

Variations in Self-Determination Across the Stages of Change for Exercise in Adults¹

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This study explored the relationship between self-determination in the regulation of exercise behavior and stage of change for exercise. Deci and Ryan (1985, 1990) outlined a continuum of behavioral regulation that ranges from non-self-determined regulation (external regulation) to completely self-determined regulation (intrinsic regulation). Prochaska and DiClemente (1984) outlined five stages of behavior change that range from no thoughts of changing (precontemplation) to maintenance of change (maintenance). In our study, 314 individuals completed measures of regulation in exercise behavior and stage of change for exercise. Discriminant function analysis revealed that those in the latter stages of change were more self-determined in their behavioral regulation than those in the early stages of change. An analysis of variance indicated that self-determination increased from the lower to the upper stages of change. Results endorse the importance of motivational considerations in understanding the change process.

In the field of exercise promotion it is accepted that success in adhering to a program of regular exercise is, to a large extent, dependent on the reasons for which exercise is undertaken (e.g., Biddle, 1992a, 1992b; Biddle & Bailey, 1985; Duda, 1989; Markland & Hardy, 1993). Individuals reporting intrinsic reasons for exercise, such as enjoyment and feeling good, typically exhibit greater levels of adherence to exercise than those who report exercising for extrinsic reasons, such as compliance with external pressures

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or attainment of rewards (McAuley, Wraith, & Duncan, 1991; Wankel, 1985, 1988, 1993). Intrinsically motivated behaviors are free from pressures and external controls, are accompanied by interest and enjoyment, and are completely self-determined. Externally motivated behaviors, on the other hand, are determined largely by pressures and controls (either internally or externally imposed), are undertaken essentially for reasons other than intrinsic interest in the activity itself, and can range from being somewhat self-determined to being completely non-self-determined. However, while intrinsic motivation appears to be fundamental to exercise adherence, for many in the initial stages of exercise adoption the enjoyment of and stimulation from the activity itself is insufficient to encourage continued participation (Dishman, 1987; McAuley *et al.*, 1991; Morgan, Shephard, & Finucane, 1984). Extrinsic motives, such as improved fitness, health, or weight loss, are often the initial change catalysts which, over time, may lead to intrinsic interest in exercise and ultimately encourage long-term adherence. Thus, there is likely to be a shift in an individual's motivational focus from extrinsic to intrinsic between initial exercise adoption and adherence to a program of regular exercise.

The concepts of intrinsic and extrinsic motivation are fundamental elements in Deci and Ryan's (1980, 1985) cognitive evaluation theory (CET), a minitheory within the larger self-determination theory framework. The theory comprises a set of hypotheses specifically concerning the effects of internal and external events on intrinsic motivation and has had a significant impact on research examining motivations in the sport and exercise domains (see Frederick & Ryan, 1995, and Ryan, Vallerand, & Deci, 1984, for reviews). However, Deci and Ryan (1985, 1990) and Deci, Vallerand, Pelletier, and Ryan (1991) have reconceptualized the often restrictive internal-external dichotomy and formulated a motivational continuum. They believe that pitting external motivation against internal motivation may be misleading, and that the simple intrinsic/extrinsic motivational dichotomy proposed by CET has outlived its usefulness (Deci & Ryan, 1990). Characterizing all extrinsically motivated behaviors as non-self-determined is incorrect; extrinsically motivated action can vary in its degree of self-determination. Thus intentional action is better conceptualized as varying along a motivational continuum (Deci & Ryan, 1990).

This continuum has its roots in organismic integration theory (OIT), another minitheory in the self-determination theory framework. OIT considers the process by which individuals come to regulate acts which are not initially intrinsically interesting by transforming regulation by external contingencies into regulation by internal processes. OIT outlines several forms of behavioral regulation which manifest varying degrees of self-determination and sit on a continuum of behavioral regulation. This continuum

ranges from external regulation (non-self-determination), through introjected regulation (limited self-determination) and identified regulation (moderate self-determination), to integrated regulation (complete self-determination).

