prototypes (an individual's image of the typical person who belongs to a group or who engages in a certain behaviour; e.g., a typical exerciser; Rosch, 1977) and exercise-related possible selves on exercise behaviour among a sample of 152 undergraduate students (M age = 20). Participants were randomly assigned to one of four conditions where they were asked to describe their impressions of (a) themselves 10 to 20 years from now as someone who exercises regularly (hoped-for possible self); (b)

themselves 10 to 20 years from now as someone who does not exercise regularly (feared possible self), (c) other people 10 to 20 years from now who exercise regularly (exerciser prototype); or (d) other people 10 to 20 years from now who do not exercise regularly (non-exerciser prototype). Participants then completed a series of questions asking for specific details about the images, including appearance, general health, energy level, attitude toward life, achievements, and relationships. Baseline exercise behaviour was measured with the following questions: “How many times a week do you go to the campus recreation center or other fitness facility to engage in non-sport aerobic exercise?” and “How many times a week do you take part in sports that include aerobic exercise?” Four weeks later, participants were contacted by the researchers and were asked to participate in a telephone survey about exercise and campus recreational facilities. The participants were not told that the telephone survey was linked to the prior study session. Exercise behaviour was measured with the same questions asked at baseline but with reference to the post-intervention 4-week time period. The personality trait consideration of future consequences (CFC; Strathman, Gleicher, Boninger, & Edwards, 1994) was also measured and assessed as a possible moderator of the relationship between the intervention and exercise behaviour.

Oullette et al. (2005) did not find any main effects or interactions between possible selves type (i.e., non-exerciser/feared possible self, exerciser/hoped-for possible self) and consideration of future consequences on exercise behaviour. This finding was contrary to their predictions that the feared possible selves manipulation would lead to a greater increase in exercise behaviour than the hoped-for possible selves manipulation. (This prediction was based on research findings showing that exposure to images of people

engaging in negative health behaviours predicts subsequent behaviour better than exposure to images of people engaging in positive health behaviours; e.g., Blanton et al., 2001; Ogilvie, 1987). Therefore, data were collapsed to form a single possible selves condition. The researchers found that the effects of the possible selves intervention were moderated by consideration of future consequences. Specifically, individuals who received the intervention and scored high on consideration of future consequences reported an increase in exercise behaviour four weeks after the intervention ($p = .05$, $r_{\text{effect size}} = .16$).

Researchers have also aimed to determine whether feared or hoped-for possible selves are more motivating. It seems that avoiding a feared or undesired self may serve as a more powerful motivator than achieving a hoped-for self. Ogilvie (1987) found that avoiding an undesired self was a stronger motivator than achieving an ideal self with regard to attaining life satisfaction. Based on these findings, Ogilvie argued that individuals form their ideals based on avoiding their undesired selves.

In the domain of possible selves and health behaviour research, findings have been mixed, although it seems that feared possible selves may have a greater impact on health behaviours. Both young and middle-aged adults report having a greater number of feared than hoped-for health-related possible selves (Hooker & Kaus, 1994). Black et al. (2001) found that feared possible selves were associated with greater adherence to mammography screening among a sample of older adult women. Additionally, Hoyle and Sherrill (2006) found that activation of a feared health-related possible self led to self-regulation of health behaviour, whereas activation of a hoped-for health-related possible self did not. Hence, it seems that avoiding feared health-related possible selves may be a

greater motivator for behaviour change and self-regulation than achieving hoped-for health-related possible selves.

Based on the studies reviewed here, it is plausible that the possible selves concept may play an important role in understanding, predicting, and changing health behaviours such as exercise. However, in order to understand *how* possible selves lead to behaviour change, it is important to examine mechanisms through which change may occur. It has been suggested that self-regulatory processes may be a mechanism through which possible selves influence behaviour (Hoyle & Sherrill, 2006).

Possible Selves and Self-Regulation of Behaviour

In previous research examining the link between possible selves and behaviour, the possible selves construct has been treated as a stand-alone construct, rather than part of a theoretical framework (Hoyle & Sherrill, 2006). However, it has been argued that the possible selves construct should be embedded within a behaviour change model that specifies a process by which possible selves influence behaviour, as little progress has been made in understanding how possible selves affect behaviour (Hoyle & Sherrill, 2006). Hoyle and Sherrill proposed an alternative view whereby possible selves are involved in self-regulation processes by serving as a source of behavioural standards against which current views of the self are compared, and discrepancies between these two images are rectified through behaviour. To test this hypothesis, the researchers examined whether activating feared or hoped-for health-related possible selves produced behavioural self-regulation. Hoyle and Sherrill also compromised self-regulation capacity for half of the study participants. They found that participants with activated feared health-related selves showed greater evidence of self-regulation than those in the hoped

for and control (no possible self intervention) conditions, but only when their ability to self-regulate was not compromised. These findings provide support for activating feared health-related possible selves as a means of producing behavioural self-regulation.

In its original conception, the notion of possible selves was theoretically linked to the self-regulatory process of self-efficacy (Markus & Nurius, 1986; Markus & Ruvolo, 1989). Self-efficacy is the belief in one's capabilities to perform the tasks required to achieve a specific goal or outcome (Bandura, 1997). The development of self-efficacy beliefs results in the development of capacity for self-regulation (Maddux & Gosselin, 2003). Self-efficacy beliefs promote self-regulation by influencing behaviour such as goal-setting, persistence, and problem-solving. Cross and Markus (1991) contend that discrepancies between one's current self and one's possible self would result in behaviour change facilitated by self-regulatory strategies such as developing action plans or developing self-efficacy for the particular behaviour that would lead to the desired possible self. Hence, if possible selves are posited to influence behaviour through self-regulatory processes, it seems that self-regulatory efficacy (confidence in one's ability to manage various skills during performance of complex tasks; Bandura 1995), which is a self-regulation process essential for the development of self-regulation, would also be related to the influence of possible selves on behaviour.

The Current Study

The studies reviewed here suggest that hoped-for and feared possible selves may play a role in self-regulation of health behaviour. The aim of the present study was to examine the effects of an intervention targeting feared versus hoped-for possible selves on exercise behavior among a sample of inactive young adults. Specifically, participants took part in a possible selves intervention where they were asked to focus their attention

on either a description of a feared possible self as a non-exerciser, a description of a hoped-for possible self as a regular exerciser, or a control condition. Additionally, self-regulatory efficacy variables were examined as possible mediators of the relationship between the possible selves interventions and exercise behaviour.

Self-regulatory efficacy mechanisms were examined within the framework of the health action process approach model (HAPA; Schwarzer 2004). The HAPA model (Figure 1) consists of two phases or stages; a motivation phase and a volition (action) phase. In the motivation phase, risk perception predicts outcome expectancies, which in turn predict self-efficacy. These three variables influence an individual's goals or intentions to perform a behaviour and the formation of action plans turn these intentions into behaviour. The volition phase consists of a planning, initiation, and behaviour maintenance phase. It seems that the self-efficacy construct is a particularly important aspect of the HAPA model, as it directly influences intentions, planning, and behaviour. The HAPA has been applied to understanding and predicting a variety of health behaviours such as smoking (e.g., Schwarzer & Fuchs, 1995), healthy eating (e.g., Schwarzer & Renner, 2000), breast self-examination (e.g., Garcia & Mann, 2003), and exercise (e.g., Lippke, Ziegelmann, & Schwarzer, 2006).

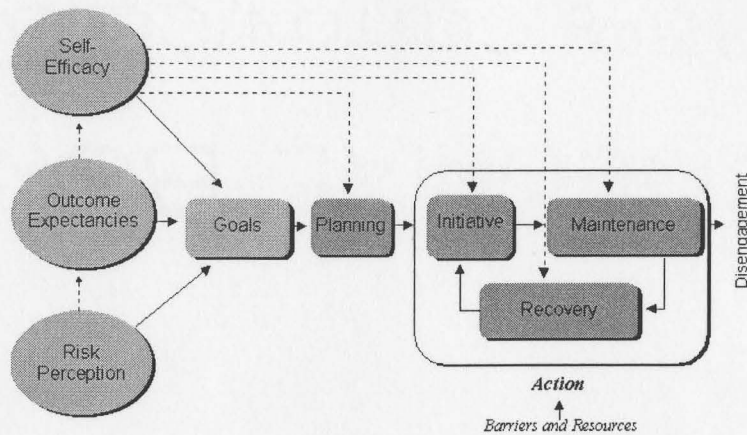


Figure 1. The Health Action Process Approach (adapted from Schwarzer 2004).

We chose the HAPA model because it conceptualizes self-regulatory efficacy variables as influencing all phases of behaviour. Since possible selves are proposed to influence exercise behaviour through self-regulatory processes, we required a theory of behaviour that incorporated self-regulatory variables such as self-regulatory efficacy. The HAPA model posits that self-regulatory efficacy variables play an important role in the volition phase (planning, initiation, and behaviour maintenance phases). Self-regulatory efficacy variables examined within the framework of the HAPA model have been found to be related to exercise behaviour (e.g., Schwarzer & Fuchs, 1995, Lippke et al., 2004, Ziegelmann et al., 2004). For example, in a study examining exercise behaviour among heart disease patients in rehabilitation, coping (barrier) self-efficacy was a significant predictor of exercise behaviour. However, previous studies have tended to focus solely on coping self-efficacy as opposed to examining multiple types of self-regulatory efficacy.

We proposed that any effects of the possible selves intervention on exercise behaviour would be mediated by self-regulatory efficacy variables. More specifically, we proposed that activation of exercise-related possible selves would influence self-regulatory efficacy which would in turn influence exercise behaviour. This proposed

mechanism is based on findings that activation of possible selves produces behavioural self-regulation (Hoyle & Sherrill, 2006), and that possible selves are related to self-regulatory processes such as self-efficacy (e.g., Harju & Reed, 2003).

Study Hypotheses

The following hypotheses were tested:

1. Based on previous research findings (Blanton et al., 2001; Ogilvie, 1987, Black et al., 2001; Hoyle & Sherrill, 2006), over the course of the study, participants exposed to the feared possible selves intervention would report greater exercise behaviour compared to participants who received the hoped-for possible selves intervention. Participants in the hoped-for possible selves condition would report greater exercise behaviour than the control group.
2. Based on evidence that self-regulatory processes may mediate the relationship between possible selves interventions and behaviour change (e.g., Hoyle & Sherrill, 2006), self-regulatory efficacy variables (planning, goal-setting, barrier and scheduling self-efficacy) will mediate the relationship between the possible selves interventions and exercise behaviour over the course of the study.

Method

Design and Methodological Overview

The present study employed a randomized controlled experimental design.

Participants were randomly assigned to one of three conditions – a hoped-for possible selves intervention where participants were asked to generate images of themselves in the future as regular exercisers, a feared possible selves intervention where participants were required to generate images of themselves as individuals who fail to exercise regularly, or

a control group where participants completed a quiz about physical activity. Participants completed log books for eight weeks following the intervention in order to track exercise behaviour. Measures of outcome variables were taken immediately before and after the experimental manipulation.

Participants

Participants were 30 males and 80 females between the ages of 18 and 33 years (M age = 21.29, SD = 3.23) who reported engaging in less than three 30 min bouts of moderate to strenuous physical activity in a typical week over the past year (Health Canada 2003) but intended to become more active over the next six months. Participants were recruited from the McMaster community via posters placed around campus (see Appendix A), advertisements on the McMaster Daily News website, and distribution of advertisements in the university student center.

