Task, Coping, and Scheduling Self-Efficacy in Relation to Frequency of Physical Activity

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Self-efficacy has been shown to be a robust predictor of exercise and other health-related behaviors (e.g., Bandura, 1986, 1995, 1997; Godin, Desharnais, Valois, & Bradet, 1995; Maddux, 1995; McAuley, Wraith, & Duncan, 1991). Maddux has proposed that there are different types of self-efficacy and that these types may fulfill different roles in the motivation of behavior, perhaps based on characteristics of the target behavior. The purpose of this study was to examine three different types of self-efficacy: task, coping, and scheduling and their respective usefulness in distinguishing among persons reporting different levels of exercise involvement. A cross-sectional telephone survey using exercise behavior as the selection criterion was completed with 203 adults. Results showed that coping and scheduling efficacy were the best discriminators of level of exercise behavior. Task efficacy did not clearly distinguish between exercise groups. The theoretical and applied implications are discussed, particularly noting specific targets for future intervention.

In 1996, the U.S. Surgeon General indicated that a sedentary lifestyle is detrimental to health, and in particular is a risk for cancer and cardiovascular disease (Bouchard & Depres, 1995; Lee, 1995). The American College of Sports Medicine (ACSM) has recommended that every adult accrue 30 min of physical activity most days of the week (Pate et al., 1995). However, population estimates indicate that fewer than 60% of people are sufficiently active, and that 25% are not active at all (Centers for Disease Control and Prevention, 1996). Despite extensive research documenting the importance of physical activity (Blair, 1995; Bouchard & Depres, 1995; Bouchard, Shephard, & Stevens, 1994; Lee, 1995; Pate et al., 1995) and recommendations for intervention (Blair, 1995; Dishman, 1988, 1994; Quinney, Gauvin, & Wall, 1994), there remains an exercise initiation

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and adherence problem: Not enough people are physically active, and, among those who are, most are not active enough.

Considerable research has addressed determinants of exercise behavior (King et al., 1992). Early work examined the role of physical characteristics such as body weight and body fat, as well as motivational factors in accounting for individual differences in exercise activity. As Dishman (1988) reported, results of this work were mostly equivocal, and proceeded largely in the absence of a comprehensive theoretical framework.

More recent research has proceeded within the framework of social cognitive theory to address the determinants of exercise behavior. Considerable attention has been given to the relation between self-efficacy and exercise behavior. Self-efficacy broadly refers to an individual's confidence in his or her ability to engage in behaviors that will yield a desired outcome (Bandura, 1986). To date, several investigations have indicated that individuals who report a high level of self-efficacy for exercise behavior exercise more frequently and are more likely to adhere to exercise programs (e.g., Bandura, 1995, 1997; Dzewaltowski, Noble, & Shaw, 1990; Godin et al., 1995; Marcus, Pinto, Simkin, Audrain, & Taylor, 1994; McAuley & Jacobson, 1991; McAuley, Wraith, & Duncan, 1991; Rodgers & Gauvin, 1998).

A review of the exercise-related literature suggests that there has been considerable cross-study variance in how self-efficacy is defined and operationalized (e.g., DuCharme & Brawley, 1995; Marcus, Selby, Niaura, & Rossi, 1992; McAuley, Bane, & Mihalko, 1995; McAuley & Jacobson, 1991; Rodgers & Gauvin, 1998). Some investigators have focused on generalized expectancies for engaging in any type of physical activity, some have addressed confidence in the ability to engage in specific exercises, and still others have examined individuals' confidence in overcoming barriers to exercise. The heterogeneity of operationalizations, as well as differences in scale-item content has created interpretive difficulties. In addition, these factors have likely contributed to inconsistencies in findings across studies.

