Physical Activity After Cardiac Rehabilitation: Evidence That Different Types of Self-Efficacy Are Important in Maintainers and Relapsers

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Objective: To test whether maintenance self-efficacy predicts physical activity among individuals who maintain an active lifestyle and whether recovery self-efficacy predicts physical activity among those who relapse to a less active lifestyle. Study Design and Participants: In a longitudinal study, data were collected from 114 participants 4–10 days after a myocardial infarction (MI), 2 weeks after rehabilitation (2 months after MI), and 8 months after MI. Results: In a subgroup of participants who maintained regular activity at 8 months after MI, maintenance self-efficacy predicted physical activity. Among participants who had relapsed by 8 months after MI, recovery self-efficacy predicted physical activity. Conclusions: Those who conduct interventions among cardiac rehabilitation patients should aim to increase recovery self-efficacy among those patients who are at risk for relapse and to increase maintenance self-efficacy among those patients who are likely to maintain their level of physical activity.

Keywords: self-efficacy, maintenance, relapse, myocardial infarction, physical activity

Maintaining the performance of exercises recommended by rehabilitation specialists and recovering after lapses in the performance of exercises constitute a process of behavior change. Usually, researchers assume that the same cognitions may help individuals to maintain their activity and to recover from relapse. Self-efficacy, which can be defined as beliefs about one’s ability to perform a specific action (Bandura, 1997), is associated with a patient’s adherence during and after rehabilitation programs (Carlson et al., 2001; Guillot, Kilpatrick, Hebert, & Hollander, 2004; McAuley, Pena, & Jerome, 2001). In this study, we investigated whether specific beliefs predict the performance of exercises recommended by rehabilitation specialists, by examining whether patients maintained their activity levels or relapsed to their less active lifestyles.

Self-Efficacy and Performance of Recommended Rehabilitation Exercises

According to social cognitive theory (Bandura, 1997), self-efficacy is a proximal, direct predictor of behavior. Several studies have yielded results that were consistent with this prediction. Participants’ beliefs about their ability to exercise in spite of various barriers were related to more frequent participation in cardiac or pulmonary rehabilitation, r(40) = .36 (Guillot et al., 2004). Self-efficacy beliefs regarding the ability to exercise daily despite barriers (bad weather, a lot of work, a lack of time, health problems) predicted the adherence to recommended exercises among men participating in cardiac rehabilitation (Blanchard, Rodgers, Courneya, Daub, & Knapik, 2002b). Among patients who participated in a cardiac rehabilitation program, self-efficacy for exercise was a significant predictor of exercise for over 3 months (Carlson et al., 2001).

Some studies, however, have revealed no effects of self-efficacy on exercise during or after rehabilitation. Baseline exercise self-efficacy may be unrelated to adherence to recommended exercises among cardiac rehabilitation participants (Jeng & Braun, 1997). Altmaier, Russell, Kao, Lehmann, and Weinstein (1993) found patients in a short-term rehabilitation program who took part in a self-efficacy intervention did not adhere to the recommended exercise after rehabilitation although their general beliefs about their ability to exercise increased after rehabilitation. McAuley and Blissmer (2000) identified a number of ambiguities in the previous research and concluded that self-efficacy plays a crucial role in the initiation of exercise but may be a weak predictor of exercise during maintenance.

The weak predictive power of self-efficacy for long-term maintenance may result from differences in the operationalization of self-efficacy and a lack of correspondence between measured beliefs and the type and complexity of the measured task (cf. McAuley et al., 2001). Social cognitive theory suggests that self-efficacy operationalized as domain-specific beliefs (i.e., beliefs about ability to exercise) may be a weak predictor of performance if the actual task is complex (cf. Bandura, 1997). Self-efficacy beliefs that match specific tasks may be a stronger predictor of task performance than domain-specific self-efficacy beliefs (cf. Bandura, 1997). Maintenance of regular physical activity for months after myocardial infarction (MI), with the frequency and intensity recommended during rehabilitation, is a complex task. Such a complex task requires not only the ability to perform certain tasks but also self-efficacy with respect to self-regulation of action in the...
face of barriers that occur when an individual has to reschedule and reorganize daily life (cf. McAuley et al., 2001).