Measures

Screening measures. The Physical Activity Readiness Questionnaire (PAR-Q; Public Health Agency of Canada [PHAC], 2003) was used to screen participants for health problems that may be aggravated by exercise (see Appendix A). If participants answered “Yes” to any of the PAR-Q items, they were excluded from participation in the study. The Godin Leisure-Time Exercise Questionnaire was used to identify participants who exercised less than three days per week (GLTEQ; Godin & Shephard, 1985; see Appendix A). This questionnaire assesses participation in mild, moderate, and strenuous physical activities in a typical week over the past year. Additionally, participants who met the exercise inclusion criteria were asked whether they intended to begin exercising regularly over the next six months (i.e., exercising at a moderate to strenuous intensity 30

min or more at least three days per week). Those individuals who answered “yes” were enrolled in the study. Only intenders were included in the study as intervention effects may differ between intenders and non-intenders (Lippke et al., 2004).

Demographics. Participants completed a questionnaire where they were asked to report their gender, age, marital status, current education level, current employment status, and ethnicity. Self-report measures of height and weight were also collected (see Appendix B).

Self-Regulatory Efficacy

Various aspects of self-regulatory efficacy (i.e., scheduling, planning, barrier, and goal setting self-efficacy) were measured. Each of the self-efficacy measures employed an 11-point response scale ranging from 0% (*I definitely can't*) to 100% (*I definitely can*).

Scheduling self-efficacy. The five item measure of scheduling self-efficacy assessed participants' confidence in their ability to arrange their schedules over the next eight weeks to include at least 30 min of moderate to strenuous physical activity one, two, three, four, and five times a week (see Appendix B; Arbour & Martin Ginis, 2004). A mean score across these five items represented scheduling self-efficacy.

Planning self-efficacy. Planning self-efficacy was measured using five items that assess participants' confidence in their ability to plan their exercise sessions (See Appendix B; DuCharme & Brawley, 1995; Rodgers, Hall, Blanchard, McAuley, & Munroe, 2002). A sample item is “Over the next eight weeks, I am confident that I can make up times when I missed my regular exercise session.” The mean score of these seven items represented planning self-efficacy.

Barrier self-efficacy. Barrier self-efficacy was measured with 16 items assessing participants' confidence to continue to participate in moderate to strenuous physical activity for 30 min at least three days per week over the next eight weeks when faced with various situations, such as bad weather, feeling depressed, or during vacation (see Appendix B). This measure was adapted from a similar measure used by Garcia and King (1991). A total barrier self-efficacy score was calculated by computing the mean of the 16 items.

Goal-setting self-efficacy. The goal-setting self-efficacy scale assessed participants' confidence for setting realistic exercise goals over the next eight weeks (see Appendix B; Brawley, Rejeski, Angove, & Fox, 2003; Dawson & Brawley, 2000). Four items were used, and this mean score represented goal-setting self-efficacy.

Consideration of Future Consequences (CFC). CFC has been shown to moderate the effects of possible selves interventions (Ouellete et al. 2005). Therefore, it was measured in order to be assessed as a possible moderator in our analyses. The revised version of the CFC scale (see Appendix B; Petrocelli, 2003; Strathman et al., 1994) was used to measure the extent to which participants consider the distal outcomes of their behaviour. This measure consisted of 8 items rated on a 5-point scale ranging from 1 (*extremely uncharacteristic*) to 5 (*extremely characteristic*). A sample item is, "My convenience is a big factor in the decisions I make or the actions I take." Seven of the 8 items were reverse scored and a mean score was calculated to provide a measure of CFC. Higher scores indicated higher CFC, with a maximum possible score of 5.

Affective Valence. The Feeling Scale (FS; Hardy & Rejeski, 1989) was used to assess affect after completing the intervention as part of a manipulation check. The

Feeling Scale is an 11-point, single-item bipolar measure of pleasure-displeasure (see Appendix E). The scale ranges from +5 to -5. Descriptive anchors are provided at the 0 point, and at all odd integers (+5 = *very good*, +3 = *good*, +1 = *fairly good*, 0 = *neutral*, -1 = *fairly bad*, -3 = *bad*, and -5 = *very bad*). Participants were asked to rate how they felt in the moment immediately after completing the intervention by circling the appropriate number.

Exercise behaviour. Exercise behaviour was assessed using log books (see Appendix D). Participants were asked to keep track of details about type, duration, and intensity of each bout of moderate to vigorous exercise they completed. Exercise was defined for participants as “structured physical activity chosen to do during one’s free time for the purpose of enhancing health or physical fitness.” Exercise behaviour was operationally defined as the total number of minutes and total number of days that participants engaged in exercise over the course of the study. Log books have been used as a measure of self-reported exercise behaviour in previous intervention research (e.g., Arbour & Martin Ginis, 2004).

Procedure

Interested participants were screened for eligibility by administering the screening measures via email, phone, or in person. Potential participants were informed that the purpose of the study was to examine whether certain psychological variables predict exercise behaviour. Participants that met eligibility criteria were scheduled for the initial testing session.

At the beginning of each session, participants provided written informed consent, acknowledging that their participation was completely voluntary and that they could

withdraw from the study at any time. Next, participants were randomly assigned to one of three conditions (hoped-for possible selves intervention, feared possible selves intervention, or control condition) using a list of random numbers, and received the questionnaire package containing the demographics measures, the first set of outcome measures (self-regulatory efficacy measures and consideration of future consequences measure), an activity to complete based on the experimental condition they were assigned to, and a second set of the outcome measures, respectively. The Consideration of Future Consequences measure was only included in the first set of outcome measures, as it is a trait variable and was not expected to be influenced by the intervention.

Possible selves intervention. To date, there is neither a standard measure of possible selves nor a consensus regarding how to operationally define this concept; however, studies have shown that possible selves can be experimentally manipulated (e.g., Ouellette et al., 2005; Hoyle & Sherrill, 2006). Ouellette et al. conducted the only study to date that attempted to experimentally manipulate feared and hoped-for exercise-related selves. Ouellette and colleagues conducted a pilot study prior to the intervention study and found that participants understood the image generation instructions and produced the images they were asked to generate (i.e., hoped for or feared possible self). In addition, an image generation manipulation check on the intervention study data also confirmed that exerciser images produced by the participants were significantly more positive than non-exerciser images. Hence, Ouellette et al.'s possible selves image generation task was used and adapted for the purposes of the present study.

The possible selves intervention consisted of written instructions asking participants to generate images of themselves in the future as either a healthy, active,

regular exerciser (hoped for possible self; Appendix C) or images of themselves in the future as inactive (feared possible self; Appendix C). Participants received the following instructions:

“We are interested in your impression of **yourself** 5 to 10 years from now. More specifically, we would like you to think about yourself in the future as a person who is (*a healthy, active, regular exerciser/an unhealthy, inactive person who fails to exercise regularly*). You (*follow/do not follow*) a healthy lifestyle which includes (*exercising/failing to exercise*) on most days of the week at a moderate to vigorous intensity. Five to ten years from now, you (*are/are not*) at a healthy weight and (*have/do not have*) the energy to carry out your daily tasks. When you think about yourself five to ten years from now as (*a healthy, regular exerciser/an inactive person who fails to exercise regularly*), what images come to mind? Please take a few minutes to imagine and think about this image before turning the page. On the following pages, you will be asked to answer some questions about this image.”

Participants then answered a series of 8 questions about the images they generated (Appendix C). First, participants were asked to describe the first thing that came to mind when they thought about this image. Participants were then asked to describe details about the image, including appearance, general health, energy level, attitude towards life, achievements, relationships and anything else that came to mind when thinking about the image. Participants in the control condition completed a quiz about physical activity (Appendix C).

After participants completed the questionnaire package, they were informed that they would immediately receive an email containing the exercise log book as well as

specific instructions for recording data in the log books (Appendix D). The researcher explained that the log book would be a Microsoft Word file in the form of a calendar that could be saved on the participants' computer, and that participants would be asked to record the type, duration, and intensity of exercise they participated in over the next eight weeks. The log books contained definitions for mild, moderate, and vigorous intensity. Participants were asked to only record moderate to vigorous bouts of exercise. Participants were informed that they would receive a daily email reminder to fill in their log books, as well as email prompts at weeks four and eight to return the log books to the researcher via email. The log books also contained messages based on the experimental condition that participants were assigned to. These messages were simply copied from the intervention activities. Control condition log books contained a general message encouraging active living. Participants in the feared and hoped-for possible selves conditions received log books containing messages asking them to think of themselves as unhealthy, inactive individuals or healthy, regular exercisers, respectively.

After returning the completed log books, participants received an email consisting of a debriefing about the nature of the study (Appendix E), were thanked for their participation, and were asked to indicate a date and time to pick up their compensation. Participant compensation consisted of \$5 dollar payments for completing each study component (Time 1 questionnaire, Time 2 [week 4] log book return, and Time 3 [week 8] log book return).

Results

Descriptive Statistics and Psychometrics

Participant Characteristics. Demographic characteristics are presented in Table 1 for participants who completed the questionnaires at the initial testing session (Time 1; $n=110$), at four weeks (Time 2; $n=80$), and at eight weeks (Time 3; $n=42$). Due to the small sample size at Time 3, no further analyses were completed for Time 3 data.

A series of independent t tests and chi-square analyses were conducted to check for any differences between the 80 participants who were included in the final analyses and those who dropped out after Time 1 data collection ($n=30$). A significant difference in the number of vigorous physical activity bouts was found between Time 2 completers and drop-outs, $t(108) = -2.59$, $p = .04$, where dropouts reported higher baseline vigorous physical activity than those who completed the study. No other significant differences for participant characteristic variables were found ($ps > .05$). Also, no significant differences in the number of drop-outs across the three experimental conditions were found.

A series of ANOVAs and chi-square analyses were conducted to determine if there were any differences in participant characteristic variables between the three experimental conditions. Number of baseline bouts of mild physical activity was higher in the control condition compared to the hoped-for and feared possible selves conditions $F(2, 77) = 4.13$, $p = .02$. No other significant differences for participant characteristic variables were found ($ps > .05$).

Table 1

Demographic Characteristics of Participants at Time 1, Time 2 (Week 4), and Time 3 (Week 8)

Variable	Time 1 (n=110)			Time 2 (n=80)			Time 3 (n=44)		
	FPS (n=37)	HFPS (n=38)	Control (n=35)	FPS (n=27)	HFPS (n=26)	Control (n=27)	FPS (n=15)	HFPS (n=15)	Control (n=14)
Sex									
Male	32.4	23.7	25.7	25.9	19.2	25.9	13.3	26.7	28.6
Female	67.6	76.3	74.3	74.1	80.8	74.1	86.7	73.3	71.4
Age	21.92 (3.38)	21.08 (3.62)	20.86 (2.55)	22.04 (3.41)	21.19 (3.61)	21.03 (2.82)	21.73 (3.92)	21.60 (4.15)	21.71 (3.29)
BMI	23.92 (3.79)	23.12 (3.67)	24.34 (6.13)	23.91 (3.82)	23.37 (4.02)	23.85 (5.67)	23.17 (4.18)	23.11 (4.14)	23.08 (4.91)
PA (bouts per week)									
Mild	1.78 (1.69)	2.38 (2.45)	3.13 (2.28)	1.72 (1.40)	1.77 (1.61)	3.00 (2.37)	1.60 (1.35)	1.77 (1.57)	2.46 (2.67)
Moderate	.45 (.60)	.45 (.66)	.71 (.78)	.43 (.57)	.54 (.72)	.72 (.74)	.48 (.64)	.37 (.55)	.64 (.74)
Vigorous	.82 (.86)	.80 (.74)	.67 (.82)	.80 (.84)	.63 (.64)	.52 (.69)	.63 (.70)	.73 (.62)	.54 (.75)
Marital Status									
Not married	100.0	97.3	97.2	100.0	100.0	96.3	100.0	100.0	92.9
Married	0.0	2.7	2.8	0.0	0.0	3.7	0.0	0.0	92.9

Current Education Level ^a

Undergraduate	78.4	89.5	94.1	74.1	84.6	92.3	73.3	80.0	92.3
Graduate	21.6	10.5	5.9	25.9	15.4	7.6	26.7	20.0	7.7

Current Employment ^a

Unemployed	45.9	39.5	35.3	44.4	38.5	34.6	40.0	46.7	38.5
Part-time	27.0	21.1	23.5	29.6	19.2	23.1	26.7	6.7	23.1
Full-time	27.0	39.5	41.2	25.9	42.3	42.3	33.3	46.7	38.5

Ethnicity

Caucasian	45.9	65.8	42.9	48.1	61.5	44.4	66.7	53.3	57.1
Asian	21.6	10.5	11.4	25.9	15.4	14.8	20.0	26.7	21.4
South Asian	21.6	13.2	34.3	14.8	11.5	25.9	13.3	13.3	7.1
Other	10.8	10.6	11.5	11.1	11.5	14.8	0.0	6.7	14.4

Note. FPS = Feared possible selves condition; HFPS = Hoped-for possible selves condition; BMI = body mass index (kg/m²); PA = physical activity. Means and standard deviations given for continuous variables, percentages given for categorical variables.