Behavior which is externally regulated is typically undertaken because of pressure from significant others (such as family, friends, or doctor), or the desire to avoid the negative consequences of inaction (such as the disapproval of others). Introjected regulation of behavior follows internalization of such external control, which is then applied to the self through the administration of sanctions and other self-controlling behaviors (Deci & Ryan, 1985). In this case "I'll feel guilt if I don't" is frequently given as the reason for exercising, and although there is no external pressure, such a person is still, in a sense, being regulated (Deci & Ryan, 1990). Action undertaken because of its value, importance or usefulness to the individual is evidence of identified regulation (Deci & Ryan, 1990; Deci *et al.*, 1991). In this case a person would exercise because he/she valued its benefits. Finally, when action is undertaken willingly and with no sense of coercion, the regulatory process is fully integrated within the individual's sense of self and regulation is completely self-determined (Deci & Ryan, 1990). This is known as integrated regulation. Integrated regulation is akin to the concept of intrinsic motivation which also represents fully self-determined regulation. According to Deci *et al.* (1991), however, "intrinsic motivation is characterized by interest in the activity itself, whereas integrated regulation is characterized by the activity's being personally important for a valued outcome" (p. 330). So someone exercising for integrated reasons would do so because exercising is part of what he/she is and, therefore, maintenance of fitness, say, is of utmost importance to that person. Someone exercising for intrinsic reasons, on the other hand, would do so for the enjoyment and stimulation gained from the act of exercising.

The continuum conceptualization allows more meaningful understanding of how one can simultaneously be extrinsically motivated for exercise (do it to improve appearance, maintain fitness, or lose weight) yet feel quite self-determined in the regulation of exercise behavior; this was not possible with the intrinsic-extrinsic dichotomy. Research has shown the relevance of the continuum approach in a diverse range of settings; academic contexts (e.g., Ryan & Connell, 1989; Vallerand & Bissonnette, 1992), sports (Pelletier *et al.*, 1995), couple happiness, (Blais, Sabourin, Boucher, & Vallerand, 1990), and among the elderly (Vallerand & O'Connell, 1989). Empirical examination of behavioral regulation in these areas has measured intrinsic rather than integrated behavioral regulation.

Exercise adoption and adherence research has also supported a dichotomy which has tended to treat exercise behavior as an all or nothing phenomenon (Dishman, 1982; Sallis & Hovell, 1990; Sonstroem, 1988). More recently, however, researchers such as Sallis & Hovell (1990), Barké and Nicholas (1990), and Marcus, Selby, Niaura, and Rossi (1992), have recognized the dynamic nature of exercise behavior, and have identified stages that individuals pass through in their movement from sedentary living to maintenance of regular exercise. The most popular of these stage approaches, the stages of change model, represents the temporal organizational dimension of the larger transtheoretical model developed by Prochaska and DiClemente (1984).

The model proposes that individuals engaged in behavior change pass through five stages ranging from no thought of change to successful maintenance of change. The five stages are labeled precontemplation, contemplation, preparation, action, and maintenance. In the precontemplation stage an individual is unaware of any problem and therefore is not considering change. In the contemplation stage he/she is aware that the behavior is problematic and is evaluating the benefits of lifestyle change, but has made no commitment to change. In the preparation stage he/she has made a commitment to change and may already be making small behavioral and lifestyle changes. In the action stage the individual is actively engaged in behavior change and lifestyle modification to accommodate this change. Finally, in the maintenance stage individuals are working to sustain the changes they have made and avoid relapse. Progression through the stages is conceptualized as a cyclical rather than a linear process and most individuals will recycle through these stages several times before achieving sustained change (DiClemente, 1993).

The transtheoretical model comprises a secondary dimension, the processes of change, which are techniques and strategies differentially employed by individuals across the stages of change. The model also incorporates two stage of change correlates, a decisional balance model, describing the change in pros and cons of behavior change expected across the stage of change, and self efficacy for change, increases in which are expected as one progresses across the stages.