**Maintenance and Relapse**

Participants of cardiac rehabilitation who try to incorporate regular exercise into their daily life may be divided into two discrete groups of maintainers and relapers. The criterion for differentiating between maintainers and relapers usually refers to the performance of a behavior over a certain time period (cf. Rothman, 2000; Sutton, 2005). Maintenance of a behavior is usually defined as action sustained over a certain period of time (Rothman, 2000). For example, if post-MI patients perform exercises as frequently as recommended for a period of 6 months after rehabilitation, it may be considered that they maintained the recommended exercise. Relapse refers to the lack of action or the lack of performance of a particular behavior (or performing below a recommended level) that has been previously performed (Sullum, Clark, & King, 2000). For example, if post-MI patients perform recommended rehabilitation exercises for a certain period but discontinue them later (or perform them only occasionally), they may be considered to have relapsed. For many types of behaviors (e.g., healthy nutrition, exercise), relapse does not mean complete lack of performance but rather underperformance relative to some criterion level. In studies on exercise, relapers are usually defined as individuals who meet certain criteria regarding exercise at the baseline (e.g., exercising three or more times per week for at least 20 min) but who do not meet these criteria at a follow-up measurement (Sullum et al., 2000).

From the perspective of clinical practice, it would be useful to identify people who are at risk for relapse after rehabilitation prior to their eventual relapse. Social, cognitive, and behavioral factors may distinguish maintainers from relapers. High social support is among the strongest predictors of adherence to cardiac rehabilitation recommendations (Jackson, Leclerc, Erskine, & Linden, 2005). Social support may refer both to levels of perceived support and to measures of the social support network (i.e., marital status). Besides self-efficacy, intention to exercise is another strong predictor of adherence to cardiac rehabilitation (cf. Blanchard, Rodgers, Courneya, Daub, & Knapik, 2002a). Past exercise is listed among the strongest determinants of future exercise (Norman, Conner, & Bell, 2000). In addition to exercise, proper nutrition prior to MI may help to distinguish maintainers from relapers: Having a low body mass index and being diagnosed with a disease that requires healthy nutrition are listed among the predictors of compliance with cardiac rehabilitation (cf. Jackson et al., 2005).

**Physical Exercise in Maintainers and Relapers: What Type of Self-Efficacy May Help to Maintain or Gain Control During a Relapse?**

Researchers’ discussion of the role of self-efficacy in the adherence to cardiac rehabilitation has addressed the initiation and maintenance of recommended exercises (cf. McAuley et al., 2001; Woodgate, Brawley, & Weston, 2005). Although some patients are able to maintain recommended exercise levels, many may fail to incorporate recommended exercise into their daily life after the completion of the rehabilitation program. After a combined 3-month rehabilitation program, almost half of the patients returned to a less active lifestyle within the following 3 months (Bock et al., 1997). At 3 months after MI, a minority of patients performed more exercises than before MI, and a minority followed the recommendations regarding physical activity (Newens, McColl, & Bond, 1997).

Social cognitive theory (Bandura, 1997) does not provide an explanation of why a behavior that was successfully initiated or sustained for a certain period of time (which should be followed by an increase in beliefs about the ability to act) is discontinued in some cases. If self-efficacy depends on past performance then self-efficacy should decrease after a relapse (cf. Sullum et al., 2000; Wallace & Buckworth, 2003). Social support may refer both to levels of perceived support and to measures of the social support network (i.e., marital status). Besides self-efficacy, intention to exercise is another strong predictor of adherence to cardiac rehabilitation (cf. Blanchard, Rodgers, Courneya, Daub, & Knapik, 2002a). Past exercise is listed among the strongest determinants of future exercise (Norman, Conner, & Bell, 2000). In addition to exercise, proper nutrition prior to MI may help to distinguish maintainers from relapers: Having a low body mass index and being diagnosed with a disease that requires healthy nutrition are listed among the predictors of compliance with cardiac rehabilitation (cf. Jackson et al., 2005).

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mote behavior exclusively within specific subgroups of participants. Previous research revealed that different social cognitions may predict exercise in individuals assigned to different subgroups. Lippke, Ziegelmann, and Schwarzer (2005) found that among orthopedic rehabilitation patients assigned to three groups (nonintenders, intertenders, and actors), different sets of social–cognitive variables (i.e., risk perception, outcome expectancies) predicted patients’ physical activity within each group. As mentioned earlier, the assignment of individuals to groups of maintainers, relapers, or those who have not yet acted (although they intend to do so) is usually based on their behavior (i.e., physical activity; Lippke et al., 2005; Sutton, 2005).