Outside of the exercise domain, there is similar variability in the examination of aspects of self-efficacy. Lust, Celuch, and Showers (1993) examined issues regarding the measurement of self-efficacy and noted that the comparability of approaches across studies is questionable as a result of assessment of different dimensions of self-efficacy (Bandura, 1986). They particularly endorse assessments of strength of self-efficacy as opposed to undifferentiated indicators. Kelly, Zyzanski, and Alemagno (1991) found that strength of self-efficacy was a better predictor of lifestyle behavior change than was magnitude. They operationalized strength as "how likely one would be to succeed in making a lifestyle change" (p. 312), and magnitude as "how easy it would be to change the behavior" (p. 312). The use of these single-item indicators and a slight conceptual drift toward outcome expectations in the assessment of strength (cf. Bandura, 1986, 1995; Maddux, 1995; Maddux, Norton, & Stoltenberg, 1986), however, creates
limitations in interpretation. Whereas Lust et al.'s (1993) study focused on the measurement of self-efficacy, they also point out the importance of addressing item content, suggesting examination of measures of self-efficacy relating to specific behaviors.

It is possible that self-efficacy might not be as much of a unitary concept as has been described in some research, and that discrepancies in findings might be reflective of different types of self-efficacy. For example, Maddux (1995) distinguished between task efficacy and coping efficacy, which seem particularly relevant to exercise. Task efficacy refers to an individual's confidence in the ability to perform the elemental aspects of a task (e.g., confidence in the ability to walk for 30 min at a prescribed intensity [heart rate]), while coping efficacy refers to an individual's confidence in the ability to perform these tasks under challenging conditions (e.g., confidence in the ability to exercise while in a bad mood).

Bandura (1995) and Maddux (1995) also noted that complex adaptations often involve the regular performance of the elemental behavior (e.g., pill swallowing vs. following a course of medication). Thus, one important aspect of adhering to a regular exercise program seems to be scheduling, which should be distinguished from the performance of the exercises per se. Scheduling efficacy has been discussed as an important determinant of activity involvement. The notion of scheduling efficacy developed from research findings showing that lack of time was the most frequently reported barrier to regular exercise (Brawley, Martin, & Gyurcsik, 1998). DuCharme and Brawley (1995) examined the influence of scheduling efficacy compared to efficacy for overcoming barriers to physical activity and found that scheduling efficacy was an important predictor of exercise attendance later in a program. Thus, an individual's confidence in the ability to effectively schedule the exercise activity would be expected to impact on the frequency with which the individual engages in physical exercise. Thus, scheduling may be, practically, an important target for intervention if regular physical activity is the goal. Research has yet to address the comparative predictive value of different types of efficacy for exercise. Demonstrating differing ability of specific types of self-efficacy to discriminate among groups that vary according to exercise involvement would have implications from a theoretical perspective, as well as for intervention.

From an intervention perspective, findings showing which type of efficacy tended to distinguish between groups could suggest areas that need to be incorporated within programs designed to increase exercise involvement. Therefore, the purpose of the present study is to compare levels of task, coping, and scheduling efficacy between individuals with varying levels of exercise involvement. In this study, telephone survey respondents were asked questions about their task, coping, and scheduling efficacy. Participants were selected on the basis of five levels of self-reported exercise frequency, ranging from never exercising to exercising more than 15 times per month (more than 3 times per week).
Although exercise intensity is also important, frequency of exercise is key in the development of fitness (Blair & Morrow, 1998). Moreover, frequency of exercise at a specific intensity must be considered. Groupings based on frequency of exercise were regarded as appropriate for, as Godin et al. (1995) indicated, frequency is most closely associated to the change process, and exercise guidelines typically focus on “exercising regularly; that is, three or more times per week” (p. 334). It is hypothesized that nonexercisers and regular exercisers will be distinguished by their coping and scheduling efficacy, but not by their task efficacy.

Method

Survey

The study is a cross-sectional survey with the criterion for selection being level of self-reported exercise behavior, operationalized into five categories ranging from never to more than 15 times per month (more than 3 times per week). Two pilot telephone surveys were undertaken to determine that the questions were clear and understandable by smaller groups of potential survey respondents (n = 33 and 27, respectively) representing the five behavioral categories. These five categories are modeled after the categories typically used to determine stage of physical activity involvement (e.g., Marcus et al., 1992, 1994).

