Perceived autonomy support and psychological need satisfaction in exercise

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Intrinsic Motivation and Self-Determination in Exercise and Sport

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Recommendations for Practitioners Aiming to Foster Exercisers' Participation Motives

- Key practitioners, like exercise promoters in exercise referral schemes and personal trainers, are encouraged to enhance intrinsic motivation as a reason for engaging in exercise, but should recognize that stressing fun and enjoyment of exercise is unlikely to be accepted by individuals who are not yet considering exercising. It is therefore important to investigate reasons for participating and to encourage potential exercisers to identify their own reasons for exercising. These may very well include extrinsic outcomes like "losing weight," but provided that they are personally relevant and also linked to other motives such as improving time and effort in the chosen activity, this is acceptable.
- During the early days of adoption, practitioners are advised to acknowledge individuals' conflict of goals and empathize with the difficulties involved, but to do so in the context of highlighting their autonomous reasons for engaging in exercise. For example, an exercise specialist might say to a person trying to lose weight, "Although it might be hard now, you will begin to reach those goals that are important to you as you get fitter, like losing weight and feeling healthier."
- Exercise practitioners can also recognize that extrinsic motives are not necessarily inherently detrimental and may be very important in helping people in the early days of adoption of exercise. For example, an exercise promoter might design a poster campaign that highlights some extrinsic reasons for exercising, but do so in an autonomy-supportive manner and stress the importance of the extrinsic goal to the individual. In this way the extrinsic goal is more likely to be internalized over time and perhaps be integrated into the personal repertoire of need-satisfying pursuits.
- Practitioners' support of individuals' autonomy, competence, and relatedness will help people to come to identify with and value the rewards of exercising so that it becomes less of a chore and more freely chosen. This is through the processes of internalization and integration. For example, a personal trainer may provide clients with novel training sessions by presenting exercise to them in an autonomy-supportive manner (e.g., adopting a questioning approach, using cooperative learning, giving participants opportunities to lead drills and practices, acknowledging competence); this, over time, is likely to result in the participants' internalizing the sessions and incorporating them into their own training programs.

CHAPTER 2

Perceived Autonomy Support and Psychological Need Satisfaction in Exercise

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The links between exercise and improved physical and psychological health have been well documented (Biddle & Mutrie, 2001). Despite this evidence, however, physical inactivity is the predominant lifestyle pattern observed among people living in contemporary industrialized societies (U.S. Department of Health and Human Services [USDHHS], 1996). To increase the number of people that engage in, and derive the benefits associated with, regular physical activity, it is imperative to understand the factors that underpin exercise adoption and maintenance. Exercise engagement is influenced by a variety of biological, environmental, social, and psychological variables (Biddle & Mutrie, 2001). Of these, the social-environmental and psychological determinants of exercise behavior appear to be those factors that practicing health and fitness professionals may most easily target with intervention strategies. However, before exercise-focused behavioral interventions are designed and implemented, the psychological processes that contribute to active engagement must be better understood, as well as the social-environmental conditions that foster their development.

The Self-Determination Perspective in Exercise

Self-determination theory holds promise for elucidating the specifically motivational factors influencing physical activity participation and the associated psychological and emotional benefits (Deci & Ryan, 1985; Ryan & Deci, this volume). A growing body of research evidence is emerging to suggest support for self-determination theory's propositions within the exercise setting. For

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example, autonomy support from friends (e.g., Wilson & Rodgers, 2004) and satisfaction of the basic psychological needs (Wilson, Rodgers, Blanchard, & Gessell, 2003; Wilson, Rodgers, & Fraser, 2002) have been shown to be positively associated with the most self-determined forms of motivational regulation. Autonomous regulation has also been associated with the action and maintenance stages of change for exercise (Landry & Solomon, 2004; Mullan & Markland, 1997), more frequent self-reported exercise behavior (Wilson, Rodgers, & Fraser, 2002), greater physical fitness (Wilson et al., 2003), more positive attitudes toward exercise (Wilson et al., 2003), behavioral intentions to continue exercising (Wilson & Rodgers, 2004), and exercise-related self-esteem (Wilson & Rodgers, 2002).