The present study united the continuum-type formulations proposed by both OIT and the transtheoretical model to explore the relationship between behavioral regulation and stage of change, thereby highlighting the role of motivational considerations in the change process. The central hypothesis was that behavioral regulation will vary in conjunction with stage of change. In the initial stages of change for exercise behavior the focus is on making the decision to start exercising and taking concrete steps to becoming more physically active. Here, in keeping with the tenets of OIT,

individuals are likely to evidence less self-determined forms of regulation as they begin the process of internalizing the regulation of this initially uninteresting behavior. As they progress from occasionally taking a little exercise (preparation stage) to taking regular exercise (action and maintenance stages) individuals will become increasingly more self-determined in the regulation of their exercise behavior. However, it is important to note that while organismic integration theory implies a progression from non- to fully self-determined regulation over the course of the internalization of a non-intrinsically motivated behavior there is no explicit presumption of any temporal or sequential pattern to the achievement of self-determined behavioral regulation.

Research has found gender differences in behavioral regulation among college- and university-aged students, in sport and academic contexts (Fortier, Vallerand, Brière, & Provencher, 1995; Pelletier *et al.*, 1995; Vallerand *et al.*, 1992) and among the elderly (Vallerand & O'Connor, 1989). In all cases females reported higher levels of intrinsic and identified regulation and lower levels of external regulation than did males. This is supported by the motivational orientations literature which has found that females are often more intrinsically motivated, or more mastery orientated in their motivation, than males (Duda, 1988; Weiss & Chaumeton, 1992). Consequently, gender differences in self-determination across the stages of change were also examined in the present study.

In sum, it was hypothesized that self-determination in the regulation of exercise behavior increases across the stages of change and that females are more self-determined, at all stages of change, than males.

METHOD

Subjects

Subjects included 314 individuals, 156 females (M age = 36.04, SD = 11.07; 28 did not report their age) and 158 males (M age = 39.07, SD = 11.45; 12 did not report their age) who completed self-administered questionnaires. Of those, 56.4% were blue collar workers, 34% were white collar workers, and 9% were retired or full-time home caregivers.

Procedure

Questionnaires were distributed directly to employees at three work sites, and to members of a local bridge club. Individuals were informed

that the questionnaires examined reasons for exercising, would be answered anonymously, and would take approximately 8 min to complete. Verbal consent was obtained and individuals were referred to the instructional set for instructions on how to complete the questionnaires. Blue collar workers completed their questionnaires during their break and questionnaires were collected immediately. Completed questionnaires were collected from white collar workers and bridge club members within the following week.

Measures

Stages of Change for Exercise Behavior. A visual-analogue stage of change measure, the stage of change ladder, developed by Beiner and Adams (1991) was used (see Fig. 1). The anchored labels represent the five items from the standard stages of change for exercise questionnaire (Marcus *et al.*, 1992); the precontemplation stage is at the bottom of the ladder and the maintenance stage is at the top of the ladder. The labels represent the minimum requirements for membership of a particular stage of change; each stage includes the above two or three rungs. Marcus and Simkin (1993) found support for the validity of the measure by comparing scores to ratings on the Seven-Day Physical Activity Recall questionnaire (Blair, 1984). Stages of change significantly differentiated between reported levels of physical activity participation in the expected direction.

The Behavioral Regulation in Exercise Questionnaire. Developed by Mullan, Markland, and Ingledew (1997), the 15-item Behavioral Regulation in Exercise Questionnaire (BREQ) measures External Regulation (EXT: e.g., "feel under pressure from family/friends to exercise"), Introjected Regulation (IJ: e.g., "I feel like a failure when I haven't exercised in a while"), Identified Regulation (ID: e.g., "It is important to me to exercise regularly"), and Intrinsic Motivation (IM: e.g., "I enjoy my exercise sessions") on a 4-point Likert-type scale. Confirmatory factor analysis revealed acceptable goodness-of-fit indices: Satorra-Bentler scaled $\chi^2_{84} = 184.16$, ($\chi^2_{84} = 239.28$), $p < .001$; Goodness-of-Fit Index = .90, root mean square error of approximation = .07, Non-Normed Fit Index = .91 ($N = 298$). Alpha reliability coefficients for the four subscales were as follows: EXT = .79; IJ = .76; ID = .78; IM = .90. Construct validity was established with respect to an ordered correlation structure, called a simplex pattern, in which forms of behavioral regulation that are nearer in conception, and thus closer on the behavioral regulation continuum, displayed a greater positive correlation than those deemed more discrepant and farther apart on the continuum. Confidence intervals ($\pm 1.96 SE$) computed for all these inter-correlations did not encompass 1.0, thereby establishing discriminant valid-