Level of physical activity was determined through a multiple-step procedure. First, in the introduction to the survey, participants were presented with the following definition of exercise:

For the purpose of this study, we will define exercise or physical activity as doing some activity in your spare time 3 or more times per week, for 20 min or more each time, at a level which causes your breathing to be a lot faster but at which talking is still possible.

This definition is consistent with those typically used in the assessment of self-reported exercise behavior (cf. Stephens & Casperson, 1994). The interviewer would then determine that the participant understood the definition. The definition was followed by a Yes/No response format question: “Do you participate in any exercise or other physical activity according to the definition I have just read?” Participants responding “No” would be considered sedentary. Participants responding “Yes” were then posed the following question: “What types of physical activity do you participate in?” This question would make salient the types of activities the person typically did that met the criteria set out in the definition, preparing them to respond to the question about frequency of activity, which was the main means of categorizing participants. “On average, how often have you exercised PER MONTH in the last 3 months?” Special instructions were provided to the interviewer not to read the categories, but to clarify the participant’s response back to the participant in terms of times per month or times...
per week and to categorize the final response accordingly. Thus, to the participant, this was basically an open-ended response question. Categorization was performed by the interviewer.

Measures

The self-efficacy items were assessed on 10-point Likert-type scales ranging from 1 (no confidence) to 10 (complete confidence). This method is consistent with others in the assessment of self-efficacy with respect to exercise behaviors (e.g., McAuley et al., 1991; Rodgers & Gauvin, 1998). This type of assessment represents a combination of the strength and magnitude dimensions of self-efficacy (Bandura, 1986), as discussed by Lee and Bobko (1994). Magnitude indicates the level of task performance that a participant feels he or she can reach. Strength is the person’s confidence that he or she can perform each task level. The present study takes a mean of confidences across all behaviors presented, thus effectively eliminating those behaviors for which a participant indicated low confidence, but by including the item in the mean, the resultant score will be lower for individuals endorsing fewer behaviors than for individuals having equal confidence for more behaviors. The resultant score, therefore, reflects both strength and magnitude of exercise self-efficacy.

There were three groupings of items representing coping, task, and scheduling efficacy, respectively. Participants had already been cued to think about their own typical activities. For coping, participants were simply asked “How confident are you that you can exercise when you . . .” The items were “. . . are tired./. . . are in a bad mood./. . . feel you don’t have the time.” These items were drawn from the work of Marcus et al. (1992), and although the last item broadly addresses a scheduling issue, the group of items addresses a more general conception of coping than the items on the scheduling scale in the present study. The instructions for task were as follows: “These next questions are about exercise itself; that is, engaging in the activity of your choice, assuming you were able to get to the place to exercise and that you have all the necessary equipment.” This was to conceptually separate the performance of the activity per se from other issues (e.g., scheduling) that might interfere with exercise. The items for task were “Can follow directions from an instructor/Pace yourself during the activity to avoid overexertion/Perform the required movements/Check how hard the activity is making you work.”

For scheduling, the lead question was, “The next questions are about scheduling time for exercise,” and the items were “Can arrange your schedule to exercise regularly no matter what/Overcome obstacles that prevent you from participating regularly/Make up times when you missed your regular exercise session.” These items are more specific behavioral means of overcoming the barrier of “no time,” which is addressed as part of the coping scale.
Table 1