This chapter presents a series of studies that extend previous research examining the utility of the basic theoretical propositions of self-determination theory in the exercise domain. The chapter focuses specifically on the role of autonomy support and psychological need satisfaction in fostering adaptive motivational regulations and, subsequently, optimal behavioral, cognitive, and affective aspects of the exercise experience. First, we discuss the relationships between autonomy support, psychological need satisfaction, autonomous regulation, and adaptive exercise behavior as determined from research that used mediational models to test and explain the processes involved in these relationships. Next, we present data on the role of thwarted need satisfaction and controlling forms of regulation in the prediction of maladaptive exercise engagement. We also examine the applicability of the basic needs and motivational regulations proposed by self-determination theory in predicting variations in cognitive and affective responses across different ethnic groups in group exercise settings.

In addition, we present the results of the first experimental study in the area of exercise that has addressed the effect of an experimentally induced autonomy-supportive instructor style on exercise class participants' psychological need satisfaction, motivational regulations, exercise program attendance, and important cognitive and affective outcomes. Drawing from this work, we present directions for future physical activity research based on self-determination theory. The potential contribution of self-determination theory toward the design of behavioral interventions is also discussed. We conclude the chapter by proposing recommendations for practicing health and exercise professionals.

Autonomy Support, Psychological Needs, and Autonomous Regulation

A number of studies examining self-determination theory's propositions in the exercise domain have focused on the conditions that are conducive to the autonomous regulation of exercise behavior (e.g., Wilson & Rodgers, 2004; Wilson, Rodgers, & Fraser, 2002). For example, Wilson and Rodgers (2004)

reported that perceived autonomy support from friends was positively associated with intrinsic motivation and identified regulation. However, self-determination theory suggests that the relationship between autonomy support and autonomous regulation is mediated by the satisfaction of the three basic psychological needs (see Hagger, Chatzisarantis, Barkoukis, Wang, & Baranowski, 2005; Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003).

With an eye toward extending previous studies in the exercise domain, we assessed the direct effects of an autonomy-supportive exercise environment on psychological need satisfaction, as well as on the different forms of motivational regulation proposed by self-determination theory (Edmunds, Ntoumanis, & Duda, in press). In addition, we examined whether psychological need satisfaction mediated the relationship between an autonomy-supportive environment and the autonomous regulation of exercise behavior.

A sample of 106 participants (35.2% male, 64.8% female) ranging in age from 16 to 62 years, who reported engaging in regular exercise classes, completed measures of perceived autonomy support provided by their exercise instructor (measured utilizing the six-item version of the Health Care Climate Questionnaire; Williams, Grow, Freedman, Ryan, & Deci, 1996), psychological need satisfaction (via an amended version of the Basic Need Satisfaction at Work Scale; Deci et al., 2001), and motivational regulations for exercise (via the Behavioural Regulation in Exercise Questionnaire; Mullan, Markland, & Ingledew, 1997).

Supporting self-determination theory's propositions, hierarchical regression analyses revealed that perceived autonomy support from the exercise instructor positively predicted autonomy, relatedness, and competence need satisfaction, as well as intrinsic motivation. In addition, competence need satisfaction partially mediated the relationship between perceived autonomy support and intrinsic motivation. The effect of autonomy support on intrinsic motivation dropped significantly when the effect of competence need satisfaction was controlled for, suggesting partial mediation (see figure 2.1).