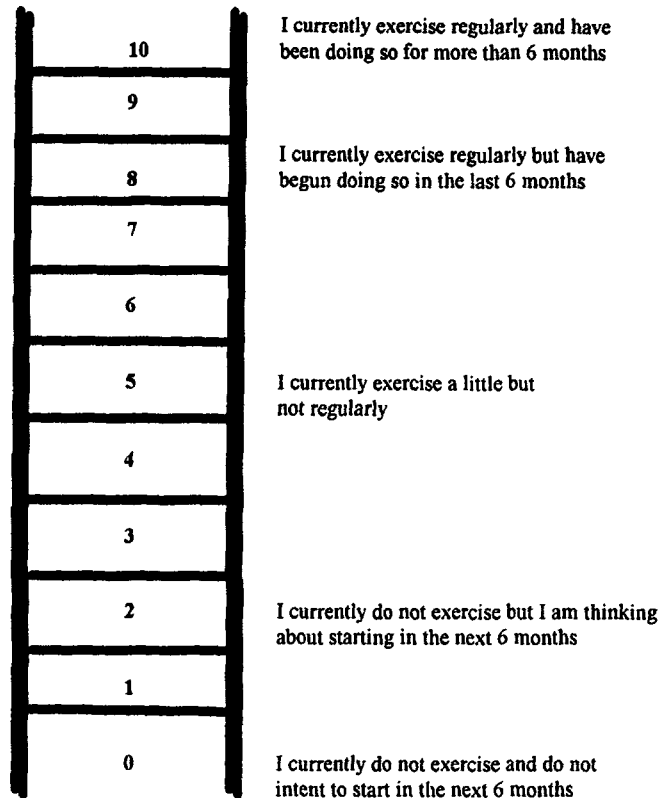


Fig. 1. The stages of change for exercise ladder.

ity. Ryan and Connell (1989) have established the criterion validity of the continuum conceptualization with reference to the Intrinsic Versus Extrinsic Orientation in the Classroom Scale (Harter, 1981), the Multidimensional Measure of Children's Perceptions of Control (Connell, 1985) and the Origin Climate Questionnaire (DeCharms, 1976). Similarly, Blais *et al.* (1990) found the predicted relationships between the Couple Motivation Questionnaire (based on the self-determination continuum) and perceptions of the couple's adaptive behaviors and dyadic happiness. While no additional validity measures were used here the construct validity of the behavioral regulation continuum is well established (see Blais *et al.*, 1990; Ryan & Connell, 1989).

The BREQ can be scored in two ways: by compiling separate subscale scores or computing the Relative Autonomy Index (RAI; Ryan & Connell,

1989). The RAI is a single score which taps the degree to which an individual is more or less self-determined in the regulation of his/her behavior. The RAI is obtained by initially applying a weighting to each behavioral regulation subscale as follows: EXT(-2), IJ(-1), ID(+1), IM(+2). The RAI is then computed by summing the products of these weighted subscale scores.

Analysis

There were two parts to the analysis. First, discriminant function analysis was used to determine whether the stages of change could be discriminated on the basis of BREQ subscale scores. Male and female data were analyzed separately. Variables with structure coefficients greater than .30 were used to define the meaning of the functions (Pedhazur, 1982). Stage of change group differences were evaluated by examining the values of the discriminant functions at the group centroids. Positive values indicate that a group scores high on a function while negative values indicate that a group has a low score on that function. Second, male and female RAI scores across the four stages of change were compared using a two-factor (Gender \times Stage) analysis of variance (ANOVA). Examination of differences in overall RAI scores across the stages of change complemented the discriminant analysis of the individual behavioral regulation elements.

RESULTS

Fifteen (4.7%) individuals reported being in precontemplation, 33 (10.5%) in contemplation, 117 (37.2%) in preparation, 45 (14.3%) in action, and 104 (33.1%) in maintenance. Due to the small numbers in the first two stages, the two were combined to form a single stage that was labeled *prepreparation*. Means and standard deviations for males and females at each stage of change for each BREQ subscale and the RAI can be seen in Table I.