Sample Characteristics

<table>
<thead>
<tr>
<th>Exercise category</th>
<th>N</th>
<th>Males/females</th>
<th>M age in years (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>42</td>
<td>20/22</td>
<td>43.12 (17.30)</td>
</tr>
<tr>
<td>1 to 3 times/month</td>
<td>40</td>
<td>20/20</td>
<td>33.65 (12.35)</td>
</tr>
<tr>
<td>4 to 8 times/month</td>
<td>41</td>
<td>20/21</td>
<td>38.44 (14.73)</td>
</tr>
<tr>
<td>9 to 15 times/month</td>
<td>40</td>
<td>20/20</td>
<td>40.38 (14.81)</td>
</tr>
<tr>
<td>&gt;15 times/month</td>
<td>40</td>
<td>20/20</td>
<td>38.53 (17.27)</td>
</tr>
</tbody>
</table>

As a means of establishing the validity of these item groupings, the factor structure for these indicators of scheduling efficacy was tested via confirmatory factor analysis in a separate survey (n = 551). In that survey, the items were presented in random order, not grouped as in the current study. The three proposed factors were supported, with goodness of fit index = .96, normed fit index = .95, comparative fit index = .97, and root mean square residual = .043, all suggesting a valid factor structure. The subscales were moderately correlated. The correlation for scheduling and coping was .66, for scheduling and task was .52, and for coping and task was .48. In the present study, the correlations of the subscales were: scheduling and coping .59, for scheduling and task .42, and coping and task .44. This level of correlation between the factors does not suggest complete independence. The strongest relationship was between scheduling and coping efficacy. Cronbach’s alphas were .72, .76, and .88 for coping, task, and scheduling, respectively, indicating good internal reliability.

Participants

A sample of 203 participants was selected using a random-digit dialing procedure to fulfill two criteria. First, there had to be equal representation of each of the five behavioral categories (minimum n = 40 each) and, second, equal representation of males and females in each category. All respondents had to be over 18 years of age. Informed consent was obtained over the telephone prior to beginning the survey. Thus, this was a criterion-selected sample. Potential respondents were sampled only until each category was filled. For example, after 20 men and 20 women had been surveyed for the never exercise category, no further respondents would be surveyed who fit this behavioral category. Sample characteristics are displayed in Table 1.

Results

There was no age difference between groups. There was also no main effect for gender, so means are presented only for the behavioral groups.
Table 2

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>1 to 3 times/ month</th>
<th>1 to 2 times/ week</th>
<th>3 times/ week</th>
<th>&gt; 3 times/ week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task (M, SD)</td>
<td>7.20  (1.97)</td>
<td>7.54 (1.50)</td>
<td>7.93 (1.55)</td>
<td>8.42 (1.53)</td>
<td>8.25 (1.54)</td>
</tr>
<tr>
<td>Coping (M, SD)</td>
<td>4.82  (1.78)</td>
<td>5.61 (1.62)</td>
<td>5.34 (2.03)</td>
<td>7.06 (1.95)</td>
<td>7.35 (2.10)</td>
</tr>
<tr>
<td>Scheduling (M, SD)</td>
<td>4.60 (2.40)</td>
<td>5.42 (2.25)</td>
<td>5.36 (2.55)</td>
<td>7.21 (2.24)</td>
<td>7.88 (1.90)</td>
</tr>
</tbody>
</table>

The means and standard deviations for the types of self-efficacy by group are presented in Table 2. A MANOVA of coping, task, and scheduling efficacy by group yielded a main effect for frequency of exercise, $F(12, 591) = 5.60, p < .0001, \eta^2 = .102$. Between-subjects univariate analyses revealed a main effect for task efficacy, $F(4, 197) = 3.84, p < .005$; coping efficacy, $F(4, 197) = 13.74, p < .0001$; and scheduling efficacy, $F(4, 197) = 14.91, p < .0001$. Effect sizes ($\eta^2$) were computed to examine the degree of variance accounted for in these analyses. The resulting $\eta^2$ values were .07, .22, and .23, for task, coping, and scheduling efficacy, respectively. In other words, coping efficacy and scheduling efficacy accounted for 3 times more between-group variance than did task efficacy.