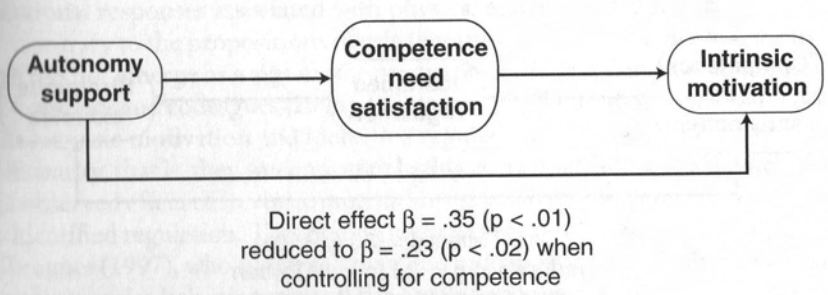

Figure 2.1 The relationship between autonomy support and intrinsic motivation as mediated by competence need satisfaction.

Psychological Needs, Autonomous Regulation, and Exercise Behavior

Research in the exercise setting has also begun to address the utility of the theoretical constructs embedded in self-determination theory in the prediction of self-reported exercise behavior. For example, Wilson and colleagues (2002), using a sample of 500 university students and staff partaking in exercise classes, found psychological need satisfaction to be positively correlated with intrinsic motivation and identified and introjected regulations. In turn, these forms of regulation were positively associated with self-reported exercise behavior. However, a more complete examination of self-determination theory's theoretical propositions would suggest that greater need satisfaction may predict behavioral responses not only directly but also indirectly, via the motivational regulations (Ryan & Deci, 2000b; Vallerand, 1997).

We tested these propositions on a sample of 369 individuals (47% male, 53% female) ranging in age from 16 to 64 years (Edmunds, Ntoumanis, & Duda, 2006; see also Hagger, Chatzisarantis, & Harris, 2006, for other investigations examining these relationships in the physical domain). As reported previously, participants completed measures of exercise-specific psychological need satisfaction, motivational regulations for exercise, and self-reported exercise behavior (in terms of mild, moderate, and strenuous intensities), as well as total exercise behavior, using the Leisure Time Exercise Questionnaire (Godin & Shephard, 1985).

The results of hierarchical regression analyses supported the importance of motivation-related variables in understanding variability in self-reported exercise behaviors. Specifically, external regulation emerged as a negative predictor of strenuous exercise behavior. In contrast, competence need satisfaction and introjected and identified regulations positively predicted strenuous exercise behavior. Introjected regulation also emerged as a positive predictor of total exercise. Identified regulation was found to partially mediate the relationship between competence need satisfaction and strenuous exercise behavior (see figure 2.2).

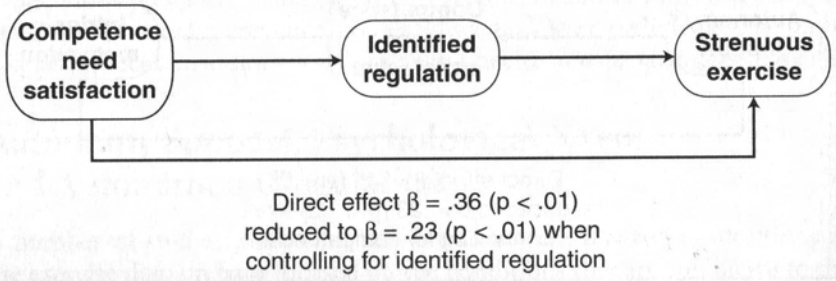

Figure 2.2 The relationship between competence need satisfaction and strenuous exercise as mediated by identified regulation.

Of particular interest was the finding that competence need satisfaction had direct and indirect (via identified regulation) effects on behavioral investment. The indirect effect indicates that feelings of competence result in increased exercise behavior by reinforcing the personal importance of exercise. Collectively, these results suggest that competence is a particularly relevant need in the exercise domain, and that exercise instructors and health professionals should pay special attention to ensuring that this need is met.