^aMissing data from one participant in the control group.

Self-Regulatory Efficacy and Consideration of Future Consequences Measures.

Internal consistencies for the scales are presented in Table 2. All scales demonstrated adequate internal consistency (i.e., $\alpha > .70$; Nunnally, 1978). Means and standard deviations for self-regulatory efficacy and CFC variables measured pre-and post-intervention are presented in Table 3. No differences in baseline self-regulatory efficacy and CFC measures were found between experimental conditions at Time 1, and between completers ($n=80$) versus drop-outs ($n=30$; $ps > .05$).

Table 2

Internal Consistency for the Self-Regulatory Efficacy and Consideration of Future Consequences Scales

Scale	Time 1 Pre-Intervention	Time 1 Post-Intervention
Scheduling Self-Efficacy	.85	.86
Planning Self-Efficacy	.93	.94
Barrier Self-Efficacy	.88	.91
Goal Setting Self-Efficacy	.90	.88
Consideration of Future Consequences	.78	N/A

Note. Acceptable reliability: $\alpha > .70$ (Nunnally, 1978).

Table 3

Means, Standard Deviations, and Possible Scoring Ranges for Time 1 Pre- and Post-Intervention Measures for Participants Included in Final Analyses (n=80)

Measure	Possible Scoring Range	FPS (n=27)	HFPS (n=26)	Control (n=27)
Scheduling SE	0 - 100			
Pre		76.96 (16.61)	80.08 (17.14)	73.63 (16.83)
Post		79.93 (15.58)	82.69 (12.30)	73.41 (19.33)
Planning SE	0 - 100			
Pre		75.26 (16.09)	72.36 (19.33)	68.15 (18.47)
Post		78.62 (12.44)	77.58 (18.09)	67.72 (18.21)
Barrier SE	0 - 100			
Pre		61.57 (15.18)	59.05 (17.64)	50.97 (14.57)
Post		66.37 (14.93)	64.17 (15.29)	51.53 (17.10)
Goal Setting SE	0 - 100			
Pre		78.01 (14.05)	73.94 (17.58)	71.94 (11.90)
Post		81.29 (10.95)	78.17 (16.60)	73.06 (11.75)
CFC	1 - 5			
Pre		3.19 (.52)	3.02 (.74)	3.40 (.75)

Note. FPS = Feared possible selves condition; HFPS = Hoped-for possible selves condition; SE = self-efficacy; CFC = Consideration of Future Consequences.

Manipulation Check of Possible Selves Intervention

In order to verify the effectiveness of the possible selves image generation task, we assessed whether the images that participants generated were consistent with the images they were asked to generate (i.e., feared possible self as a non-exerciser, hoped for possible self as a regular exerciser) using methods described by Ouellette and colleagues (2005). Specifically, two independent coders (the researcher and a research assistant) independently rated the responses to each of the eight image questions on a 7-point scale ranging from -3 (extremely negative) to +3 (extremely positive), where a score of zero served as a neutral point. Inter-rater reliability was assessed by computing intraclass correlations (ICC) for all eight image question valence scores. The ICCs for all eight valence measures were $> .98$.

We expected the responses to the hoped-for selves image questions to be significantly more positive than responses to the feared possible selves image questions. Independent t tests were conducted to determine whether there were significant differences between the average valence scores for each image type. For all eight questions, valence scores for the hoped-for possible selves condition were significantly more positive than those for the feared possible selves condition (all $ps < .001$).

In order to compare the ease of describing the hoped-for versus feared images, the two coders recorded the number of content phrases (i.e., the number of descriptive phrases; e.g., “I picture myself being unattractive”, “I see myself running a marathon”) that participants used to describe the two different image types. Any disagreements were resolved by discussion. Independent t tests were conducted to determine whether there were any differences in the number of phrases generated for each type of image; no

differences in the number of content phrases between conditions were found (all $ps > .05$). Table 4 contains the mean number of content phrases recorded for each image question. A one-way ANOVA was also conducted to check for differences in post-intervention feeling scores across all three conditions. No differences between conditions were found, $F(2, 107) = 1.68, p = .19$.

Taken together, the results of the manipulation check support the effectiveness of the possible selves intervention. As expected, the hoped-for possible selves images were significantly more positive than the feared possible selves images, indicating that participants were indeed describing the images they were asked to describe. Also, participants were able to describe both types of images with similar ease, as no significant differences in the number of content phrases used were found between conditions. No differences in feelings were reported between the conditions after completing the intervention, indicating that the two interventions may have impacted feeling scores similarly.

Table 4

Number of Content Phrases Recorded for Each Possible Selves Image Question

Image Question	HFPS (n=38)	FPS (n=37)	<i>t</i>	<i>p</i>
1 General Image	5.42 (3.07)	5.16 (2.19)	.42	.68
2 Appearance	4.30 (1.97)	4.08 (1.86)	.47	.64
3 Health	3.29 (1.90)	3.62 (2.03)	-.73	.47
4 Energy Level	2.76 (1.24)	2.57 (1.26)	.68	.50
5 ^a Attitude	3.00 (1.41)	3.50 (1.80)	-1.33	.19
6 ^b Achievements	3.51 (1.79)	3.25 (1.70)	.65	.52
7 ^c Relationships	3.59 (1.58)	3.42 (1.52)	.43	.67
8 ^d Extra Comments	1.96 (1.71)	1.86 (.91)	.26	.80

Note. FPS = Feared possible selves condition; HFPS = Hoped-for possible selves. Standard deviations are in parentheses. All *ps* > .05.

^a One participant in the FPS condition replied “not sure.”

^b One participant in the FPS condition replied “not sure.” One participant in the HFPS condition did not write a response for question 6.

^c For the HFPS condition, two participants did not write responses for question 7, one participant’s response was illegible, and one participant described relationships with food and exercise instead of interpersonal relationships.

^d 15 participants in the HFPS condition and 17 participants in the FPS condition did not answer question 8.

Hypothesis Testing

Before testing each study hypothesis, statistical outliers (values +/- 3 standard deviations from the mean; Tabachnick & Fidell, 2001) were removed and the data were examined for normality (skewness, kurtosis, and Kolmogorov-Smirnov normality test). Study hypotheses were evaluated at $p \leq .05$.

Hypothesis 1: Participants exposed to the feared possible selves intervention will report greater exercise behaviour compared to participants in the hoped-for possible selves condition, and participants in the hoped-for possible selves condition will report greater exercise behaviour than the control group over the 4-week study. Examination of the total minutes of exercise data (see Table 5 and Figure 1) revealed four outliers which were subsequently removed (two outliers in the control condition, one in the HFPS conditions, one in the FPS condition). Removal of the outliers resulted in normal distributions for all three experimental conditions ($ps > .05$). Examination of the total days of exercise data (see Table 5 and Figure 2) revealed normal distributions for all three conditions ($ps > .05$) and no outliers.

Before testing Hypothesis 1, we tested the consideration of future consequences variable as a moderator of the intervention-exercise behaviour relationship, as previous research has found that CFC may moderate the effect of possible selves interventions on exercise behaviour (Ouellette et al., 2005). In order to test CFC as a moderator, we centered the CFC variable by subtracting the mean CFC value from each participant's CFC score. Then, we created an interaction term by multiplying the centered CFC variable by condition (0 = possible selves intervention condition, 1 = control condition).

Exercise behaviour was then regressed on CFC, condition, and the CFC x condition interaction term. Neither the main effect for CFC nor the CFC x Experimental Condition interaction were significant ($ps > .20$), indicating that CFC did not moderate the intervention-exercise relationship.

To test Hypothesis 1, a series of one-way ANCOVAs were conducted to compare total minutes of exercise and total days of exercise completed over the 4 week intervention between experimental groups. Baseline moderate to vigorous exercise levels were included as a covariate in the analyses to control for differences in baseline exercise levels among participants. Contrary to our hypothesis, there were no significant differences in the number of minutes or days exercised between any of the conditions (all $ps > .05$). However, the means reflected a trend toward a greater number of minutes of exercise reported by the hoped-for and feared possible selves conditions compared to the control condition (Table 4). Additionally, there was virtually no difference in the number of minutes of exercise reported between the hoped-for and feared possible selves conditions. The manipulation check analyses also indicated no significant differences in the number of content phrases recorded for each condition, suggesting that participants were able to describe both images with similar ease and that perhaps both types of images were equally impactful. Hence, the two experimental conditions were collapsed into one possible selves intervention condition and our first hypothesis was revised and retested.

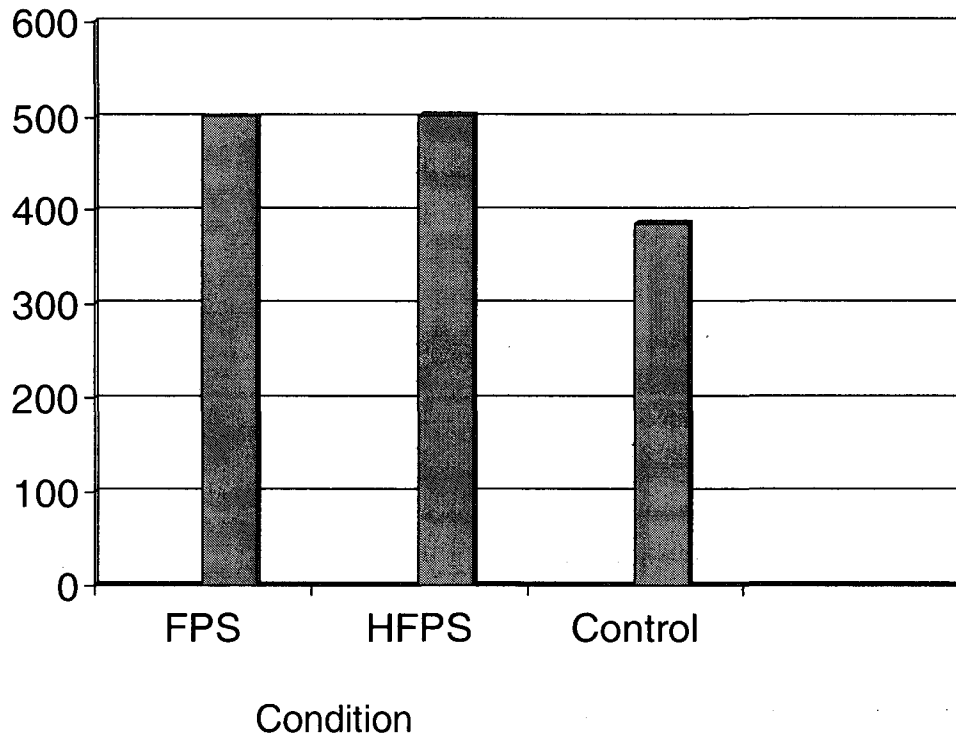


Figure 2: Total Minutes of Exercise over the 4-Week Study.