**Aims**

In this study, we investigated whether maintenance and recovery self-efficacy predict behavior in groups of participants who maintain the performance of rehabilitation exercises as frequently as recommended (i.e., three to five times per week) or who relapse to a lifestyle less active than that which was recommended. We used the pattern of change in exercise behavior across 6 months to assign participants to groups of maintainers or relapers. Group assignment was expected to moderate the relationship between self-efficacy and exercise. An additional aim of the study was to test whether variables measured before rehabilitation predict maintenance or relapse 6 months after rehabilitation.

We hypothesized that among individuals who maintain their activity at the recommended level, maintenance self-efficacy predicts behavior over and above recovery self-efficacy. Conversely, we hypothesized that among individuals who relapse (i.e., after an initial period of maintenance, perform exercises less frequently than recommended by a rehabilitation specialist), recovery self-efficacy predicts behavior over and above maintenance self-efficacy. Analyses were conducted separately for groups of maintainers and relapers because it was expected that different types of self-efficacy would predict behavior in these two groups. Finally, we hypothesized that maintenance or relapse at 6 months after rehabilitation can be predicted by variables measured before rehabilitation (social support, intention to comply, and baseline behavior).

**Method**

**Participants**

One hundred and thirty individuals who had an uncomplicated MI were invited to take part in the study. One person refused, and 15 participants dropped out at the second or third data collection. The final sample consisted of 114 participants aged 39–67 years ($M = 54.3, SD = 6.90$), with 64% of them being men and 46% of them being women. Except for 6 participants, it was the participants’ first MI episode; 70% of participants used beta-blockers after MI. All participants had very low or low risk of cardiovascular complications after vigorous exercise. About 69% of respondents were married or living with a partner, 51% had completed high school education, and 21% had obtained a university degree.

**Procedure**

Participants were approached by members of the research team (psychologists or rehabilitation specialists), informed about the purpose and design of the study, and asked to participate on a voluntary basis. At all three measurement points, members of the research team assisted each patient individually. Time 1, which was assessed 4–10 days after MI, refers to the period before the participant had an MI. Time 2 took place in the 8th week after MI (2 weeks after a short-term rehabilitation). Time 3 took place 8 months after MI. Time 1 data collection took place in five wards in five general hospitals in Central and Northern Poland where patients stayed after MI. Data collection at Time 2 and 3 took place in three rehabilitation centers for patients with cardiovascular diseases; the research team members telephoned the participants and invited them to take part in each data collection wave.

The short-term (2 week) rehabilitation program consisted of low frequency cardiovascular training exercises (once per day or less) and education regarding nutrition and smoking. The program represents a Phase 2 cardiac rehabilitation that combines medically supervised exercises with education regarding the reduction of risk factors associated with coronary heart disease. The program, which consists of five to seven sessions per week, is shorter than most other Phase 2 cardiac rehabilitation programs (cf. American Association of Coronary Pulmonary Rehabilitation, 1995).

At the end of the rehabilitation program, all participants received individual recommendations regarding type, frequency, duration, and intensity of exercises. All participants received a recommendation that they perform three to five 30-min exercise sessions per week.

At Time 1, participants responded to the questions regarding MI and their physical activity prior to the MI, their intention to adhere to a healthy lifestyle after their discharge, their support from their families for a healthy lifestyle, and the participants’ nutrition prior to the MI. At Time 2, participants were asked about their physical activity, their intention to maintain regular exercises recommended by the rehabilitation specialist, and their maintenance and recovery self-efficacy beliefs. At Time 3, participants were asked about their performance of the exercises recommended by the rehabilitation specialist.

**Measures**

At Time 1, physical activity was measured with the following item: “Within two weeks before MI, how often did you engage (for at least 30 minutes) in any kind of moderate physical activity (e.g., walking, cycling on a level terrain, swimming)?” At Time 2 and 3, we used a measure of physical activity that corresponded to the specific recommendations regarding physical exercise that each participant received. Before being asked about their physical activity, participants were reminded about their individual recommendations regarding type, frequency, duration, and intensity of exercises. Then, physical activity was measured with one item: “Within the last two weeks, how often did you engage (for at least 30 minutes) in moderate physical activity (e.g., walking, cycling on level terrain, swimming; as intensively as recommended by your rehabilitation specialist)?” Responses were made on a scale rated from 0 to 10 (0 = never, 1 = once, 2 = once per week, 4 = twice per week, 6 = three times per week, 8 = four times per week, 10 = five or more times per week). The scale was recoded to obtain an index of the number of physical activity sessions performed per week. On average, participants reported exercising as recommended twice per week before the MI ($M = 2.09, SD = 1.83$), over three times per week at Time 2 ($M = 3.61, SD = 0.70$) and slightly fewer than three times per week at Time 3 ($M = 2.51, SD = 1.52$).