Identified and introjected regulations also emerged as significant positive predictors of exercise behaviors. Valuing the benefits associated with an activity (i.e., identified regulation) constitutes a self-determined form of extrinsic motivation that should, according to self-determination theory, be associated with more adaptive outcomes. Given that many forms of exercise (e.g., working out on the step machine) are commonly construed as boring or not inherently enjoyable, this finding appears to support the suggestion that identification is essential to the regulation of valuable, but uninteresting, activities (Koestner & Losier, 2002).

Introjected regulation, however, is a more controlling form of extrinsic motivation that reflects feelings of guilt and compulsion or contingent self-esteem and pride (Ryan & Deci, 2000b). The observed positive association between introjection and exercise behavior should not be interpreted as advocacy for instilling feelings of guilt or contingent self-worth in individuals in an attempt to facilitate active lifestyles. Indeed, there is evidence demonstrating that introjected regulation has negative implications for sustained involvement in sporting activities (e.g., Pelletier, Fortier, Vallerand, & Brière, 2001; Vansteenkiste, Soenens, & Lens, this volume). In addition, research in the educational and political domains has shown introjected regulation to be related to poor emotional functioning (Koestner & Losier, 2002). Thus, this form of regulation may also have a detrimental impact on the psychological well-being of the exerciser. Future longitudinal research is warranted to examine the role of autonomous versus controlling forms of regulation not only in relation to sustained behavioral engagement, but also in terms of the psychological and emotional responses associated with physical activity participation.

Contrary to the propositions of self-determination theory, intrinsic motivation did not emerge as a significant predictor of exercise behavior in the study by Edmunds and colleagues (2006). In interpreting this finding, one should note that intrinsic motivation and identified regulation were not marked by multicollinearity; that is, they were not very highly correlated. Thus, it is unlikely that the observed effect of intrinsic motivation on behavior was severely attenuated by identified regulation. This finding adds credence to the claims of Mullan and colleagues (1997), who suggested that "individuals may be unlikely to maintain regular exercise behavior, with all the organization and commitment it entails, purely for the intrinsic reasons of fun and enjoyment" (p. 745).

However, before dismissing the importance of intrinsic motivation in the exercise domain, we should acknowledge research findings suggesting that

intrinsic motivation fosters exercise persistence. For example, Mullan and Markland (1997) demonstrated that, in conjunction with identified regulation, individuals in the later stages of change (i.e., action and maintenance) reported higher levels of intrinsic motivation compared to those individuals in the earlier stages of change (i.e., precontemplation and preparation). It is therefore suggested that longitudinal methodologies be adopted to delineate the role of intrinsic motivation in *sustaining* exercise engagement. In addition, future work may benefit from being more specific regarding the type of exercise under examination. It is conceivable that different types of physical activity may be guided by different regulatory styles. For example, individuals playing a sport, which may typically be an inherently interesting activity, are likely to be far more intrinsically motivated toward their exercise endeavor than those engaging in a vigorous gym workout involving exercise equipment (e.g., running on the treadmill).

Similar to findings from previous research (e.g., Wilson, Rodgers, & Fraser, 2002), in our study the motivational regulations considered by self-determination theory were more strongly correlated with strenuous and total exercise behaviors than with moderate and mild ones (Edmunds, Ntoumanis, & Duda, 2006). This is probably the case because mild and moderate forms of exercise commonly constitute more habitual modes of physical activity, such as walking and easy cycling. Future researchers might examine whether the motivational regulations proposed by self-determination theory are more important for predicting structured, as opposed to incidental (e.g., walking to work or to the shops), forms of exercise.

Predicting Maladaptive Exercise Engagement

Despite the well-documented benefits associated with regular physical activity, researchers (e.g., Hausenblas & Symons Downs, 2002a, 2002b) have suggested that, if allowed to become excessive, exercise can result in serious detrimental physical (e.g., depressed immune response, menstrual irregularity) and psychological (e.g., anxiety and depression) consequences. Researchers examining the negative consequences associated with excessive physical activity have focused primarily on the occurrence of exercise dependence, a condition in which moderate to vigorous physical activity becomes a compulsive behavior (Hausenblas & Symons Downs, 2002a).