Table II shows that in the discriminant analysis one discriminant function was significant for males (canonical $r = .628$; Wilks's lambda = .577, $df = 12$, $p < .001$) and reflected a strong emphasis on ID and IM. This function accounted for 87.85% of the variance. On this function, males in action and maintenance were positive (.38, .95), while those in preparation and prepreparation were negative (-.45, -1.28), as judged by the values of

Table 1. Means (and Standard Deviations in Parentheses) for RAI and BREQ Subscales by Stage of Change^a

Group	Means (SD)				
	RAI	External	Introjected	Identified	Intrinsic
Prepreparation					
Males	13.65 (10.25)	.31 (.40)	.72 (.97)	1.59 (.95)	1.51 (1.02)
Females	5.00 (9.77)	.57 (.92)	.66 (.77)	1.31 (.92)	.81 (.88)
Preparation					
Males	19.66 (12.88)	.48 (.75)	1.13 (1.05)	2.29 (.86)	2.21 (1.04)
Females	18.38 (10.85)	.40 (.64)	1.12 (1.07)	2.13 (.83)	2.06 (.95)
Action					
Males	28.27 (7.43)	.32 (.46)	1.20 (.66)	2.80 (.52)	2.89 (.62)
Females	28.60 (27.65)	.23 (.46)	1.40 (1.15)	2.98 (.70)	2.86 (.70)
Maintenance					
Males	33.13 (8.65)	.06 (.21)	1.52 (1.23)	3.22 (.67)	3.20 (.83)
Females	27.65 (12.64)	.25 (.62)	1.43 (1.36)	3.12 (.91)	3.06 (.97)

^aRAI = Relative Autonomy Index; BREQ = Behavioral Regulation in Exercise Questionnaire.

the discriminant function at the group centroids. One discriminant function was also significant for females (canonical $r = .666$; Wilks's lambda = .539, $df = 12$, $p < .001$) and was dominated by IM and ID. This function accounted for 90.85% of the variance. Again action and maintenance groups scored positively (.76, .79) while preparation and prepreparation groups scored negatively (-.32, -1.65). For both males and females IJ approached the cutoff mark for inclusion in the discriminant function with structure coefficients of .30 and .29, respectively.

The RAI \times Stage of Change and Gender ANOVA revealed significant main effects for both stage ($F_{1,303} = 50.11$, $p < .001$) and gender ($F_{3,303} = 7.86$, $p < .001$). There was no significant interaction ($F_{3,03} = 2.04$, $p = .11$). Follow-up Tukey's comparison of RAI across stage of change revealed that those in preparation had significantly greater RAI scores than those in prepreparation ($p < .05$) while those in action and in maintenance had significantly higher RAI scores than those in preparation ($p < .05$). There was no significant difference between RAI scores in action and maintenance ($p > .05$). Overall, males had significantly higher RAI scores than females ($p < .05$).

Table II. Discriminant Function Analysis for Males and Females Separately Using Behavioral Regulation to Differentiate Between Stage of Change Groupings

Discriminating variable	Structure coefficients	
	Males	Females
Intrinsic	.81	.85
Identified	.88	.86
Introjected	.30	-.29
External	-.29	-.11

Group	Value of discriminant function at group centroid	
Prepreparation	-1.28 (<i>n</i> = 23)	-1.65 (<i>n</i> = 25)
Preparation	-.45 (<i>n</i> = 62)	-.32 (<i>n</i> = 55)
Action	.38 (<i>n</i> = 22)	.76 (<i>n</i> = 23)
Maintenance	.95 (<i>n</i> = 52)	.79 (<i>n</i> = 53)