At Time 1, intention to adhere to the recommended lifestyle after MI was measured with one item: “Within the next six months after your discharge from the hospital, do you intend to follow the recommendations that you have obtained/will obtain regarding a healthy lifestyle (i.e., regular exercise and healthy nutrition)?” On a scale from 1 (definitely not) to 4 (exactly true), the responses ranged from 1 to 4 ($M = 2.65, SD = 0.94$).

Additionally, at Time 1 perceived support from family for regular physical activity was measured. The participants were asked to respond to the following: “What would be the attitude of your family after you are...
discharged from the hospital? My family would help me to adhere to a physically active lifestyle.” On a scale from 1 (definitely not) to 4 (exactly true), the responses ranged from 1 to 4 (M = 3.20, SD = 0.87).

We measured nutrition with one item: “Within two weeks before MI, how often did you eat fruit and vegetables (excluding potatoes)?” The responses were given on a scale from 0 to 7 (never, once or twice per week, almost every day, once a day, 2 a day, 3 a day, 4 a day, 5 a day or more) with a mean of 3.10 (once a day), SD = 1.22.

At Time 2, maintenance self-efficacy was measured with four items. Participants were instructed as follows: “Think about maintenance of regular performance of exercises (recommended to you by the rehabilitation specialist). Do you believe that you are able to perform them regularly at home?” They were then presented with the following statements: “I am confident that I am able to do rehabilitation exercises regularly even if I do not see any positive effects of exercises,” “I am confident that I am able to do rehabilitation exercises regularly even if doing exercises takes me a lot of time,” “I am confident that I am able to do rehabilitation exercises regularly even if I have to force myself to do them again everyday,” “I am confident that I am able to do rehabilitation exercises regularly even if I am tempted to do something else.” The responses were given on a 4-point scale from definitely not (1) to exactly true (4). The total responses on all four items ranged from 4 to 16 (M = 12.14 SD = 2.94). Cronbach’s alpha for the scale was .81.

At Time 2, recovery self-efficacy was measured with three items. Participants were instructed as follows: “Despite good will it may happen that someone gives up regular performance of the exercises, recommended to you by the rehabilitation specialist. If it happened (would happen) to you that you stopped performing them for a short time (a couple of days), to what degree are you certain that you could resume regular performance?” They were then presented with the following statements: “I am confident that I am able to resume the regular performance of exercises (after giving them up) even if I had failed to pull myself together to exercise,” “I am confident that I am able to resume the regular performance of exercises (after giving them up) even if I feel weak after illness period,” “I am confident that I am able to resume the regular performance of exercises (after giving them up) even if I haven’t done exercises for a couple of days.” The responses were given on a 4-point scale from definitely not (1) to exactly true (4). The total responses on all three items ranged from 3 to 12 (M = 7.64, SD = 3.11). Cronbach’s alpha for the scale was .85.

To investigate the factorial validity of the two types of self-efficacy, we conducted a principal components analysis with varimax rotation on the total group of participants. Two components were found, which explained 43.9% and 27.4% of the variance, respectively. The four items from the maintenance self-efficacy scale formed the first component (pattern coefficients: .79, .80, .79, and .87), and the three items from the recovery self-efficacy scale formed the second component (pattern coefficients: .78, .93, and .92).

The psychometric properties of maintenance and recovery self-efficacy scales were tested in a pilot study of 60 patients with spondylosis who were admitted to a rehabilitation center (cf. Luszczynska & Gregiatis, 2005). Both scales had satisfactory internal consistency (Cronbach’s alpha was .76 and .79, respectively) and were moderately correlated (r = .38, p < .01).

Classification of Participants as Maintainers or Relapsers

Participants who exercised three or more times per week at both Time 2 and Time 3 were assigned to the maintenance group (n = 50). Participants who exercised three or more times per week at Time 2 but exercised two or fewer times per week at Time 3 were assigned to the relapse group (n = 49). The remaining 14 participants, who exercised at Time 2 less frequently than recommended (i.e., less than three times per week), were excluded from the following analyses.

