Imagining the Possibilities: The Effects of a Possible Selves Intervention on Self-Regulatory Efficacy and Exercise Behavior

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This experiment examined the effects of a possible selves intervention on self-regulatory efficacy and exercise behavior among 19 men and 61 women (mean age = 21.43 years, SD = 3.28) who reported exercising fewer 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. The hoped-for and feared possible selves interventions required participants to imagine themselves in the future as either healthy, regular exercisers or as unhealthy, inactive individuals, respectively. Participants in the control condition 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 the intervention. Participants who received either possible selves intervention reported greater exercise behavior 4 weeks and 8 weeks post-intervention than participants in the control group. Planning self-efficacy partially mediated the effects of the possible selves intervention on exercise behavior over the first 4 weeks of the study. These findings highlight the effectiveness of possible selves interventions for increasing exercise behavior and the role of self-regulatory processes for explaining such effects.

Keywords: self-efficacy, self-regulation, self, physical activity, imagery

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

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Possible Selves

One psychological construct that may be useful for predicting and changing exercise behavior 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 provide a link between an individual’s self-concept and motivation for behavior 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 that 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 behavior (the ability to change oneself and exert control over one’s inner processes; Baumeister & Vohs, 2004; Oyserman & James).

Possible Selves and Health Behaviors

A few studies have provided support for a relationship between health-related possible selves and various health behaviors (e.g., Hooker, 1992; Hooker & Kaus, 1992, 1994; Black, Stein, & Loveland-Cherry, 2001). 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 several health behaviors (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). Hoyle and Sherrill (2006) found that activation of a feared health-related possible self led to self-regulation of health behavior, whereas activation of a hoped-for self did not (Hoyle & Sherrill, 2006). Possible selves have also been found to be positively associated with evaluation of antismoking messages (Freeman et al. 2001).

Possible Selves and Exercise

Studies have also examined the relationship between exercise-related possible selves and exercise behavior (e.g., Harju & Reed, 2003; Whaley, 2003). Harju and Reed found that among a sample of college students, examples of commonly listed hoped-for exercise-related selves included being fit, being healthy, and being
attractive. Commonly listed feared nonexerciser selves were being unfit, unattract-
vive, and failing with exercise goals. 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 with 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 nonexercisers were more likely to describe hoped-for
and feared possible selves related to body image compared with participants
who described themselves as occasional, short-term, or long-term exercisers. In
addition, long-term exercisers reported a greater number of hoped-for and feared
possible selves related to health and physical activity compared with nonexercisers.
Taken together, these studies suggest that the possible selves construct may
be important in understanding exercise behavior.

To date, only one published study has employed a possible selves interven-
tion aimed at increasing exercise behavior (Ouellette, Hessling, Gibbons, Reis-
Bergan, & Gerrard, 2005). The researchers examined the impact of exercise-related
prototypes and exercise-related possible selves on exercise among a sample of
undergraduate students. Participants were asked to describe their impressions of
either (a) themselves 10–20 years from now as someone who exercises regularly
(hoped-for possible self); (b) themselves 10–20 years from now as someone
who does not exercise regularly (feared possible self), (c) other people 10–20
years from now who exercise regularly (exerciser prototype); or (d) other people
10–20 years from now who do not exercise regularly (nonexerciser prototype).
Participants then provided specific details about the possible self/prototype such as
appearance, general health, and energy level. Self-reported exercise was assessed
at baseline and 4 weeks later.

Contrary to prediction, there was no difference in the amount of change in
exercise between the feared and hoped-for possible selves conditions. This predic-
tion was based on research showing that exposure to images of people engaging
in negative health behaviors predicts subsequent behavior better than exposure to
images of people engaging in positive health behaviors (e.g., Blanton et al., 2001;
Ogilvie, 1987). This may be because images of unhealthy behaviors tend to be more
vivid than images of healthy behaviors (Ouellette et al., 2005). However, in Ouellette
et al.’s study, participants reported that both the exerciser and nonexerciser images
were equally vivid. Therefore, data were collapsed to form a single possible selves
condition. People in the possible selves intervention condition who scored high on
the personality trait of consideration of future consequences (Strathman, Gleicher,
Boninger, & Edwards, 1994) reported a greater increase in exercise over the 4-week
study period than participants who did not receive a possible selves intervention
(i.e., participants in the exerciser and nonexerciser prototype conditions).