Tukey's HSD post hoc test, however, did not indicate any clear differences between the categories for task efficacy, with Categories 1, 2, and 3, and Categories 2, 3, 4, and 5 each forming a homogeneous group. As can be seen, there was considerable overlap in these two groups. Tukey's HSD post hoc tests revealed that for coping and scheduling, Categories 1, 2, and 3 formed a homogeneous group that was significantly different from Categories 4 and 5, which were not different from each other. These results indicate that, as expected, coping and scheduling efficacy were better discriminators of the exercise categories. Figure 1 clearly shows that nonexercisers can be characterized as displaying high task efficacy and low coping and scheduling efficacy, whereas avid exercisers display high task, coping, and scheduling efficacy.

As a means of further determining behaviorally defined groups that are also meaningful in terms of self-efficacy, as well as more specific potential targets for intervention, a discriminant function analysis was performed. Individual items from the coping and scheduling efficacy scales were entered in the discriminant analysis predicting high and low activity involvement. Two groups of exercisers were used, based on the findings from the post hoc tests: those exercising three or more times per week, and those exercising two or fewer times per week (i.e.,
Exercise Frequency Per Month

Figure 1. Three types of self-efficacy by behavioral category.

Table 3

Pooled Within-Group Correlations of Items With Canonical Variable From Predictive Discriminant Analysis

<table>
<thead>
<tr>
<th>Item</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrange schedule to exercise regularly (scheduling)</td>
<td>.823</td>
</tr>
<tr>
<td>Exercise when you feel you don't have time (coping)</td>
<td>.802</td>
</tr>
<tr>
<td>Overcome obstacles that prevent participating (scheduling)</td>
<td>.735</td>
</tr>
<tr>
<td>Exercise when you are tired (coping)</td>
<td>.651</td>
</tr>
<tr>
<td>Make up missed sessions (scheduling)</td>
<td>.612</td>
</tr>
<tr>
<td>Exercise when in a bad mood (coping)</td>
<td>.380</td>
</tr>
</tbody>
</table>

Groups 1, 2, and 3 were collapsed, and Groups 4 and 5 were collapsed. The discriminant function analysis resulted in one function correctly classifying 77.4% of cases, with an eigenvalue of .410 and a Wilks's lambda of .71, χ²(6, N = 195) = 65.23, p < .0001. All items were included on the function. Pooled within-group correlations with the canonical variable are presented in Table 3. The two items most strongly related to the between-group difference were “Scheduling exercise regularly” and “Exercising when one feels one doesn’t have time,” consistent with previous research indicating that scheduling-related factors may be the primary obstacles to regular exercise.
Discussion

Recently, it has been suggested that there are different types of self-efficacy, and that these types may serve different purposes, depending to some extent on the task to be pursued (Maddux, 1995). Within the health domain, most tasks (e.g., following a pharmaceutical prescription) comprise elemental behaviors that are not particularly challenging (e.g., swallowing a pill; cf. Bandura, 1995; Maddux, 1995). It was hypothesized that task efficacy would not distinguish between the behaviorally defined groups, but that coping efficacy and scheduling efficacy would. There was a multivariate difference between the groups for task efficacy, which was not expected, and for coping efficacy and scheduling efficacy, which was expected. It should be noted, however, that the differences for coping and scheduling efficacy accounted for approximately 3 times the variance accounted for by task efficacy and that there were no clear between-group differences for task efficacy identifiable in the post hoc tests, offering some support for the hypotheses in general.

These results indicate that individuals who exercise more are also more confident that they can do so regularly and can overcome personal obstacles, such as a bad mood. It should also be noted that the effect sizes reported are larger than those reported by Marcus and Simkin (1994), suggesting a reliable finding for coping efficacy and an equally interesting finding for scheduling efficacy.