The groups did not differ in age, F(1, 94) = 1.07, ns; gender, χ²(1, N = 98) = 0.26, ns; or body mass index, F(1, 98) = 1.32, ns. To test whether participants assigned to groups of maintainers and relapers actually differed in the pattern of exercise, we used an analysis of variance. Repeated measures analysis of variance revealed that there was a main effect of time, F(2, 95) = 93.74, p < .001, η² = .69 and a Time × Group interaction, F(2, 95) = 93.50, p < .001, η² = .69. Compared with participants who relapsed, participants in the maintenance group exercised more frequently at Time 1, F(1, 95) = 7.14, p < .01, η² = .08, d = 0.59; Time 2, F(1, 95) = 11.75, p < .001, η² = .12, d = 0.70; and Time 3, F(1, 95) = 511.92, p < .001, η² = .86, d = 4.71. The means for the frequency of the performance of the recommended exercises are displayed in Figure 1. Additionally, repeated measures analysis of variance revealed within-group differences. Participants who maintained an active lifestyle performed more sessions of physical activity at Time 2 and at Time 3 than at Time 1, F(2, 48) = 8.53, p < .001, η² = .27. There was no significant difference in performance between Time 2 and Time 3, F(1, 49) = 0.11, ns, η² = .00, d = 0.03. By contrast, participants who relapsed exercised less frequently at Time 1 and at Time 3 than at Time 2, F(2, 47) = 81.85, p < .001, η² = .82. There was a significant decrease in the frequency of the performance of the exercises between Time 2 and Time 3, F(1, 48) = 168.01, p < .001, η² = .82, d = 3.08.

Results

Preliminary Analyses: Correlations Between Self-Efficacy and Exercise Behavior

The correlations between self-efficacy and physical activity are displayed in Table 1. Among participants who maintained regular exercises, maintenance self-efficacy at Time 2 was related to physical activity at Time 3. Among participants who relapsed, recovery self-efficacy at Time 2 was related to physical activity at Time 3. Among all participants, recovery self-efficacy was associated with physical activity at Time 3.

Effects of Maintenance and Recovery Self-Efficacy in Maintainers and Relapers

According to the first hypothesis, among participants who maintain regular physical activity, maintenance self-efficacy predicts the performance of physical activity over and above recovery

Figure 1. Figure 1 shows the participants’ performance of the recommended exercises before myocardial infarction (MI; as determined 4–10 days after the MI [T1]), 2 weeks after a short-term rehabilitation (2 months after the MI [T2]), and 6 months after T2 (8 months after the MI [T3]).
self-efficacy, whereas among the participants who relapse to a less active lifestyle, recovery self-efficacy predicts the performance of exercises over and above maintenance self-efficacy. To test the hypothesis, we used hierarchical regression to predict physical activity at Time 3. In the first two steps, we entered control variables. Age and gender were entered in the first step, and exercise before MI was entered in the second step (physical activity at Time 1 was selected because physical activity represents participants’ baseline behavior in their daily life circumstances). In the last step, we entered the type of self-efficacy that was expected to be the best predictor of behavior in a particular group. For the maintenance group, we entered recovery self-efficacy in the third step and maintenance self-efficacy in the fourth step. For the relapse group, we entered maintenance self-efficacy in the third step and recovery self-efficacy in the fourth step (cf. Table 2).

The results for the maintenance group revealed that only maintenance self-efficacy predicted the performance of rehabilitation exercises among participants who maintained an active lifestyle. Including maintenance self-efficacy in the regression equation resulted in a significant increase in the variance explained above recovery self-efficacy, after we controlled for age, gender, and exercise before MI (cf. Table 2). By contrast, the results for the relapse group revealed that recovery self-efficacy but not maintenance self-efficacy predicted the performance of rehabilitation exercises. Those participants who were in relapse and who had strong recovery self-efficacy were still able to perform some exercises. They performed more frequently compared with those with weak recovery self-efficacy. Including recovery self-efficacy in the regression resulted in a significant increase in the variance explained above maintenance self-efficacy, after we controlled for age, gender, and exercise before MI (cf. Table 2).