Although Ouellette and colleagues (2005) did not find any differences between
feared and hoped-for possible selves on exercise behavior, studies of other health-
related behaviors described earlier have demonstrated an advantage for feared
selves. On the one hand, Ouellette et al.’s findings may simply be an anomaly.
On the other hand, they may indicate that unlike possible selves for other health-
related behaviors, both feared and hoped-for exercise-related possible selves are
equally vivid and influential. Given the inconsistent findings of studies comparing
the effects of the two types of selves, further research on this issue is warranted.
Mechanisms Underlying the Effects of Possible Selves on Behavior Change

Research is also needed to examine theory-based mechanisms by which possible selves lead to behavior change. It has been suggested that possible selves serve as a source of behavioral standards against which current views of the self are compared, and discrepancies between these two views are rectified through behavior change (Cross & Markus, 1991; Hoyle & Sherrill, 2006). The behavior change is facilitated by self-regulatory strategies, which, in turn, lead to the desired possible self (Cross & Markus, 1991). Hoyle and Sherrill tested this hypothesis by examining whether activating feared or hoped-for health-related possible selves produced behavioral 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 behavioral self-regulation. Oyserman and James (2008) caution that these results do not necessarily suggest that feared possible selves are a greater motivator than hoped-for possible selves. Rather, cuing a possible self that is discrepant with one’s present self is necessary for motivation and, in turn, may be effective in promoting self-regulation. Oyserman and James also state that possible selves that are detailed and linked with strategies for achievement are most likely to influence self-regulation.

Self-regulation consists of activities such as planning, scheduling, developing strategies to overcome barriers, and goal-setting (Barone, Maddux, & Snyder, 1997; Baumeister, Heatherton & Tice, 1994). Performance of these activities is strongly influenced by self-efficacy (Bandura, 1997; Maddux & Gosselin, 2003). That is, people who are more confident in their capabilities to perform the self-regulatory tasks required to achieve a specific goal or outcome (i.e., people who have high self-regulatory efficacy) are more likely to use self-regulatory strategies than their less efficacious counterparts. Given the centrality of self-regulation and self-efficacy to both possible selves (Markus & Nurius, 1986; Markus & Ruvolo, 1989) and behavior change (Bandura; Maddux & Gosselin, 2003), an increase in self-regulatory efficacy is a viable mechanism by which possible selves exert their influence on behavior. This hypothesis was examined in the present experiment.

Study Overview and Hypotheses

We examined the effects of an intervention targeting feared versus hoped-for possible selves versus a control intervention on exercise behavior among a sample of inactive young adults (i.e., not meeting Health Canada’s [2003] physical activity guidelines). Self-regulatory efficacy variables, including scheduling, planning, barrier, and goal-setting self-efficacy, were examined as possible mediators of the intervention’s effects (specifically, self-efficacy to perform the self-regulatory tasks that have been identified as important in self-regulatory theoretical frameworks; Barone et al., 1997; Baumeister et al., 1994). Although previous research compar-
ing the effects of feared and hoped-for selves on behavior has yielded inconsistent results, we hypothesized that consistent with the majority of health-related studies (e.g., Black et al., 2001; Hoyle & Sherrill, 2006), (a) participants exposed to the feared possible selves intervention would report greater exercise behavior over the 8-week follow up period, compared with participants who received the hoped-for possible selves intervention, and (b) participants in the hoped-for possible selves condition would report greater exercise behavior than the control group. Based on preliminary evidence that self-regulatory processes mediate the relationship between possible selves interventions and behavior change (e.g., Hoyle & Sherrill, 2006), we also predicted that self-regulatory efficacy variables would mediate the relationship between the possible selves interventions and exercise behavior over the course of the study.