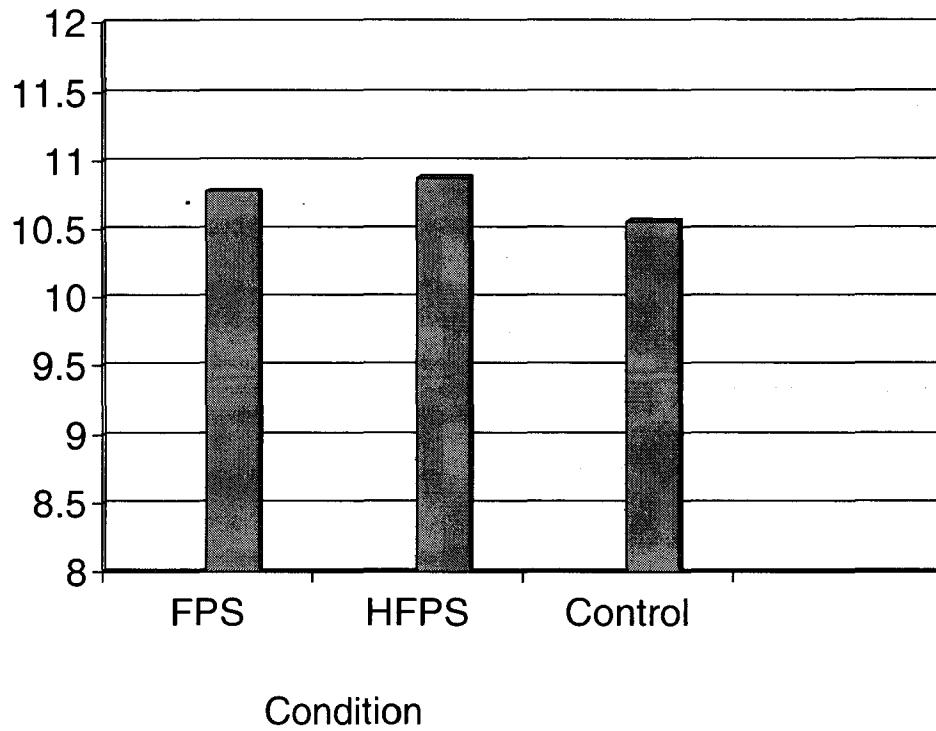


Figure 3: Total Days of Exercise over the 4-Week Study.

Table 5

Means and Standard Deviations (Unadjusted for baseline differences) for Total Minutes and Total Days Exercised over the 4-Week Study

Variable	FPS (n=27)	HFPS (n=26)	Control (n=27)	<i>F</i>	<i>p</i>
Total Min ^a	500.85 (298.63)	502.12 (298.88)	385.20 (210.28)	1.86	.16
Total Days	10.78 (4.64)	10.88 (4.98)	10.56 (5.24)	.20	.82

Note. FPS = Feared possible selves condition; HFPS = Hoped-for possible selves condition.

^a 2 outliers in the control group, 1 outlier in the HFPS group, 1 outlier in the FPS group.

Revised Hypothesis 1: Participants who receive a possible selves intervention will report a greater number of minutes and days exercised compared to participants in the control condition over the 4 week study. Before testing revised Hypothesis 1, CFC was again examined as a moderator of the combined intervention-behaviour relationship. Neither the main effect for CFC nor the CFC x Experimental Condition interaction were significant ($p > .30$), indicating that CFC did not moderate the intervention-exercise relationship. In order to test revised Hypothesis 1, we conducted a one-way ANCOVA controlling for baseline moderate to vigorous exercise levels. Results of the ANCOVA indicated that there was an effect for condition, $F(1, 72) = 3.73, p = .05, \eta^2 = .05, r_{\text{effect size}} = .22$. Participants in the combined possible selves condition reported greater total minutes of exercise over the 4-week study compared to participants in the control condition. There were no significant differences in the number of days exercised between any of the conditions ($p > .05$).

Hypothesis 2: Self-regulatory efficacy variables will mediate the relationship between the possible selves interventions and exercise behaviour. Based on the results of Hypothesis 1 and revised Hypothesis 1, Hypothesis 2 was revised. Rather than examining all three experimental conditions, the feared possible selves and hoped-for possible selves conditions were once again collapsed into one possible selves intervention condition.

Revised Hypothesis 2: Self-regulatory efficacy variables will mediate the relationship between the possible selves intervention and exercise behaviour.

In order to demonstrate statistical mediation, the following four conditions need to be satisfied (Baron & Kenny, 1986): (1) the possible selves intervention significantly affects the outcome variable (i.e., total minutes and total days of exercise over the 4-week study;

Path A); (2) the possible selves intervention significantly affects the mediator (self-regulatory efficacy variables; Path B); (3) the mediator is a significant predictor of the outcome variable (Path C); and (4) controlling for the effects of the mediator eliminates the significant relationship between the independent and outcome variables (full mediation) or reduces the relationship (partial mediation; Path D; see Table 6).

Path A: the intervention-exercise relationship. The relationship between the possible selves intervention and total minutes exercised over the 4-week study was significant ($\beta = .20, p = .05$). In other words, the possible selves intervention was associated with greater number of minutes exercised. The relationship between the possible selves intervention and total days exercised was not significant ($\beta = .03, p = .75$). Hence, no further analyses were conducted for total days of exercise.

Path B: the intervention-self-regulatory efficacy relationship. The relationships between the intervention and all four self-regulatory efficacy variables were tested separately, and baseline levels of the self-regulatory efficacy variables were controlled for in the analyses. The intervention-planning self-efficacy relationship was significant ($\beta = .18, p = .01$), as was the intervention-barrier self-efficacy relationship ($\beta = .16, p < .01$). Neither scheduling self-efficacy nor goal-setting self-efficacy were significantly related to the intervention ($\beta = .13, p = .08$; $\beta = .14, p = .06$). Thus, the possible selves intervention was associated with greater planning self-efficacy and barrier self-efficacy, but not scheduling self-efficacy or goal-setting self-efficacy.

Path C: the self-regulatory efficacy-exercise relationship. Only the self-regulatory efficacy variables that were significantly related to the intervention (planning and barrier self-efficacy) were tested for Path C. Planning self-efficacy was significantly related to total minutes of exercise ($\beta = .31, p < .01$). The relationship between barrier self-efficacy and total

minutes of exercise was not significant ($\beta = .17, p = .12$). Thus, greater planning self-efficacy was associated with greater minutes of exercise over the 4-week study, whereas barrier self-efficacy was not associated with greater minutes of exercise.

Path D: *Examining whether planning self-efficacy mediates the effects of the intervention on total minutes of exercise.* Given that the first three conditions required to test for mediation were met for the planning self-efficacy variable, the relationship between the possible selves intervention and total minutes of exercise while controlling for the mediator variable (planning self-efficacy) was examined. After controlling for planning self-efficacy, the relationship between the intervention and total minutes of exercise was reduced ($\beta = .11, p = .31$), indicating that planning self-efficacy partially mediated the effect of the possible selves intervention on exercise behaviour (see Figure 3).

To test the significance of the mediated effect, a Sobel test was conducted. The difference between Paths A ($\beta = .20$) and D ($\beta = .11$) was not significant (z score = 1.47, $p = .14$). However, the Sobel test is very conservative and lacks power when $n < 400$ (Dearing & Hamilton, 2006). Hence, the magnitude of the mediating effect was also calculated. In order to calculate the magnitude of the mediating effect, we used the following equation: ab/c , where a , b , and c are unstandardized regression coefficients for the regression of the mediator on the predictor, the outcome variable on the mediator, and the total effect of the predictor on the outcome variable, respectively. Results indicated that 29% of the effect of the intervention on total minutes of exercise was mediated by planning self-efficacy.

Table 6

Regression Model Examining Planning Self-Efficacy as a Mediator of the Possible Selves Intervention-Exercise Behaviour Relationship

Mediational Path Tested	<i>Adj. R²</i>	<i>B</i>	β	<i>t</i>	<i>p</i>
Path A	.19				
Baseline exercise behaviour		118.06	.42	3.99	<.01
Possible selves intervention condition		115.53	.20	1.94	.05
Path B	.67				
Pre-intervention planning self-efficacy		.73	.78	11.79	<.01
Possible selves intervention condition		6.22	.17	2.65	.01
Path C	.24				
Baseline exercise behaviour		91.71	.32	3.05	<.01
Planning self-efficacy		4.96	.31	2.94	<.01
Path D	.24				
Baseline exercise behaviour		95.01	.33	3.15	<.01
Planning self-efficacy		4.32	.27	2.41	.02
Possible selves intervention condition		63.35	.11	1.02	.31

Note. Adj. R² = Adjusted R-squared

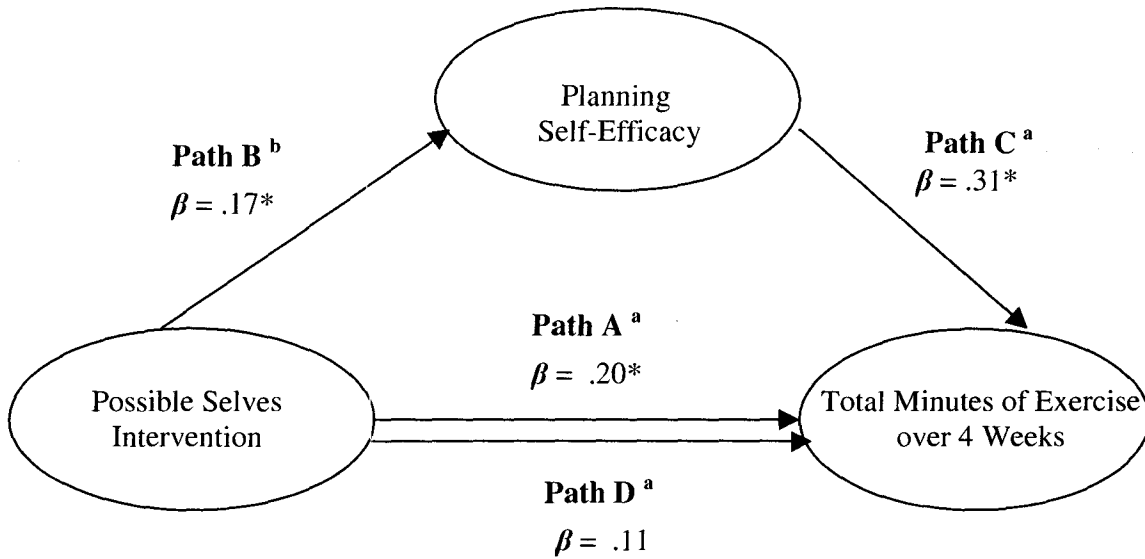


Figure 4. Model testing planning self-efficacy as a mediator of the possible-selves intervention-exercise behaviour relationship. Values with an asterisk (*) denote $p \leq .05$.

^a Controlling for baseline moderate to vigorous exercise levels.

^b Controlling for baseline planning self-efficacy scores.

Summary of Hypothesis Testing

HYPOTHESIS	SUPPORTED
Original Hypothesis 1: FPS > HFPS > Control for exercise behaviour over the 4-week study	NO
Revised Hypothesis 1: PS Intervention > Control for exercise behaviour over the 4-week study	Partial (Minutes Only)
Original Hypothesis 2: Self-regulatory efficacy variables will mediate Intervention (FPS vs. HFPS vs Control)-Exercise Behaviour Relationship	Not tested
Revised Hypothesis 2: Self-regulatory efficacy variables will mediate the Intervention (PS vs. Control)-Exercise Behaviour Relationship	Partial (Planning Self-Efficacy Mediated Intervention-Behaviour Relationship)

Discussion

The purpose of the present study was to examine the effects of a possible selves intervention on participants' exercise behaviour, and to determine if self-regulatory- efficacy variables (planning, barrier, scheduling, and goal-setting self-efficacy) mediated the relationship between the possible selves intervention and exercise behaviour. It was found that there were no differences in the total number of days or minutes of exercise reported by the hoped-for possible selves condition, feared possible selves condition, or control condition. However, when the two possible selves conditions were collapsed, participants who received a possible selves intervention reported a greater number of minutes of moderate to vigorous exercise over the course of the study compared to the control condition. The effects of the intervention on total minutes of exercise were partially mediated by planning self-efficacy. The following sections will discuss the study findings in detail, as well as theoretical and practical implications of the findings, limitations, and directions for future research.