DISCUSSION

The objective of this study was to examine whether behavioral regulation varies across the stages of change such that self-determination is higher in the active stages of change. Results from discriminant analyses showed that the use of the more self-determined identified and intrinsic forms of behavioral regulation distinguished those in the action and maintenance stages of change from those in the prepreparation and preparation stages. Complementary examination of the RAI across the stages of change showed support for the proposal that behavioral regulation becomes more self-determined across the stages of change: Those in the action stage of change, who had recently begun exercising and those more regular exercisers in the maintenance stage of change evidenced a significantly higher index of self-determination (RAI) than did their infrequent or irregular exercising counterparts. Results from both discriminant function analysis and analysis of variance, therefore, supported the hypothesis that self-determination in the regulation of exercise behavior increases across the stages of change. Caution should be exercised, however, in generalizing from the present findings given the cross-sectional nature of the study and the fact that only self-report measures were used to quantify stage of change. Due to the single point of data collection, it is not possible to ascertain whether those in the later stages of change *became* more self-determined in the regulation of their exercise behavior over time as they increased their stage of change, or whether they reached the later stages of change *because* they were more self-determined from the outset. In addi-

tion, the stages of change categorization used here may not be an accurate reflection of actual exercise behavior.

Results also showed, contrary to the original hypothesis, that males were more self-determined than females. However, an examination of mean RAI scores at each stage of change group may explain this. It appears that, while in this sample males and females had similar levels of self-determination in the preparation, action, and maintenance stages of change, females had less self-determined reasons for contemplating exercise than males.

According to Deci and Ryan (1987), when events are perceived to support self-determination individuals demonstrate greater interest, more cognitive flexibility, more creativity, and more persistence than when they perceive events to be controlling their behavior. Deci and Ryan (1985) maintained that long-lasting behavior change depends on autonomous, internal regulation of behavior. This requires acceptance of the regulation of behavior as one's own and not merely regulation by continued compliance with external demands. This study found that those in the action and maintenance stages of change were more self-determined than those in the preliminary stages of change. Further longitudinal research, however, is needed to examine the effect of a stage of change-self-determination interaction on maintenance of behavior change. We would suggest that greater self-determination in the regulation of exercise behavior in the action and maintenance stages of change may lead to continued maintenance of regular exercise while less self-determined regulation may lead to relapse or a return to sedentary living.

The transtheoretical model, by incorporating the processes of change, self efficacy theory, and a decisional balance model within the stages of change framework, suggests that one's degree of readiness for behavior change depends on perceived ability to cause change and cope with change, the salience of environmental cues throughout the period of change, and the pros versus the cons of change. Change also depends on such motivational variables as the pressures or demands to change and source of the pressure to change (self or external). Although the model recognizes that behavioral change "requires movement through discrete motivational stages over time" (Prochaska, Redding, Harlow, Rossi, & Velicer, 1994, p. 471), it does not explicitly consider the role of motivation in determining intention to change and regulation of changes in behavior. Motivational variables thus deserve a role in a model of behavior change which professes to be transtheoretical.

Heather (1992) argued that the transtheoretical model provides a heuristic framework for the study of behavior change and intervention. Such a heuristic framework is potentially a powerful base for the incorporation of theories of motivation, such as self-determination theory (Deci & Ryan,

1985), into the transtheoretical framework. Moreover, Courneya (1995) believes that "social-cognitive constructs from [such] theoretical models would benefit from an integration with the stages of change model; integration may help clarify the theoretical relationship between particular constructs and behavior change" (p. 448). The dynamic stages of change conceptualization displays good capacity as a base for integrating the behavioral regulation continuum, and organismic integration theory also provides a base from which to understand the development of the underlying motivational or regulatory processes that foster change.

In conclusion, this study has shown that people are more self-determined in the regulation of their exercise behavior in the latter stages of change. In light of the acknowledged limitations we would encourage longitudinal investigation of the temporal nature of the underlying motivational processes involved in behavior change.

APPENDIX

Behavioral Regulation in Exercise Questionnaire Subscales and Items

External Regulation

- I exercise because other people say I should
- I take part in exercise because my friends/family/spouse say I should
- I exercise because others will not be pleased with me if I don't
- I feel under pressure from my friends/family to exercise

Introjected Regulation

- I feel guilty when I don't exercise
- I feel ashamed when I miss an exercise session
- I feel like a failure when I haven't exercise in a while

Identified Regulation

- I value the benefits of exercise
- It's important to me to exercise regularly
- I think it is important to make the effort to exercise regularly
- I get restless if I don't exercise regularly

Intrinsic Regulation

- I exercise because it's fun
 - I enjoy my exercise sessions
 - I find exercise a pleasurable activity
 - I get pleasure and satisfaction from participating in exercise
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