**Method**

**Design and Methodological Overview**

A randomized controlled experimental design was used. Participants were randomly assigned, using a random numbers table, 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 kept log books for eight weeks following the intervention to track their exercise behavior. Measures of outcome variables were taken immediately before and after the experimental manipulations.

**Participants**

Participants were 30 men and 80 women between the ages of 18 and 33 years ($M_{age} = 21.29, SD = 3.23$) who were recruited from a southwestern Ontario (Canada) university campus using poster and web-based advertisements. Specifically, individuals who exercised less than three times per week over the past year were invited to participate in a research study about physical activity. The advertisement explained that participants would complete a series of questionnaires and keep an exercise log book for 8 weeks. The sample was predominantly White-Caucasian (48%), Asian, (20%), and South Asian (19%). Participants met the following inclusion criteria: (1) reported no health problems that may be aggravated by exercise, (2) reported engaging in less than three 30 min bouts of moderate to vigorous physical activity in a typical week over the past year (i.e., they did not meet Health Canada’s [2003] physical activity guidelines) as measured by a modified version of the Godin Leisure Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985) that queried the number of bouts performed for $\geq 30$ in a typical week over the past year (as opposed to the original version of the GLTEQ that measures bouts of activity $\geq 15$ min over a period of seven days); and (3) intended to begin exercising regularly (i.e., exercising at a moderate to vigorous intensity 30 min or more at least three days per week) over the next six months.
Measures

**Baseline Exercise Levels.** Responses to the GLTEQ were used to calculate a baseline measure of exercise that was used as a covariate in the analyses. Specifically, moderate and vigorous exercise were added to create a baseline exercise variable.

**Self-Regulatory Efficacy.** Each of the self-efficacy measures employed an 11-point response scale ranging from 0% (I definitely can’t) to 100% (I definitely can). Each self-efficacy scale was scored by calculating a mean across the scale items.

* Scheduling self-efficacy was assessed with a 5-item measure evaluating participants’ confidence in their ability to arrange their schedules over the next eight weeks to include at least 30 min of moderate to vigorous exercise one, two, three, four, and five times a week (Arbour & Martin Ginis, 2004). Internal consistency was acceptable at both pre- and posttesting (αs ≥ .85, respectively).

* Planning self-efficacy was measured using seven items that assess participants’ confidence in their ability to plan their exercise sessions (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.” Internal consistency of the scale was acceptable at pre-posttesting (αs ≥ .93).

* Barrier self-efficacy was measured with 16 items assessing participants’ confidence to participate in moderate to vigorous exercise 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. This measure was adapted from a similar measure used by Garcia and King (1991) by adding two items that were considered relevant to the study sample. Internal consistency for the measure was acceptable at pre- and posttesting (αs ≥ .88).

* Goal-setting self-efficacy was assessed with four items evaluating participants’ confidence to set realistic exercise goals over the next eight weeks (Dawson & Brawley, 2000). Internal consistency for the measure was acceptable pre- and postintervention (αs ≥ .88).

**Exercise Behavior.** Exercise was measured with log books. 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 behavior 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.

Procedure

Interested participants were screened for eligibility via phone or e-mail and subsequently scheduled for a baseline testing session in the laboratory. After providing written informed consent, participants were given a package containing the questionnaires and intervention materials. They were instructed to first complete the demographics questionnaire and self-regulatory efficacy measures. Participants then completed one of three randomly allocated sets of intervention materials in their package.
Participants in the control condition completed an 11-item quiz about physical activity. Participants in the hoped-for and feared possible selves intervention conditions completed an image generation task identical to that used by Ouellette et al. (2005). Given that Ouellette and colleagues reported that participants understood the image generation instructions, were able to produce the images (i.e., hoped for or feared possible self), and produced images that differed in predictable ways (i.e., exerciser images were more positive than nonexerciser images), their protocol was considered appropriate for the present experiment. The 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) or images of themselves in the future as inactive (feared possible self). Participants received the following instructions (italicized material denotes information that was provided to the hoped-for/feared possible selves conditions, respectively):

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.