Effects of the Possible Selves Intervention on Exercise Behaviour

Contrary to our first hypothesis, there were no differences in the total number of days or minutes of exercise among the three conditions. However, there was a trend for greater total minutes of exercise among the feared and hoped-for possible selves groups compared to the control group. The findings parallel those of Ouellette and colleagues (2005), who also did not find any differences in exercise behaviour outcomes among a university student sample that completed similar feared and hoped-for exercise selves interventions. The researchers ended up collapsing these two groups into one possible selves intervention condition for their final analyses. Additionally, in line with the

findings of Ouellette et al., our manipulation check revealed that participants were able to describe both the hoped-for and feared images with similar ease. Therefore, we collapsed the hoped-for and feared possible selves conditions into one intervention condition.

Consistent with previous exercise research using a possible selves intervention (i.e., Ouellette et al. 2005), once the possible selves conditions were collapsed, greater exercise behaviour (total minutes) was reported by the intervention group than the control group. Hence, these comparable findings suggest that both feared and hoped-for possible selves in the exercise domain may be equally motivating for this particular population.

A question that remains to be addressed is *why* did these two interventions have similar effects on exercise behaviour? Behaviour change by manipulation of possible selves can only work if there is some type of discrepancy between the current self and the possible self, otherwise behaviour change would seem pointless to the individual (Oyserman & James, 2008). Presumably, even though our sample was mainly comprised of inactive but still relatively young and healthy individuals, they saw discrepancies between both their current selves (inactive but fairly healthy) and hoped-for selves (active and fit), and between their current selves and feared selves (inactive with serious health concerns related to a sedentary lifestyle). As such, both feared and hoped-for images were able to influence behaviour change by highlighting these discrepancies.

In contrast, Hoyle and Sherrill (2006) found health-related feared possible selves to be related more strongly to behaviour than hoped-for possible selves. However, this finding does not necessarily suggest that feared possible selves have a greater impact on behaviour than hoped-for selves. Rather, the influence of these two types of possible selves depends on the magnitude of the discrepancy that may exist between the current

self and the type of possible self. Indeed, Hoyle and Sherrill argued that since their study participants were generally young and healthy, they may not have seen a large enough discrepancy between their current health-related selves and hoped-for health-related selves to result in self-regulatory behaviour. However, when feared possible selves were activated, individuals would have felt the need to increase the gap between their current, healthy selves and the feared, unhealthy versions of themselves that they could become (Oyserman & James, 2008). Therefore, it seems reasonable to conclude that the relative influences of feared versus hoped-for possible selves on health behaviours such as exercise may depend on the magnitude of discrepancy that the individual perceives between the current self and the hoped-for or feared possible self. If the individual believes that the magnitude is large, in the case of hoped-for selves, or uncomfortably small, in the case of feared selves, behaviour change may result.

Another noteworthy finding was that the possible selves intervention led to a significant difference in the total number of minutes of exercise, but not in the total number of days of exercise over the 4-week study. Interestingly, the possible selves intervention appears to have been effective in increasing exercise behaviour above and beyond other aspects of the study protocol that have been found to promote exercise adherence, such as self-monitoring behaviour through the use of daily log books (Aittasalo, Miilunpalo, Kukkonen-Harjula, & Pasanen, 2006; Speck & Looney, 2001), and email reminders to complete the log books (Dinger, Heesch, Cipriani, & Qualls, 2007). We may have failed to find a between-condition difference in the number of days exercised because all participants received daily reminders to complete their exercise log books. These daily reminders may have served as a cue to exercise for the given day, thus

attenuating the effects of the intervention on the number of days exercised. However, participants who received the possible selves intervention exercised for a greater number of minutes over the 4-week study compared to those in the control group, which suggests that the intervention may have motivated participants to exercise for a longer period of time at each exercise session. Given that planning self-efficacy mediated the effects of the intervention on total minutes of exercise completed, those who received the intervention may have planned to set aside more time for exercise sessions, or been more likely to make up for missed exercise sessions by exercising for increased durations during subsequent workouts. The role of planning self-efficacy will be discussed further in the next section.

Mediating Effects of the Self-Regulatory Efficacy Variables

Participants who received a possible selves intervention had greater planning self-efficacy and barrier self-efficacy compared to participants in the control condition. An important question to be answered is *why* did the possible selves intervention lead to greater planning and barrier self-efficacy? It is possible that imagining oneself as healthier and more fit allowed individuals to visualize themselves accomplishing these outcomes. Visualizing oneself confronting and mastering challenging situations is a type of vicarious experience which serves to increase efficacy beliefs (Bandura, 1997). Thus, the hoped-for intervention may have served as an opportunity to increase self-efficacy for performing the behaviours needed for achieving one's hoped-for possible self. In line with this reasoning, Cumming (2008) found that individuals who more frequently imagined themselves as healthier or more fit as a result of exercising reported greater coping self-efficacy and exercise behaviour. It is interesting that participants who

received a feared possible selves intervention also reported greater planning and barrier self-efficacy. Perhaps picturing feared possible selves provided participants with an opportunity to reassess their capabilities for avoiding these negative images, and imagine accomplishing behaviours to avoid the feared images. As the present findings are preliminary in nature, further research is required to determine exactly why hoped-for and feared possible selves have similar effects on self-regulatory efficacy variables.

Differences in scheduling self-efficacy and goal-setting self-efficacy approached significance ($ps = .08, .06$, respectively), and may have emerged as significant with a larger sample. However, the intervention may not have had as great an impact on scheduling self-efficacy because participants (university students with busy schedules) may have perceived little control over their schedules and little opportunity to increase their number of exercise sessions. In contrast, the intervention may have had a greater impact on planning self-efficacy because participants felt that although they could not realistically increase their number of exercise sessions per week by much, they had more control over their ability to attend planned exercise sessions, or make up for missed sessions by increasing the duration of their planned exercise sessions.

In line with previous research supporting the relationship between self-regulatory efficacy variables and exercise behaviour (e.g., Rodgers, Hall, Blanchard, McAuley, & Monroe, 2002; Sniehotta, Scholz, & Schwarzer, 2005), planning, scheduling, and goal-setting self-efficacy predicted exercise behaviour. In other words, higher levels of planning, scheduling, and goal-setting self-efficacy were related to greater total minutes of exercise reported over the 4-week study. These findings are in line with the theoretical tenets of the HAPA model, wherein self-efficacy predicts behaviour. However, barrier

self-efficacy was not a significant predictor of total minutes of exercise. Perhaps the barrier self-efficacy items were not successful in capturing some important barriers related to exercise participation for this particular population. Poor validity would undermine the ability to detect a relationship between barrier self-efficacy and exercise behaviour.

The results of the mediational analyses revealed that only planning self-efficacy partially mediated the relationship between the intervention and exercise behaviour. That is, the possible selves intervention led to greater planning self-efficacy, which in turn, led to greater exercise behaviour among participants in the possible selves condition compared to those in the control condition. As mentioned earlier, it is possible that with a larger sample size, and in turn greater statistical power, the other self-regulatory efficacy variables may also have emerged as significant mediators of the intervention-behaviour relationship. Consequently, further research is needed to replicate and extend these preliminary findings.

Theoretical Implications

The present study is the first to examine the relationship between exercise-related possible selves and self-regulatory efficacy among a sample of inactive young adults. The study findings have theoretical implications for understanding the relationship between possible selves and exercise behaviour. We now know that increased planning self-efficacy serves as a mechanism by which possible selves promote exercise behaviour. These findings provide support for the notion put forth by Hoyle and Sherrill (2006) that possible selves should be examined as a component of theories and models that account for self-regulatory processes, and that the possible selves construct plays a role in

influencing self-regulatory processes needed for behaviour change. Future research should build on these findings in order to develop a stronger understanding of how possible selves influence self-regulatory efficacy. Furthermore, the present study lends support to the role of self-regulatory efficacy variables (planning, scheduling, and goal-setting self-efficacy) in predicting and understanding exercise behaviour. From a theoretical perspective, these results support the idea that self-regulatory efficacy encompasses self-efficacies for a variety of self-regulatory skills (Bandura, 1995) required for adherence to a complex behaviour such as exercise. Hence, the results support previous recommendations for the measurement of multiple aspects of self-regulatory efficacy when examining and predicting exercise behaviour (McAuley & Mihalko, 1998) in order to fully understand the construct of self-regulatory efficacy and its relationship with exercise.

Practical Implications

The findings of the present investigation have important implications for health and exercise promotion professionals. Possible selves interventions may be a useful tool for increasing self-regulatory efficacy and exercise participation among inactive individuals. Possible selves interventions could serve as an additional tool along with other behaviour change strategies promoted by exercise interventionists. The intervention used for the present study was a brief activity that would be relatively easy to carry out in a health promotion setting. For example, exercise interventionists could ask participants to imagine and write descriptions of their feared and hoped-for exercise related possible selves. Participants would then be able to keep these descriptions and refer to them periodically as they progress towards their physical activity goals. They could evaluate

their progress in narrowing the discrepancies between their current selves and exercise-related hoped-for and feared possible selves.

A second practical implication of this study relates to the finding that planning self-efficacy was a significant predictor of exercise behaviour. Health promotion professionals designing interventions to increase physical activity should focus on targeting this self-regulatory efficacy variable for intervention. It should be noted that although barrier self-efficacy failed to predict exercise behaviour in the present study, previous research supports barrier self-efficacy as a predictor of exercise behaviour, and as such, barrier self-efficacy should also be targeted for intervention by health professionals.

Limitations

It is important to address some of the limitations of the present study. First, the small sample size resulted in limited power to detect significant differences between experimental conditions for the self-regulatory efficacy variables and exercise behaviour. Although some significant effects were found, we may have been able to better detect intervention effects on exercise and self-regulatory efficacy with a larger sample size. Additionally, we may have found that more of the self-regulatory efficacy variables mediated the intervention-behaviour relationship.

Another notable limitation was the failure to include a measure of visual imagery ability, which may be an important moderator of the relationship between possible selves intervention effects and exercise behaviour. Indeed, Cumming (2008) found that exercisers' abilities to create appearance-health images moderated the relationship between imagery frequency and leisure-time exercise, coping self-efficacy, and

scheduling self-efficacy. Hence, it is possible that the effects of eliciting possible selves on self-regulatory variables and exercise behaviour may be moderated by visual imagery ability.

A third limitation that must be acknowledged concerns the length of the study. Exercise behaviour was measured over a period of 8 weeks, but due to the high number of drop-outs, only exercise behaviour data over a 4-week period were analyzed. The short behaviour period examined limits our understanding of longer-term effects of the possible selves intervention. It would be beneficial to examine exercise behaviour over a longer period of time to determine how long the effects of the single-session possible selves intervention last, and to determine at what point the effects of the intervention attenuate. Since the goal of exercise promotion professionals is to promote long-term adherence to exercise plans, future research should examine ways to strengthen the longer-term impact of possible selves interventions on exercise behaviour.

Finally, the generalizability of the study findings is limited to the young adult population. It would be valuable to examine whether the findings are consistent across other populations, as possible selves interventions may vary as a function of the characteristics of particular populations. For example, studies have found that older adults tend to have a greater number of health-related possible selves compared to young adults (e.g., Frazier, Hooker, Johnson, & Kaus, 2000; Hooker & Kaus, 1994). Hence, greater intervention effects may be observed among older populations, where exercise and health-related possible selves are more salient.