Identifying Participants at Risk for Relapse and Those Who Are Likely to Maintain an Active Lifestyle at 6 Months After MI With Variables Measured Prior to Rehabilitation

According to the second hypothesis, maintenance or relapse at 6 months after rehabilitation can be predicted with variables measured prior to rehabilitation (physical activity and nutrition before MI, intention to adhere to a recommended lifestyle, having a spouse or partner, perceived social support from family for an active lifestyle). The results of the logistic regression analysis are presented in Table 3. All included variables significantly predicted group assignment. Overall, 80% of participants were classified correctly (85% of participants from the maintenance group and 74% of participants from the relapse group). Participants who had a more active lifestyle and healthier nutrition before MI, who had a stronger intention to adhere to the recommended lifestyle after being discharged from hospital, who were married or living with a partner, and who perceived support for an active lifestyle after MI were more likely to maintain physical activity at Time 3. By contrast, participants who had poorer nutrition and a less active lifestyle before MI, who had weak intentions to adhere to the recommended active lifestyle, who had no spouse or partner, and who perceived less family support for active lifestyle were at risk for relapse.

Discussion

The present research supports the role of maintenance and recovery self-efficacy as predictors of the performance of exercises that were recommended by a rehabilitation specialist. Participant’s strong beliefs about their ability to maintain recommended physical exercise (measured 2 months after rehabilitation) predicted
more frequent exercise (more than three times per week) among participants who met rehabilitation guidelines 8 months after rehabilitation. Conversely, their beliefs about their ability to recover from a lapse predicted more frequent exercise among those who had relapsed by 8 months. Maintenance self-efficacy beliefs may be important for those who exercise as frequently as recommended, but they are not important for cardiac rehabilitation participants who relapse to a less active lifestyle. Strong beliefs about their ability to recover from a relapse may help those who relapse to perform at least some exercise. The results support the notion that different cognitions may predict the performance of at least some exercise during a relapse and help to increase exercise among individuals who maintain regular physical activity (cf. Scholz et al., 2005).

Variables measured within 4–10 days after MI allowed for the accurate identification of participants who were at risk for relapse and those who were likely to maintain regular physical activity 8 months later. Compared with participants who maintained the recommended level of physical activity, those who relapsed exercised less frequently before MI, had poorer nutrition before MI, had weaker intentions to adhere to the recommended lifestyle after being discharged from the hospital, were more likely to live without a partner, and perceived low support for active lifestyle after MI from their family. On the basis of these variables, it is

Table 2
Predictors of Rehabilitation Exercises at 8 Months After MI Among Participants Who Maintained Recommended Exercises and Those Who Relapsed: Results of Hierarchical Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>Adjusted R²</th>
<th>ΔR²</th>
<th>F</th>
<th>df</th>
<th>F for change</th>
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<tbody>
<tr>
<td><strong>Maintainers</strong></td>
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<tr>
<td>Step 1</td>
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<tr>
<td>Gender</td>
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<td>.12</td>
<td>.08</td>
<td>.12</td>
<td>2.88</td>
<td>2.43</td>
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<tr>
<td>Age</td>
<td>.35</td>
<td></td>
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<td>Step 2</td>
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<tr>
<td>Exercise at T1</td>
<td>.15</td>
<td>.14</td>
<td>.08</td>
<td>.02</td>
<td>2.27</td>
<td>3.42</td>
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<tr>
<td>Step 3</td>
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<tr>
<td>Recovery self-efficacy</td>
<td>.15</td>
<td>.16</td>
<td>.08</td>
<td>.02</td>
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<tr>
<td>Maintenance self-efficacy</td>
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<td>.25</td>
<td>.16</td>
<td>.09</td>
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<td>5.40</td>
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<tr>
<td>Gender</td>
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<tr>
<td>Exercise at T1</td>
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<td>.15</td>
<td>.07</td>
<td>.12</td>
<td>1.88</td>
<td>4.41*</td>
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<tr>
<td>Maintenance self-efficacy</td>
<td>.06</td>
<td>.16</td>
<td>.05</td>
<td>.01</td>
<td>1.40</td>
<td>4.45</td>
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<tr>
<td>Recovery self-efficacy</td>
<td>.39*</td>
<td>.30</td>
<td>.18</td>
<td>.15</td>
<td>2.62*</td>
<td>6.05*</td>
</tr>
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</table>

**Note.** Unless otherwise indicated with an asterisk, p values for the F tests were nonsignificant. MI = myocardial infarction; T1 = Time 1.

*p < .05.