After reading the instructions, participants responded, in writing, to eight questions regarding the image that they had generated. They described the first thing that came to mind when they thought about this image and then wrote details about the image’s appearance, general health, energy level, attitude toward life, achievements, relationships and anything else that came to mind. These responses served as a manipulation check for the possible selves intervention. Next, participants completed the self-regulatory efficacy measures again. Finally, all participants were told that they would immediately receive an e-mail containing an exercise log book and instructions for recording the number of minutes of moderate and vigorous intensity exercise performed each day over the next eight weeks. The log books contained definitions of mild, moderate, and vigorous intensity exercise. The log book instructions also explained that participants were not required to start any type of exercise program to participate in the study, but simply to record any exercise done over the eight week time period. Participants were informed that they would receive a daily e-mail reminder to fill in their log books, as well as e-mail prompts at weeks four and eight to return the log books to the researcher via e-mail. The log books also contained messages based on the experimental condition that participants were assigned to. Specifically, 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. These messages were taken directly from the intervention activities
and located in a box on each page of the exercise log book. Participants received $5 cash for completing each of the three study phases (questionnaires/intervention, Week 4 log book return, Week 8 log book return). After returning the completed log books, participants were debriefed.

**Data Analysis**

All assumptions underlying the statistical analyses were tested and met as per guidelines provided by Tabachnick and Fidell (2001). Level of statistical significance was set at $p < .05$ for all analyses. Because explicit hypotheses were established before the study, each hypothesis was evaluated at the 0.05 level without any adjustment for multiple comparisons (Keppel, 1991). Furthermore, given the limitations associated with relying on $p$ values to determine significance (Cohen, 1994), effect sizes were also calculated and interpreted. Cohen’s $d$ was calculated as the measure of effect size, and interpreted such that values of .20, .50, and .80 indicated small, medium and large effect sizes respectively (Cohen, 1994).

A series of one-way general linear model (GLM) analyses of covariance (ANCOVAs) were conducted to examine between-condition differences in total minutes and total days of exercise performed over the course of the study. Baseline activity levels served as a covariate. Because of the participant attrition that occurred from Week 4 ($n = 80$; 19 men, 61 women) to Week 8 ($n = 52$; 11 men, 41 women), separate ANCOVAs were conducted on the data available from Weeks 1–4 and Weeks 1–8 to maximize statistical power.1

To test for mediation of the self-regulatory efficacy variables, the following conditions were tested (Baron & Kenny, 1986): (1) the intervention significantly affects exercise behavior (Path A); (2) the intervention significantly affects the self-regulatory efficacy variables (Path B); (3) the self-regulatory efficacy variables are significant predictors of exercise behavior (Path C); and (4) controlling for the effects of the self-regulatory efficacy variables eliminates the significant relationship between the intervention and exercise behavior (full mediation) or reduces the relationship (partial mediation; Path D). These conditions were tested using hierarchical multiple regression analyses. Separate analyses were conducted to examine postmanipulation self-efficacy as a mediator of exercise behavior over 4 weeks and 8 weeks.

To test the significance of the mediated effect, a Sobel test was conducted. The Sobel test is very conservative and lacks power when $n < 400$ (Dearing & Hamilton, 2006). Hence, the magnitude of the mediated effect (i.e., an effect size) was also calculated using the following expression: $ab/c$, 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 (Dearing & Hamilton).