Directions for Future Research

The present investigation has provided support for the efficacy of possible selves interventions for promoting exercise. However, further research is necessary to develop a better understanding of the role that possible selves play in exercise behaviour change. In the present study, hoped-for and feared possible selves were elicited separately, and both had a similar impact on self-regulatory efficacy and exercise behaviour. One potential research avenue would be to investigate the role of a combined hoped-for and feared possible selves intervention. It would be interesting to determine how priming a 'balanced' possible self (i.e., asking individuals to imagine both a feared and hoped-for exercise related possible self; Oyserman & Markus, 1990a, 1990b) would impact self-regulatory efficacy and exercise behaviour compared to eliciting only a hoped-for or feared self. Some research suggests that when salient possible selves include both feared and hoped-for possible selves, the result is improved behavioural self-regulation (Oyserman & James, 2008). When individuals hold balanced possible selves, they choose strategies that lead to both achievement of hoped-for possible selves and avoidance of feared possible selves, resulting in selection of self-regulatory strategies that are more effective (Oyserman & James). Considering that the population of inactive but relatively health individuals that was targeted in the present study likely experienced discrepancies between both their hoped-for and feared selves, it seems reasonable that priming a balanced possible self may have a larger impact on exercise behaviour than priming only one type of possible self.

A second research avenue would be to measure individuals' perceived discrepancies between their current selves and their hoped-for or feared possible selves.

Particularly in heterogenous samples, possible selves intervention effects may be diluted by variability in the discrepancies that individuals experience when comparing their current selves to their hoped-for or feared selves. Future studies should explore the possible moderating or mediating effects of discrepancies between current and possible selves to further our understanding of how possible selves serve as behavioural standards to which the current self is compared.

A final suggestion for future research would be to further examine the self-regulatory efficacy variables as mediators of the possible selves intervention-exercise behaviour relationship. As this is the first study to examine the mediating role of self-regulatory efficacy variables, further research is needed to replicate the present findings, and to determine under what circumstances or in which populations certain self-regulatory efficacy variables are particularly relevant. Additionally, it is possible that developing a better understanding of the mediating mechanisms of the self-regulatory efficacy variables will allow researchers to develop theory regarding how possible selves influence exercise behaviour through self-regulatory mechanisms.

Conclusion

In summary, the present study lends further support for the effectiveness of possible selves interventions for increasing exercise behaviour among inactive individuals. In terms of contribution, this study is the first to examine self-regulatory efficacy variables as mediators of the relationship between possible selves interventions and exercise behaviour. Additionally, the study findings have theoretical implications for understanding how possible selves influence exercise behaviour, and have practical implications for exercise promotion. Building evidence for the relationship between

possible selves interventions, self-regulatory processes, and exercise behaviour suggests that further study of the role that possible selves play in exercise behaviour change interventions is warranted.

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Appendix A

Screening Measures

- Appendix A.1 Recruitment Poster
- Appendix A.2 Participant Letter of Information and Consent Form
- Appendix A.3 Screening Questionnaires

Appendix A.1 - Recruitment Poster

Participants who are currently exercising less than three times per week are needed for a research study about physical activity.

Eligible participants will be asked to:

- **Attend a brief information session about becoming more physically active**
- **Keep a physical activity log book for 8 weeks**
- **Complete a series of questionnaires**

Participants will receive \$15 for completing the study.

For more information, please contact Elisa:

(905) 525-9140 ext. 26825
murrucec@mcmaster.ca

Appendix A.2 - Participant Letter of Information and Consent Form

Letter of Information and Consent Form

A Study of the Role of Possible Selves in Increasing Physical Activity

Purpose of the Study

In this study, we want to determine whether certain psychological variables predict physical activity behaviour.

Procedures Involved in the Research

The entire experiment consists of three main parts. During the first part of the study, you will be asked to attend a 30 minute session. At this session, you will also be asked to fill out some questionnaires. The questionnaires have to do with your thoughts and feelings about yourself and physical activity. Two sample questions from the questionnaire package include “I think that sacrificing now is usually unnecessary since future outcomes can be dealt with at a later time,” and “It would be enjoyable for me to participate in at least 30 minutes of moderate to vigorous physical activity on most days of the week over the next 8 weeks.” The questionnaire will also ask you for personal information about your age, height, weight, marital status, educational level, employment situation and ethnic background. You will also receive a log book via email where you will be asked to record your physical activity for the next 8 weeks.

The second part of the study will involve filling out questionnaires similar to those you complete at the information session 4 weeks after attending the session. At this time you will be emailed and provided with a questionnaire that will take approximately 15-20 minutes to complete. Those who do not have access to e-mail will receive the questionnaire by mail along with a stamped, self-addressed envelope that can be used to mail the questionnaire back to the university. This questionnaire will consist of questions similar to those completed at the initial information session. You will receive another email 8 weeks after attending the session. You will again be provided with a questionnaire or with a hard copy of the questionnaire. The questionnaire is similar to the one you completed at 4 weeks. At this time, you will also be asked to email or mail your completed physical activity log books to the student investigator. After completing the week 8 questionnaires, you will receive either a letter or email message consisting of a debriefing about the nature of the study.

Potential Harms, Risks or Discomforts:

Minimal risks associated with participation may exist:

You may experience physical discomfort such as minor muscle strain or fatigue associated with becoming more physically active.

Potential Benefits

Potential benefits to science and society:

The findings of this study may help health educators and practitioners who aim to promote and increase physical activity participation. By having a better understanding of how various psychological variables play a role in physical activity behaviour change, practitioners can begin to implement interventions that incorporate the manipulation of these variables to increase participation in health behaviours such as physical activity.

Benefits to you as a participant:

You may find the information about how to begin and follow a regular physical activity program helpful.

Payment or Reimbursement:

You will receive \$5 for attending the initial information session and completing the first set of questionnaires. After completing the week 4 questionnaires you will receive another payment of \$5. You will receive another payment of \$5 after completing the week 8 questionnaires.

Confidentiality:

The information we collect from you during this study will be treated with confidentiality. Access to information that might identify participants will be limited to Elisa Murru (Principal Investigator), Kathleen Martin Ginis (Supervisor) and a trained research assistant.

The names of specific participants in the study will not be attached to comments or issues raised within project reports or presentations generated from this study. Data obtained during the testing is completely private and will be kept in a locked filing cabinet or on a secure computer server in Dr. Martin Ginis' research laboratory at McMaster University. Only the investigators will have access the data. All original written documents will be destroyed five years following the publication of the study.

Participation:

Your participation in this study is voluntary. If you decide to participate, you can decide to stop at any time, even after signing the consent form or part-way through the study. If you decide to stop participating, there will be no consequences to you. In cases of withdrawal, any data you have provided to that point will be destroyed unless you indicate otherwise. If you do not want to answer some of the questions you do not have to, but you can still be in the study.

Information about the Study Results:

Following the completion of our study we would be happy to send you an executive summary of our results. You may indicate your interest in receiving a summary by responding to the debriefing email that will be sent to you upon completion of the study.

Information about Participating as a Study Subject:

If you have questions or require more information about the study itself, please feel free to contact Elisa Murru at murru.ec@mcmaster.ca.

This study has been reviewed and approved by the McMaster Research Ethics Board. If you have concerns or questions about your rights as a participant or about the way the study is conducted, you may contact:

McMaster Research Ethics Board Secretariat
Telephone: (905) 525-9140 ext. 23142
c/o Office of Research Services
E-mail: ethicsoffice@mcmaster.ca

CONSENT

I have read the information presented in the information letter about a study being conducted by Elisa Murru and Kathleen Martin Ginis of McMaster University. I have had the opportunity to ask questions about my involvement in this study, and to receive any additional details I wanted to know about the study. I understand that I may withdraw from the study at any time, if I choose to do so, and I agree to participate in this study.

Signature of Participant

Email or Address of Participant (PLEASE PRINT CLEARLY)

In my opinion, the person who has signed above is agreeing to participate in this study voluntarily, and understands the nature of the study and the consequences of participation in it.

Signature of Researcher or Witness

Appendix A.3 - Screening Questionnaires

“Thank you for your interest in participating in the research study. At this time I would like to ask you a few questions to make sure you are eligible to participate.”

1. How old are you?

2. Over the past year how many times DURING A TYPICAL WEEK have you done the following kinds of exercise for 30 minutes or more DURING YOUR FREE TIME? Keep in mind these activities have to be structured exercise like going to the gym, playing sports, training, etc.

-Strenuous exercise (where your heart beats rapidly) i.e., running, hockey, football, long distance biking, figure skating)?

How many times on average per week? _____

-Moderate exercise (not exhausting i.e., baseball, tennis, volleyball, easy swimming, skiing)?

How many times on average per week? _____

Mild exercise (minimal effort i.e., yoga, fishing, golf, snow-mobiling, easy walking)?

How many times on average per week? _____

Please place an X at the end of the statement below that best describes you:

Do you engage in regular exercise on a regular basis?
(By regular basis, we mean exercising at a moderate to strenuous intensity 30 min or more at least 3 days per week)

- A. Yes, I have been exercising regularly for MORE than 6 months.
- B. Yes, I have been exercising regularly for LESS than 6 months.
- C. No, but I intend to start exercising regularly in the next 30 days.
- D. No, but I intend to start exercising regularly in the next 6 months.
- E. No, and I do NOT intend to start exercising regularly in the next 6 months.

“Participation in this study may lead you to become more physically active. Becoming more active is safe for most people, but to ensure that this will not be a problem for you, we would like to ask you to answer the following questions:”

1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
2. Do you feel pain in your chest when you do physical activity?
3. In the past month, have you had chest pain when you were not doing physical activity?
4. Do you lose your balance because of dizziness or do you ever lose consciousness?
5. Do you have a bone or joint problem that could be made worse by a change in your physical activity?
6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
7. Do you know of any other reason why you should not do physical activity?

If you answered YES to one or more questions:

You may want to talk to your doctor about what type of physical activity would be safe for you. However, for your own safety, we would prefer not to include you in the study. Thank you very much for your interest in this study. Thank you for phoning/emailing us.

If you answered NO to all questions:

This means you are eligible to participate in this study. We would now like to tell you more about what your participation will involve.

Delay becoming much more active if:

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

Eligible:

“Thanks for your interest in this study. To participate in this study you will be required to come to the Kinesiology Department in the Ivor Wynne Center. You will complete some questionnaires at the session. Then, at 4 and 8 weeks after the session, you will receive an email which will ask you to complete additional questionnaires that are similar to those completed at the initial information session. If you do not have access to e-mail, you can choose to receive the questionnaires by mail along with a stamped, self-addressed envelope that can be used to mail the questionnaire back to the researcher. These questionnaires will take about 15 to 20 minutes to complete. The questionnaires have to do with your thoughts and feelings about yourself and exercise. Two sample questions from the questionnaire package include “I think that sacrificing now is usually

unnecessary since future outcomes can be dealt with at a later time,” and “It would be enjoyable for me to participate in at least 30 minutes of moderate to vigorous physical activity on most days of the week over the next 8 weeks.” The questionnaire will also ask you for some personal information about your age, height, weight, marital status, educational level, employment situation and cultural background. You will also receive a log book where you will be asked to record your exercise for the next 8 weeks. You are not required to start an exercise program to participate in this study. We are simply interested in any exercise that you do decide to do over the next 8 weeks, and you will be asked to use the log books to record any physical exercise that you choose to do. Again, the log books can be sent by email or by mail based on your preference.

Do you have any questions?”

Not Eligible:

“Thanks for your interest in this study. Unfortunately, you are not eligible to participate in the present study at this time. Thank you for phoning/emailing us. Have a great day!”

Appendix B

Measures

- Appendix B.1 Demographics Questionnaire
- Appendix B.2 Self-regulatory Efficacy Questionnaire
- Appendix B.3 Consideration of Future Consequences Questionnaire

Appendix B.1 - Demographics Questionnaire**ALL ANSWERS WILL REMAIN PRIVATE AND CONFIDENTIAL**

Instructions: We are interested in learning more about your background. Please follow the directions carefully and fill in all of the questions.