The present data offer support for the idea of different kinds of self-efficacy; that, within the operationalizations of this study, task efficacy is different from scheduling efficacy and coping efficacy. Although it would be premature to suggest that the types addressed herein are adequately inclusive, or even generalizable beyond exercise, it is apparent that, as Bandura (1995) has suggested, it is coping efficacy that distinguishes between behavioral levels. Or, as Bandura has indicated, it is not the skills that one has but what one can do with the skills that is the essence of self-efficacy. Although there is some relatedness between the types of efficacy, the discriminant function suggests that the items contribute independently to the distinction among individuals who exercise two or fewer times per week or more than three times per week. However, the coping and scheduling items all contributed to a single function. Taken in consideration of the high correlation between these scales ($r = .59$), it is possible that scheduling is a subtype of coping. Given the level of abstraction in the items on each of these scales, it is possible that scheduling could be conceived of as the elemental behaviors necessary to achieve a behavioral goal of exercising regularly, for which one must develop self-efficacy. Nonetheless, it is clear that the performance of the exercise per se can be distinguished from the organization of regular exercise and that these are likely separate behavioral domains, and the latter is superior in distinguishing among behavioral categories of exercisers.
Although there were no clear distinctions between groups, there was a multi-variate-level significant effect of task efficacy across the exercise categories. Taken in consideration with the findings related to scheduling efficacy and coping efficacy, it appears that task efficacy may be a necessary but not sufficient condition for regular exercise. It seems that a person may know how to do something, but unless he or she can fit it in, regular performance of the behavior will not be forthcoming. From an intervention perspective, then, training or instruction in scheduling may be as important or even more important than training in the task. Thus, both may need to be integral parts of successful exercise adherence programs.

These data clearly indicate that there are differences between groups of individuals defined in terms of self-reported frequency of exercise. King et al. (1994) called for more research to identify behaviorally based groupings, and Godin et al. (1995) indicated that "in spite of. . . consensus regarding the prevalence of stages in the process towards adherence to exercise, there is no final agreement on the specific types and number of stages" (p. 334). Furthermore, Godin et al. indicated that the stages should reflect both a behavioral and a motivational dimension. Although the present study used the behavioral dimension as a selection criterion, based on the association between these two dimensions, it suggests that individuals might be grouped as those who exercise zero to two times per week, and those who exercise three times per week (minimally) or more. This is consistent with the findings of Rodgers and Gauvin (1998). Presently, it appears that there is a motivational distinction between these two behaviorally defined groups. To date, only correlates of membership of these two groups have been identified, yielding few clues as to whether these are, in fact, steps in a continuous process from never exercising to exercising three times per week, or whether these are truly distinct categories of behavior. Future research is needed to replicate this finding and to further identify both distinguishing characteristics of these behavioral groups and explanations for the distinction.

The present data are limited because of their correlational, cross-sectional nature. It is not possible, therefore, to offer any predictions. Confidence in the present data is increased by similar findings on similar variables to other studies (e.g., Armstrong, Sallis, Hovell, & Hofstetter, 1993; Marcus et al., 1994), where patterns of coping efficacy are comparable. The present study, however, showed a difference between activity groups for scheduling efficacy and a lack of difference for task efficacy. This results in a much more precise target for intervention: scheduling efficacy and related skills.

This study clearly indicates between-group differences for coping efficacy and scheduling efficacy, but not for task efficacy. Thus, it appears that knowing how to do the exercise is not a barrier, but lowered ability to schedule and overcome other obstacles is associated with lower adherence. This is not a new finding in the literature addressing exercise adherence; thus, it appears that a change
of focus in research from what motivates exercise behavior to what impedes exercise behavior is needed. Clearly, this will be a complex area of future exploration. For example, one can deduce that scheduling efficacy and coping efficacy might be determined by a variety of factors, including skill-based factors (Can I improve my organization to fit this into my schedule?), relative importance factors (Is exercise of high enough priority to be fit into my schedule?), and face-saving factors (It is preferable for me to say “I have no time” than to say “I’m too lazy to try.”). The task of future research will be to determine ways of identifying the different forces that impinge on scheduling efficacy or directly on exercise behavior.

References