**Results**

**Manipulation Check of Possible Selves Intervention**

Using a protocol described by Ouellette and colleagues (2005), we verified that participants generated images consistent with their assigned conditions (i.e., feared possible self as a nonexerciser, hoped-for possible self as a regular exerciser). First,
two independent coders rated the valence (i.e., attractiveness or aversiveness) of each response to the image generation questions on a 7-point scale ranging from −3 (extremely negative) to +3 (extremely positive). (Intraclass correlation coefficients for all eight valence measures were > .98 indicating very high inter-rater reliability.) Second, the ratings were subjected to independent t tests to compare the average of the eight valence scores of the feared and hoped-for images. As expected, 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). Next, to compare the ease of describing the hoped-for versus feared images, the number of content phrases (i.e., the number of descriptive phrases; e.g., “I see myself running a marathon,” “I picture myself being unattractive”) were compared. Independent t tests revealed no differences in the number of content phrases generated for each type of image (all ps > .05), suggesting that participants were able to describe both types of images with similar ease and detail. Taken together, the results of the manipulation check suggest that participants did indeed generate images consistent with the intervention instructions.

**Exercise Behavior**

Contrary to our hypothesis, there were no significant differences in the number of minutes or days exercised between any of the conditions over 4 weeks or 8 weeks (all ps > .05). However, over Weeks 1–4, there was nearly half of a standard deviation’s difference in exercise minutes between the control condition and both the feared and hoped-for possible selves conditions (ds = .45). Similarly, over Weeks 1–8, there was a medium- to large-sized difference in exercise minutes between the control condition and the feared (d = .71) and hoped-for (d = .67) possible selves conditions. As shown in Table 1, there was virtually no difference in the number of minutes of exercise reported between the hoped-for and feared possible selves conditions. Given this pattern of findings, coupled with the manipulation check data indicating that participants described both images with similar ease and detail, the two experimental conditions were collapsed into one possible selves intervention condition. ANCOVAs were then conducted to determine whether participants who received a possible selves intervention reported more exercise than the control condition. For minutes of exercise, the results indicated a medium-sized effect for condition at 4 weeks, \( F(1, 72) = 3.73, p = .057, d = .45 \), and a medium- to large-sized effect for condition at 8 weeks postintervention \( F(1, 49) = 5.23, p = .027, d = .70 \). Thus, participants who received a possible selves intervention reported more minutes of exercise over 4 weeks and 8 weeks than control participants. The conditions did not differ in the number of days of exercise at either time point (ps > .05).²

**Mediation Analysis**

Analyses were then undertaken to examine mediators of the effects of the intervention on exercise. Replicating the ANCOVA results, after controlling for baseline exercise behavior, the possible selves intervention had a significant, positive effect on total minutes of exercise performed over 4 weeks (\( \beta = .20, p = .05 \); Path A) and 8 weeks (\( \beta = .30, p = .03 \); Path A). The intervention did not have an effect on number of days exercised over 4 weeks (\( \beta = .03, p = .75 \)) or 8 weeks (\( \beta = .17, p = .22 \)). Hence, no further analyses were conducted for total days of exercise.
Table 1  Means and Standard Deviations (Unadjusted for Baseline Differences) for Total Minutes and Total Days Exercised Over 4 Weeks and 8 Weeks

<table>
<thead>
<tr>
<th>Variable</th>
<th>Weeks 1–4 (n = 80)</th>
<th></th>
<th>Weeks 1–8 (n = 52)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FPS (n = 27)</td>
<td>HFPS (n = 26)</td>
<td>Control (n = 27)</td>
<td>FPS (n = 20)</td>
</tr>
<tr>
<td>Total Minutes&lt;sup&gt;a&lt;/sup&gt;</td>
<td>500.85 (298.63)</td>
<td>502.12 (298.88)</td>
<td>385.20 (210.28)</td>
<td>1102.00 (655.30)</td>
</tr>
<tr>
<td>Total Days</td>
<td>10.78 (4.64)</td>
<td>10.88 (4.98)</td>
<td>10.56 (5.24)</td>
<td>18.13 (10.68)</td>
</tr>
</tbody>
</table>

Note. FPS = feared possible selves condition; HFPS = hoped-for possible selves condition.