1. What is your age (in years)? _____ Gender: Female Male

2. What is your height (in feet and inches)? _____

3. What is your weight (in pounds)? _____

4. What is your marital status? (Please check the boxes that apply):

Single Divorced Widowed

Married Separated Common-law

5. What is your current level of education/employment? (please check the boxes that apply):

Undergraduate student: 1st year 2nd year 3rd year 4th year

5th year

Graduate student: Masters Ph.D.

What program are you in? _____

6. What is your current employment situation?

Unemployed

Employed full-time

Employed part-time

7. What is your ethnic background? (please check the box that applies to you):

Aboriginal

Asian

African-Canadian

Caucasian

Arab/West Asian

South Asian

Other _____

Appendix B.2 - Self-regulatory Efficacy Questionnaire

Scheduling Self-Efficacy

How Confident Are You?

The following questions ask you to rate your confidence in your abilities to carry out certain tasks over the next eight weeks, using a 0-100% scale. Circle the % value that most closely represents your level of confidence for each of the following questions:

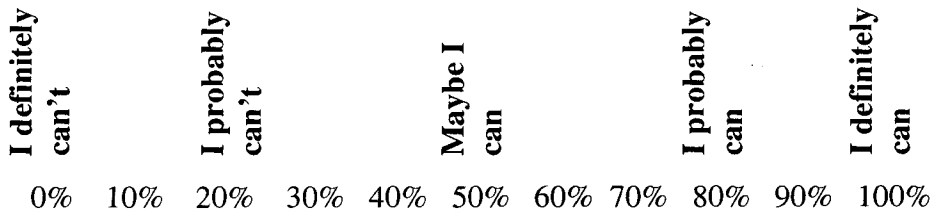
How confident are you in your ability to **arrange your schedule** over the next 8 weeks to include at least 30 minutes of moderate to vigorous exercise for the following number of days per week:

	I definitely can't		I probably can't		Maybe I can		I probably can		I definitely can		
Once a week?	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Twice a week?	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Three times a week?	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Four times a week?	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Five times a week?	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

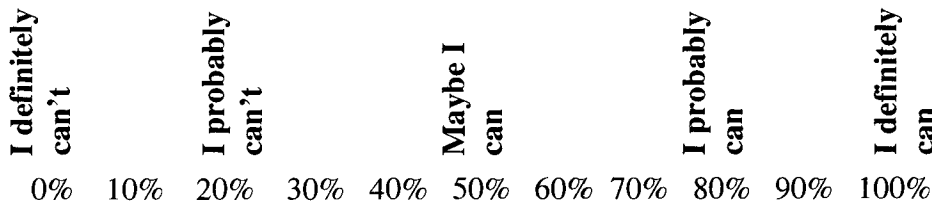
Planning Self-Efficacy

Over the next 8 weeks, I am confident that I can:

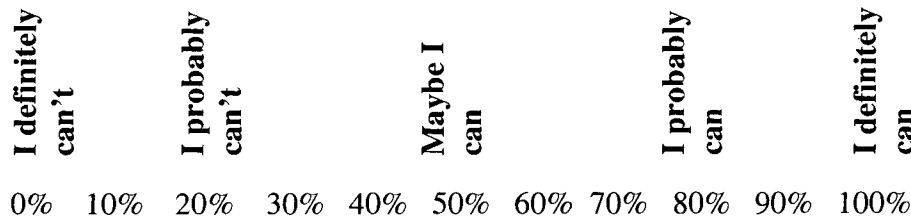
Attend exercise sessions three times per week no matter what



Plan for the attendance of my exercise sessions in my daily plans

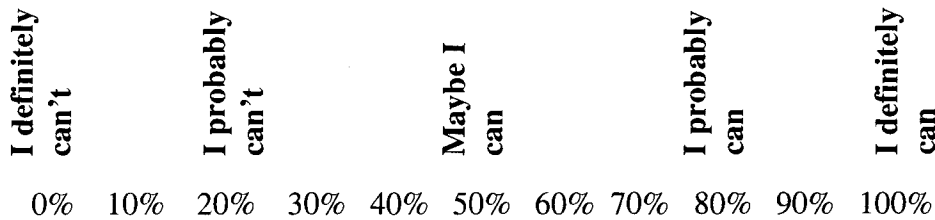


Arrange my schedule to exercise regularly no matter what

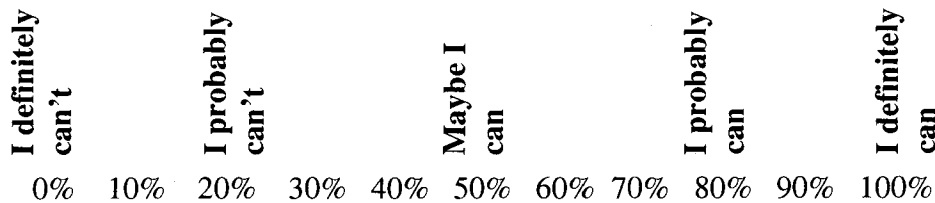


Over the next 8 weeks, I am confident that I can:

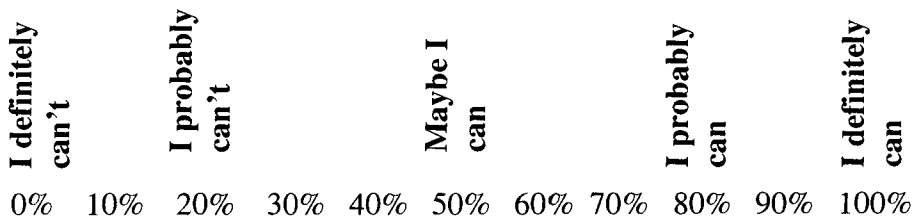
Maintain a definite plan to restart exercise if I should miss several sessions or weeks of sessions



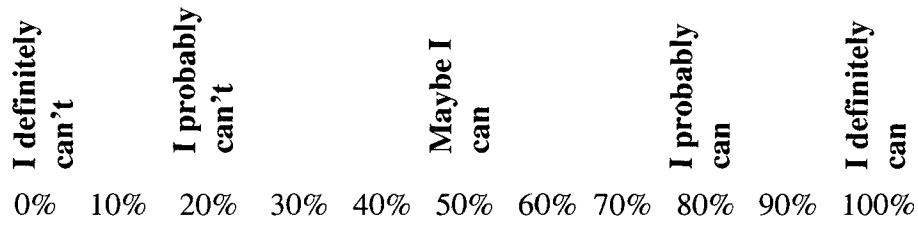
Make up times when I missed my regular exercise session



Make sure that I do not miss more than one week of exercise due to other obligations



Organize time and responsibilities around each exercise session during the next eight weeks no matter what



Barrier Self-Efficacy

How confident are you that you can continue to participate in moderate to vigorous exercise for at least 30 minutes on most days of the week over the next 8 weeks when you are faced with the following situations:

	I definitely can't		I probably can't		Maybe I can		I probably can		I definitely can		
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Tired	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
During or following a crisis	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
During bad weather	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Anxious or stressed	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
During vacation	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Feeling sick (i.e., cold-like symptoms)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
When there are competing interests	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Having a lot of work or schoolwork to do	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Unable to reach my exercise goals 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Lack of social support 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Having a hectic schedule 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

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

Have no one to exercise with 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Having an injury 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Exercise workout is not enjoyable 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

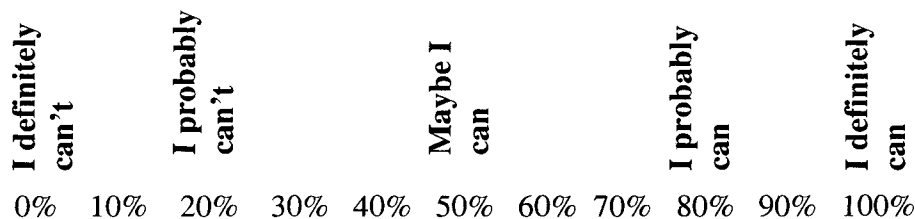
Feeling depressed 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Not exercising for a prolonged period of time 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

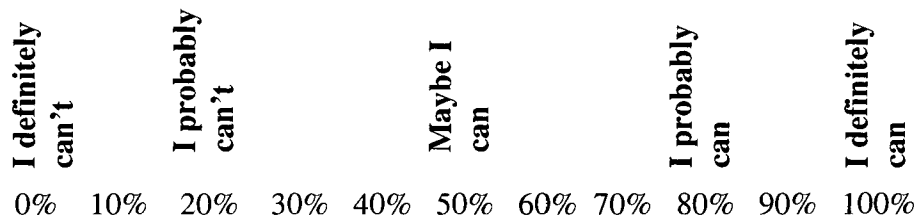
Goal-Setting Self-Efficacy

Over the next eight weeks, I am confident I can:

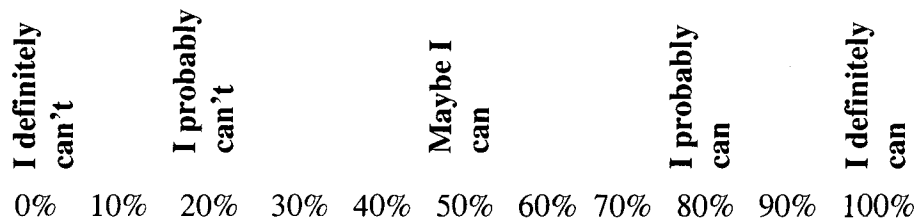
Set realistic goals for **maintaining** my exercise



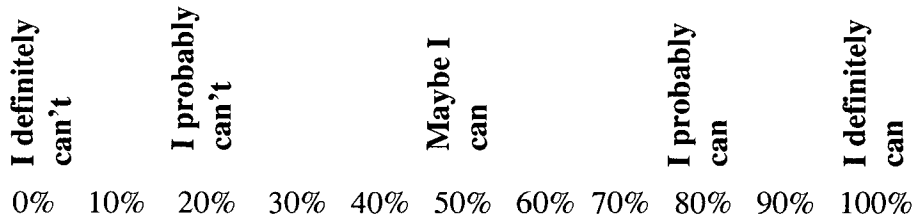
Set realistic goals for **increasing** my exercise



Develop plans to reach my exercise goals



Follow through with my exercise goals, even though it may be difficult at times



Appendix B.3 - Consideration of Future Consequences Questionnaire

For each of the statements below, please indicate to what degree each statement is **CHARACTERISTIC OF YOU** by circling the number.

1. Often I engage in a particular behaviour in order to achieve outcomes that may not result for many years.

1	2	3	4	5
Extremely uncharacteristic	Somewhat uncharacteristic	Uncertain	Somewhat characteristic	Extremely characteristic

2. I only act to satisfy immediate concerns, figuring the future will take care of itself.

1	2	3	4	5
Extremely uncharacteristic	Somewhat uncharacteristic	Uncertain	Somewhat characteristic	Extremely characteristic

3. My behaviour is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions.

1	2	3	4	5
Extremely uncharacteristic	Somewhat uncharacteristic	Uncertain	Somewhat characteristic	Extremely characteristic

4. My convenience is a big factor in the decisions I make or the actions I take.

1	2	3	4	5
Extremely uncharacteristic	Somewhat uncharacteristic	Uncertain	Somewhat characteristic	Extremely characteristic

5. I generally ignore warnings about possible future problems because I think the problems will be resolved before they reach crisis level.

1	2	3	4	5
Extremely uncharacteristic	Somewhat uncharacteristic	Uncertain	Somewhat characteristic	Extremely characteristic

6. I think that sacrificing now is usually unnecessary since future outcomes can be dealt with at a later time.

1	2	3	4	5
Extremely uncharacteristic	Somewhat uncharacteristic	Uncertain	Somewhat characteristic	Extremely characteristic

7. I only act to satisfy immediate concerns, figuring that I will take care of future problems that may occur at a later date.