Table 3
Logistic Regression Analysis Predicting Relapse Versus Maintenance of Recommended Physical Exercises at 8 Months After MI From Variables Measured 4–10 Days After MI

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>OR</th>
<th>95% CI</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined model</td>
<td>.50</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Physical activity before MI</td>
<td>0.45**</td>
<td>0.17</td>
<td>1.57</td>
<td>1.12–2.21</td>
<td></td>
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<tr>
<td>Nutrition before MI</td>
<td>0.56*</td>
<td>0.26</td>
<td>1.74</td>
<td>1.04–2.91</td>
<td></td>
</tr>
<tr>
<td>Intention to adhere to recommended lifestyle</td>
<td>1.24*</td>
<td>0.57</td>
<td>3.46</td>
<td>1.13–10.61</td>
<td></td>
</tr>
<tr>
<td>Perceived support from family for active lifestyle</td>
<td>0.92**</td>
<td>0.35</td>
<td>2.51</td>
<td>1.26–4.99</td>
<td></td>
</tr>
<tr>
<td>Having partner or spouse</td>
<td>2.38**</td>
<td>0.86</td>
<td>10.78</td>
<td>2.00–58.23</td>
<td></td>
</tr>
</tbody>
</table>

**Note.** N = 91. In the regression equation, maintainers were coded as 1 and relapsers as 0. MI = myocardial infarction; OR = odds ratio; CI = confidence interval.

* p < .05. ** p < .01.
possible to identify those at risk for relapse, even if they temporarily exercised as frequently as recommended within a 2-week period after rehabilitation. These participants who are at risk for relapse may benefit from an intervention designed to strengthen their recovery self-efficacy.

The results of the present research may help to explain those of studies that revealed a lack of a significant relationship between various types of exercise self-efficacy (which is different from the self-efficacy beliefs measured in the present study) and adherence to the recommendations of the rehabilitation specialist (during and after the rehabilitation period). For example, cardiac rehabilitation participants’ beliefs about their ability to perform the recommended exercises (i.e., self-efficacy for exercise capacity) were unrelated to adherence during the early part of an exercise-based rehabilitation program (Bray & Cowan, 2004). Among participants in a rehabilitation program, arthritis self-efficacy was unrelated to adherence to recommended exercises within a 6-week period (Huyser, Buckelew, Hewett, & Johnson, 1997). An intervention aimed at enhancing general exercise self-efficacy showed initial change in physical activity, but the effects of the intervention did not last for as long as 6 months (Pinto et al., 2002). A lack of predictive power may result from the fact that interventions have usually tried to enhance task-related self-efficacy (e.g., “I am able to exercise”). Stronger effects could be expected if it were specified which participants are at risk for relapse and which may be expected to maintain their activity, followed by a tailoring of the intervention (i.e., enhancing specific self-efficacy beliefs) to these two groups. As McAuley et al. (2001) suggested, targeted self-efficacy beliefs that correspond with the task (i.e., recovering from relapse, or further maintenance) may better explain behavior than beliefs about the ability to exercise. The results of the present study suggest that recovery self-efficacy helps participants to perform exercise more frequently during an actual relapse. Further studies could help to establish whether recovery self-efficacy helps individuals to recover from a relapse and adhere to recommendations.

The present research has several limitations. First, physical activity was measured with a single item. Although the question was detailed, more questions about the nature of the other physical activity that the participants undertook should be used in future studies. Other researchers investigating the effects of psychological interventions on health behavior change have used single-item self-report measures (cf. Kelley & Abraham, 2004). A replication of our study that includes more detailed self-report physical activity measures with good psychometric properties (cf. Kriska & Casperson, 1997) is necessary. Second, in the study, we used self-report measures. Objective measures of participants’ adherence to a recommended active lifestyle would have been preferable, but they would have been difficult to collect in this context. Self-report measures of health behaviors are seen as valid and related to objective measures (Sallis et al., 1996). Finally, the sample size in this study was relatively small, so the results should be regarded as preliminary. Further research in a larger sample would allow the factorial structure of maintenance and recovery self-efficacy to be confirmed and the predictive power of both types of self-efficacy to be estimated. Although the present study provides some support for the discriminant validity of the two self-efficacy scales, in further studies researchers should also test the validity and predictive power of the two types of self-efficacy, comparing them with more general self-efficacy beliefs.

Although further experimental evidence is needed, the results of the present research are of particular importance for psychological practice. In order to maximize long-term adherence to recommendations on physical exercise, interventions should address different cognitions depending on whether the patients are at risk for relapse or the patients are likely to adhere to rehabilitation recommendations.

References