<sup>a</sup>Two outliers in the control group, 1 outlier in the HFPS group, 1 outlier in the FPS group. Outliers were removed from the data set before analysis. Baseline exercise levels were measured as self-reported bouts of moderate and vigorous exercise ≥ 30 min in a typical week over the past year. Moderate exercise bouts per week: FPS = .45 (.60); HFPS = .45 (.66); Control = .71 (.78). Vigorous exercise bouts per week: FPS = .82 (.86); HFPS = .80 (.74); Control = .67 (.82).
The relationships between the intervention and all four self-regulatory efficacy variables (Path B) were tested separately; baseline scores for each self-regulatory efficacy variable were controlled for (see Table 2). Participants in the intervention condition had greater postintervention planning self-efficacy ($\beta = .18, p = .01$) and barrier self-efficacy ($\beta = .16, p < .01$) than controls. The conditions did not differ on postintervention scheduling self-efficacy ($\beta = .13, p = .08$) or goal-setting self-efficacy ($\beta = .14, p = .06$).

Given the results of the Path B analyses, only planning and barrier self-efficacy were tested in the Path C analyses. Planning self-efficacy was significantly related to total minutes of exercise over 4 weeks ($\beta = .31, p < .01$), but not 8 weeks ($\beta = .15, p = .29$). The relationship between barrier self-efficacy and total minutes of exercise was not significant over Weeks 1–4 ($\beta = .17, p = .12$) or Weeks 1–8 ($\beta = .22, p = .11$). Consequently, only planning self-efficacy was entered into the Path D analyses to examine whether it mediated the effects of the intervention on exercise over Weeks 1–4. After controlling for planning self-efficacy, the relationship between the intervention and total minutes of exercise during Weeks 1–4 was reduced ($\beta = .11, p = .31$), indicating that planning self-efficacy partially mediated

### Table 2  Means and Standard Deviations for Pre- and Postintervention Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>FPS ($n = 27$)</th>
<th>HFPS ($n = 26$)</th>
<th>Control ($n = 27$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scheduling Self-Efficacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preintervention</td>
<td>76.96</td>
<td>80.08</td>
<td>73.63</td>
</tr>
<tr>
<td></td>
<td>(16.61)</td>
<td>(17.14)</td>
<td>(16.83)</td>
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<tr>
<td>Postintervention</td>
<td>79.93</td>
<td>82.69</td>
<td>73.41</td>
</tr>
<tr>
<td></td>
<td>(15.58)</td>
<td>(12.30)</td>
<td>(19.33)</td>
</tr>
<tr>
<td><strong>Planning Self-Efficacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preintervention</td>
<td>75.26</td>
<td>72.36</td>
<td>68.15</td>
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<tr>
<td></td>
<td>(16.09)</td>
<td>(19.33)</td>
<td>(18.47)</td>
</tr>
<tr>
<td>Postintervention</td>
<td>78.62</td>
<td>77.58</td>
<td>67.72</td>
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<tr>
<td></td>
<td>(12.44)</td>
<td>(18.09)</td>
<td>(18.21)</td>
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<tr>
<td><strong>Barrier Self-Efficacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preintervention</td>
<td>61.57</td>
<td>59.05</td>
<td>50.97</td>
</tr>
<tr>
<td></td>
<td>(15.18)</td>
<td>(17.64)</td>
<td>(14.57)</td>
</tr>
<tr>
<td>Postintervention</td>
<td>66.37</td>
<td>64.17</td>
<td>51.53</td>
</tr>
<tr>
<td></td>
<td>(14.93)</td>
<td>(15.29)</td>
<td>(17.10)</td>
</tr>
<tr>
<td><strong>Goal-Setting Self-Efficacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preintervention</td>
<td>78.01</td>
<td>73.94</td>
<td>71.94</td>
</tr>
<tr>
<td></td>
<td>(14.05)</td>
<td>(17.58)</td>
<td>(11.90)</td>
</tr>
<tr>
<td>Postintervention</td>
<td>81.29</td>
<td>78.17</td>
<td>73.06</td>
</tr>
<tr>
<td></td>
<td>(10.95)</td>
<td>(16.60)</td>
<td>(11.75)</td>
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</tbody>
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*Note.* FPS = feared possible selves condition; HFPS = hoped-for possible selves condition. For all scales, possible scoring ranges are 0 to 100.
the effect of the possible selves intervention on exercise behavior over the first 4 weeks of the study (see Figure 1).