1	2	3	4	5
Extremely uncharacteristic	Somewhat uncharacteristic	Uncertain	Somewhat characteristic	Extremely characteristic

8. Since my day to day work has specific outcomes, it is more important to me than behaviour that has distant outcomes.

1	2	3	4	5
Extremely uncharacteristic	Somewhat uncharacteristic	Uncertain	Somewhat characteristic	Extremely characteristic

Appendix C

Intervention Questionnaires

- Appendix C.1 Feared Possible Selves Questionnaire
- Appendix C.2 Hoped-for Possible Selves Questionnaire
- Appendix C.3 Control Physical Activity Quiz

Appendix C.1 - Feared Possible Selves Questionnaire

We are interested in your impression of **yourself 5 to 10 years from now**. More specifically, we would like you to think about yourself in the future as a person who is an unhealthy, inactive person who fails to exercise regularly. You do not follow a healthy lifestyle which includes failing to exercise most days of the week at a moderate to vigorous intensity. Five to ten years from now, you are not at a healthy weight and do not have the energy to carry out your daily tasks.

When you think about yourself five to ten years from now as an inactive person who fails to exercise regularly, what images come to mind? Please take a few minutes to imagine and think about this image before turning the page. On the following pages, you will be asked to answer some questions about this image.

We would like to know more about your impression of this image of yourself 5 to 10 years from now as an unhealthy person who fails to exercise regularly. Please think carefully about it. On the following pages, we will ask you to write a description of different characteristics of this image.

1. What was the first thing that came to mind when you thought of this image of yourself as an unhealthy, inactive person who fails to exercise regularly 5 to 10 years from now? Describe this image with as much detail as possible in the space below.

2. What does this image look like? Can you describe your appearance?

3. Can you describe the general health of this image of yourself?

4. Describe the energy level of this image.

5. What kind of attitude towards life does this image have?

6. What type of achievements do you see this image of yourself accomplishing?

7. Describe the relationships that this image may have.

8. Is there anything else that comes to mind when you think of this image?

Appendix C.2 - Hoped-for Possible Selves Questionnaire

We are interested in your impression of **yourself 5 to 10 years from now**. More specifically, we would like you to think about yourself in the future as a person who is a healthy, active, regular exerciser. You follow a healthy lifestyle which includes exercising on most days of the week at a moderate to vigorous intensity. Five to ten years from now, you are at a healthy weight and have the energy to carry out your daily tasks.

When you think about yourself five to ten years from now as a healthy, regular exerciser, what images come to mind? Please take a few minutes to imagine and think about this image before turning the page. On the following pages, you will be asked to answer some questions about this image.

We would like to know more about your impression of this image of yourself 5 to 10 years from now as a healthy person who exercises regularly. Please think carefully about it. On the following pages, we will ask you to write a description of different characteristics of this image.

1. What was the first thing that came to mind when you thought of this image of yourself as a healthy, active, regular exerciser 5 to 10 years from now? Describe this image with as much detail as possible in the space below.

2. What does this image look like? Can you describe your appearance?

3. Can you describe the general health of this image of yourself?

4. Describe the energy level of this image.

5. What kind of attitude towards life does this image have?

6. What type of achievements do you see this image of yourself accomplishing?

7. Describe the relationships that this image may have.

8. Is there anything else that comes to mind when you think of this image?

Appendix C.3 - Control Physical Activity QuizQuiz: Test Your Knowledge about Physical Activity

Circle the best answer. Correct answers are provided at the end of the quiz.

1. People of all ages need to be active to be healthy. How many Canadians are not active enough to achieve health benefits?
 - a) All
 - b) One-third (1/3)
 - c) None
 - d) Two-thirds (2/3)

2. Benefits of regular physical activity include better posture and balance, stronger muscles and bones, improved self-esteem, increased energy and decreased stress.
 - a) True
 - b) False

3. Physical inactivity is as dangerous to your health as smoking.
 - a) True
 - b) False

4. How much physical activity do experts say adults should do to stay healthy?
 - a) 10 minutes a day
 - b) 60 minutes of vigorous activity once a week
 - c) 30 minutes twice a week
 - d) Accumulate 60 minutes of light activity a day

5. If you're not active for at least 30 minutes at a time, you will not gain health benefits.
 - a) True
 - b) False

6. To stay healthy, people should choose a variety and range of activities to build endurance, improve strength and maintain flexibility.
- a) True
 - b) False
7. Walking is one of the best ways to improve health through physical activity for the majority of people.
- a) True
 - b) False
8. Fifty-seven percent of Canadian children and youth are not active enough for healthy growth and development.
- a) True
 - b) False
9. The new Canada's Physical Activity Guide for Children and Youth recommend:
- a) Increasing the amount of time they currently spend being physically active by 30 minutes more per day
 - b) Decreasing the amount of time spent watching TV, surfing the internet and playing computer games by 30 minutes less per day
 - c) Both a. and b.
10. Individuals with disabilities can be physically active and participate in a wide range of activities
- a) True
 - b) False
11. Active living is...
- a) Having a busy social life.
 - b) A way of life in which physical activity is valued and integrated into daily living.
 - c) A community health program.
 - d) A community sports program.

Physical Activity Quiz Answers:

Question 1: Two-thirds (2/3)

Question 2: True

Question 3: True

Question 4: Accumulate 60 minutes of light activity a day

Question 5: False

Question 6: True

Question 7: True

Question 8: True

Question 9: Both a. and b.

Question 10: True

Question 11: A way of life in which physical activity is valued and integrated into daily living.

Quiz adapted from Canada's Physical Activity Guide to Healthy Active Living.

Appendix D

Log Books

- Appendix D.1 Log Book Instructions
- Appendix D.2 Feared Possible Selves Log Book
- Appendix D.3 Hoped-for Possible Selves Log Book
- Appendix D.4 Control Log Book

Appendix D.1 - Log Book Instructions**Exercise Log Book**

INSTRUCTIONS:

The following pages contain a log book where you will be asked to record any exercise you do over the next eight weeks. You are *not required* to start an exercise program to participate in this study. We are simply interested in any exercise that you do decide to do over the next 8 weeks. For each day that you exercise, you will be asked to record the following information:

Type: This is where you will record the type of exercise you did (e.g., went for a run, kickboxing class, played tennis)

minutes: Record the number of minutes you spent doing the activity

Intensity: We are only interested in exercise that you did at a **moderate** or **vigorous** intensity. Here you will indicate whether the exercise you did was at a moderate or vigorous intensity.

If you are not active on a particular day, simply **place an X in the box that says “none.”**

Recall the following definitions:

EXERCISE refers to structured physical activity that you choose to do during your free time for the purpose of enhancing health or physical fitness (e.g., going to the gym, going for a run, playing sports, swimming, yoga, etc.). It DOES NOT include work-related activities, activities part of your daily routine (e.g., walking to school) or household activities, doing chores, etc.

VIGOROUS intensity exercise refers to exercise where your heart beats rapidly and you are breathing heavily (e.g., aerobics, fast swimming, jogging, hockey, long distance biking, circuit training).

MODERATE intensity exercise is not as exhausting as vigorous intensity exercise (e.g., brisk walking, easy swimming, dancing, biking, lifting free weights).

At the end of the 4 week and 8 week periods you will be asked to return your logbook to me via email. You will also receive a daily email reminder to complete your logbook. If this is a concern for you, please let me know.

Reminder: You will be receiving a questionnaire to complete at the end of week 4 and week 8 via email.

If you have any questions please feel free to contact me:
murrucec@mcmaster.ca (905) 525-9140 ext. 26825

Appendix D.2 - Feared Possible Selves Log Book

March 2008						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Think about yourself in the future as a person who is an unhealthy, inactive person who fails to exercise regularly. You do not follow a healthy lifestyle which includes failing to exercise most days of the week at a moderate to vigorous intensity. Five to ten years from now, you are not at a healthy weight and do not have the energy to carry out your daily tasks.					14 Week 1	15
					Type:	Type:
					# minutes:	# minutes:
					Intensity:	Intensity:
					None:	None:
16	17	18	19	20	21 Week 2	22
Type:	Type:	Type:	Type:	Type:	Type:	Type:
Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):
Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:
None:	None:	None:	None:	None:	None:	None:
23	24	25	26	27	28 Week 3	29
Type:	Type:	Type:	Type:	Type:	Type:	Type:
Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):
Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:
None:	None:	None:	None:	None:	None:	None:
30	31					
Type:	Type:					
Duration (min):	Duration (min):					
Intensity:	Intensity:					
None:	None:					

Appendix D.3 - Hoped-for Possible Selves Log Book

March 2008						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Think about yourself in the future as a person who is a healthy, active, regular exerciser. You follow a healthy lifestyle which includes exercising on most days of the week at a moderate to vigorous intensity. Five to ten years from now, you are at a healthy weight and have the energy to carry out your daily tasks.					14 Week 1	15
					Type:	Type:
					# minutes:	# minutes:
					Intensity:	Intensity:
					None:	None:
16	17	18	19	20	21 Week 2	22
Type:	Type:	Type:	Type:	Type:	Type:	Type:
Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):
Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:
None:	None:	None:	None:	None:	None:	None:
23	24	25	26	27	28 Week 3	29
Type:	Type:	Type:	Type:	Type:	Type:	Type:
Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):
Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:
None:	None:	None:	None:	None:	None:	None:
30	31					
Type:	Type:					
Duration (min):	Duration (min):					
Intensity:	Intensity:					
None:	None:					

Appendix D.4 - Control Log Book

March 2008						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Get active your way - build physical activity into your daily life...that's active living!					14 Week 1	15
					Type:	Type:
					# minutes:	# minutes:
					Intensity:	Intensity:
					None:	None:
16	17	18	19	20	21 Week 2	22
Type:	Type:	Type:	Type:	Type:	Type:	Type:
Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):
Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:
None:	None:	None:	None:	None:	None:	None:
23	24	25	26	27	28 Week 3	29
Type:	Type:	Type:	Type:	Type:	Type:	Type:
Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):	Duration (min):
Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:	Intensity:
None:	None:	None:	None:	None:	None:	None:
30	31					
Type:	Type:					
Duration (min):	Duration (min):					
Intensity:	Intensity:					
None:	None:					

Appendix E

Manipulation Check and Debriefing

Appendix E.1 Feeling Questionnaire

Appendix E.2 Debriefing Script

Appendix E.1 - Feeling Questionnaire

Please indicate **how you're feeling at this moment** (circle the appropriate number):

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Very bad	Bad	Fairly Bad	Neutral	Fairly Good	Good	Very good				

Appendix E.2 - Debriefing Script

PARTICIPANT DEBRIEFING

Thank you for participating in this study.

The purpose of the study was to examine whether an intervention aimed to manipulate an individual's image of hoped-for or feared possible selves related to being an exerciser led to an increase in self-reported exercise behaviour.

Participants in this study were in one of three different conditions. In the first condition, participants completed an activity where they were asked to think about an image of themselves 5 to 10 years into the future as inactive (feared possible selves). In the second condition, participants completed the same exercise but were asked to think about an image of themselves as healthy, regular exerciser (hoped-for possible selves). Participants in the third group acted as the control condition. This means that they did not complete the possible selves activity; instead, they completed a quiz about exercise.

I hypothesized that the participants in the feared possible selves condition would report doing the greatest amount of exercise, followed by participants in the hoped-for possible selves condition, and then the control condition.

If you would like to learn more about this topic, you may be interested in the following references:

Ouellette, J.A., Hessling, R., Gibbons, F.X., Reis-Bergan, M., & Gerrard, M. (2005). Using images to increase exercise behaviour: Prototypes versus possible selves. *Personality and Social Psychology Bulletin*, 31, 610-620.

Whaley, D.E., & Schrider, A.F. (2005). The process of adult exercise adherence: Self-perceptions and competence. *The Sport Psychologist*, 19, 148-163.

If you are interested in receiving the results of this study once the study has been completed, please reply to this email indicating your interest in receiving a summary of the study findings.