The Sobel test indicated that the difference between Paths A ($\beta = .20$) and D ($\beta = .11$) was not statistically significant ($z$ score = 1.47, $p = .14$). However, calculation of the magnitude of the mediating effect indicated that 29% of the effect of the intervention on total minutes of exercise was mediated by planning self-efficacy.

**Discussion**

The purpose of the current study was to examine the effects of a possible selves intervention on participants’ exercise behavior, and the potential mediating effects of self-regulatory efficacy variables. Consistent with previous research (Ouellette et al. 2005), after collapsing the feared and hoped-for possible selves conditions into a single intervention condition, greater exercise behavior (total minutes) was reported by the intervention group than the control group. These effects were partially mediated by planning self-efficacy.

**Effects of the Possible Selves Intervention on Exercise**

Interestingly, the positive effects of the possible selves intervention were only revealed after collapsing the two conditions, a finding which suggests that both feared and hoped-for exercise selves are equally motivating to young, exercise initiates. In contrast, Hoyle and Sherrill (2006) found that health-related feared possible selves were more strongly related to behavior than hoped-for possible selves. Behavior change by manipulation of possible selves can only work if there is a discrepancy between the current self and the possible self, otherwise the
individual would consider behavior change pointless (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 behavior change by highlighting discrepancies.

This finding suggests that exercise-related possible selves are unique insofar as both feared and hoped-for possible selves can influence exercise behavior. Our findings also raise the possibility that a “balanced” possible self (i.e., asking individuals to imagine both a feared and hoped-for exercise-related possible self; Oyserman & Markus, 1990a, 1990b; Hoyle & Sherrill, 2006) would have greater impact than either a hoped-for or feared self on its own. Some research suggests that when salient possible selves include both feared and hoped-for possible selves, the result is improved behavioral 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 most effective (Oyserman & James). Considering that our sample of inactive, but relatively healthy individuals likely experienced discrepancies between both their hoped-for and feared exercise-related selves, it seems reasonable that priming a balanced possible self may have had a larger impact on exercise behavior than priming only one type of possible self. This is a possibility that warrants examination in future research.

It is noteworthy that there were medium- to large-sized differences between the possible selves and control conditions for the total number of minutes of exercise, but not the total number of days of exercise over the 8-week study. Moreover, the possible selves intervention increased exercise above and beyond other aspects of the study protocol that were employed in both conditions and that have been found to promote exercise adherence, such as self-monitoring through the use of daily log books (Aittasalo, Miilunpalo, Kukkonen-Harjula, & Pasanen, 2006; Speck & Looney, 2001), and e-mail 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 each day, thus attenuating the effects of the intervention on number of days exercised. However, participants who received the possible selves intervention exercised for more minutes over the course of the study compared with 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 (Weeks 1–4), 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 Self-Regulatory Efficacy

In addition to having greater planning self-efficacy, the regression analyses indicated that participants in the possible selves condition also had greater barrier self-efficacy
than the control condition. Imagining themselves as healthier and more fit may have prompted people in the hoped-for selves condition to also visualize themselves overcoming barriers to exercise to achieve this outcome. Likewise, picturing feared possible selves may have provided participants with an opportunity to reassess their capabilities for avoiding these negative images, and imagine accomplishing behaviors to avoid the feared images. Visualizing oneself confronting and mastering challenging situations is a type of vicarious experience which serves to increase efficacy beliefs (Bandura, 1997). Thus, the intervention may have served as an opportunity to increase self-efficacy for performing the behaviors needed for achieving one’s hoped-for possible self or avoiding one’s feared self. Although speculative, this explanation is consistent with studies of exercise imagery which have shown that greater imagery of oneself as healthier, or more fit as a result of exercising, is associated with greater coping self-efficacy and exercise (Cumming, 2008).

Scheduling and goal-setting self-efficacy did not emerge as significant mediators in the regression analyses. The intervention may not have had as great an impact on scheduling self-efficacy as it did on planning 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 behavior (e.g., Rodgers et al., 2002; Sniehotta, Scholz, & Schwarzer, 2005), greater planning, scheduling, and goal-setting self-efficacy were associated with more minutes of exercise over the study duration. However, barrier self-efficacy was not a significant predictor of total minutes of exercise. Failure to capture self-efficacy for all relevant barriers may have undermined our ability to detect a relationship between barrier self-efficacy and exercise behavior. It is also possible that participants did not have enough experience with the barriers to accurately estimate their self-efficacy for overcoming them. Inaccurate efficacy estimates would also undermine the strength of the relationship between this variable and subsequent exercise.

Planning self-efficacy was shown to be a partial mediator of exercise over 4 weeks but not 8 weeks. Failure to demonstrate mediation over both measurement periods may be due to reduced statistical power for the 8-week analyses. Alternatively, consistent with previous research, planning self-efficacy may have a more potent influence on the initiation of an exercise program (i.e., over the first 4 weeks), rather than on longer-term behavior (Arbour-Nicitopoulos, Martin Ginis, & Latimer, 2009; McAuley & Blissmer, 2000). Additional adequately powered, longitudinal research is needed to examine the role of mechanisms underlying the possible selves-exercise relationship, and whether these mechanisms change over time.

**Implications, Limitations and Conclusion**

Taken together, our findings have important implications for theory and practice. From a theoretical perspective, we now know that increased planning self-efficacy
serves as a mechanism by which possible selves promote exercise behavior. These findings provide support for the notion that possible selves play a role in influencing self-regulatory processes (Hoyle & Sherrill, 2006) and should be examined as a component of theories that account for self-regulatory processes (such as social cognitive theory). From a practical perspective, our results indicate that possible selves interventions may be a useful tool for increasing self-regulatory efficacy and exercise participation among inactive individuals. The fact that a single brief laboratory manipulation influenced exercise behavior over eight weeks suggests that possible selves may be an important tool for exercise behavior change interventions. The intervention used in the current study was a brief activity that would be relatively easy to implement in a health promotion setting in conjunction with other behavior change strategies.

In addition to highlighting the implications of our study, a few limitations also warrant mention. First, there was considerable participant attrition. Although there were no differences in participant characteristics between those lost to follow-up and those who remained in the study, it is not known whether exercise behavior differed between these groups. Second, participant attrition reduced statistical power to detect significant mediated effects. Third, imagery ability was not measured. Recent evidence indicates that exercisers’ abilities to create appearance-health images moderates the relationship between imagery frequency and leisure-time exercise, coping self-efficacy, and scheduling self-efficacy (Cumming, 2008). Thus, imagery ability may be an important moderator and should be examined in future studies of the effects of possible selves interventions on exercise.

In summary, despite some limitations, the current study provides support for the effectiveness of possible selves interventions for increasing exercise behavior. Our study has also provided the first evidence that changes in self-regulatory processes (particularly, planning self-efficacy) mediate the effects of possible selves interventions. These findings provide important direction for practitioners seeking strategies to increase exercise behavior, particularly during initiation of an exercise program, and for researchers working to understand psychosocial processes underlying effective exercise interventions.

Notes

1. Differences in characteristics of participants who participated at baseline, Week 4 and Week 8 were tested with a series of one-way ANOVAs and chi-square analyses. No significant differences were found.
2. Participants also completed a measure of consideration of future consequences (Strathman et al., 1994). Analyses indicated that this variable did not moderate the effects of the intervention.

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References


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