Limited research has dealt with the etiological factors of exercise dependence (Loumidis & Roxborough, 1995). However, there is evidence to suggest that certain motives for exercise can be potential antecedents of this condition (Ogles, Masters, & Richardson, 1995). For example, research adopting a self-determination theory approach has highlighted the difference between obsessive and harmonious passions with respect to pastimes like exercise (Vallerand et al., 2003). Obsessive passion is characterized by an internal pressure that compels individuals to participate in a "passionate" activity, while harmonious passion

is defined by an individual's choosing to participate in an activity. Hamer, Karageorghis, and Vlachopoulos (2002) recently examined the relationship between motivational regulations from self-determination theory and exercise dependence among endurance athletes. Introjected regulation emerged as a positive predictor of exercise dependence, supporting self-determination theory's propositions that more controlling forms of regulation will be associated with maladaptive outcomes. However, Hamer and colleagues (2002) did not consider the relationship between satisfaction of the three psychological needs proposed by self-determination theory and the regulation and level of exercise dependence. Furthermore, their study was limited in that it utilized a unidimensional measure of exercise dependence that does not consider the dependence (American Psychiatric Association, 1994). With these limitations in mind, we conducted a study to more comprehensively examine the "darker side" of introjected regulation (see Ryan & Deci, 2000a, for review) in the exercise domain (Edmunds, Ntoumanis, & Duda, 2005a). That is, we aimed to determine whether a thwarting of the psychological needs and an emphasis on introjected regulation were pertinent to the prediction of exercise behavior among individuals classified as exercise dependent.

Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria for

A sample of 351 male and female exercisers, ranging in age from 16 to 62 years, completed measures of exercise-specific psychological need satisfaction (Deci et al., 2001), motivational regulations (Li, 1999; Mullan, Markland, & Ingledew, 1997), and exercise behavior (Godin & Shephard, 1985). In addition, participants completed the Hausenblas and Symons Downs (2002b) Exercise Dependence Questionnaire. This measure was chosen as it allows individuals to be classified, on the basis of DSM-IV criteria (American Psychiatric Association, 1994; i.e., tolerance, withdrawal, intention effects, lack of control, time, reduction in other activities, and continuance), into three groups. These are (a) at risk for exercise dependence, (b) nondependent symptomatic (i.e., not classified as exercise dependent but showing some symptoms), or (c) nondependent asymptomatic (i.e., showing no symptoms of exercise dependence). However, despite repeated attempts to recruit "at-risk" individuals, only 12 of the 373 participants were classified as suffering from this pathological condition, and thus these individuals were excluded from any further analyses. Therefore only nondependent symptomatic (56.4%; 52.5% male, 46.5% female) and nondependent asymptomatic (40.1%; 39% male, 59.6% female) individuals were compared with respect to the psychological needs and motivational regulations underpinning their reported exercise behavior.

The results of regression analyses revealed that among nondependent symptomatics, introjected regulation was a marginally significant predictor of strenuous exercise behavior. In contrast, in the case of asymptomatic individuals, identified regulation predicted strenuous exercise behavior. These findings add further support to the applicability of self-determination theory within the exercise domain. That is, introjected regulation, proposed by self-determination

theory to represent a harshly evaluative and pressured regulatory style linked to maladaptive outcomes (Koestner & Losier, 2002), predicted a pattern of excessive exercise engagement associated with detrimental behavioral and psychological consequences. On the other hand, autonomous regulation (i.e., identified regulation) was associated with more adaptive patterns of exercise, a finding that is consistent with previous exercise research grounded in self-determination theory (Edmunds, Ntoumanis, & Duda, 2006; Wilson & Rodgers, 2002, 2004; Wilson et al., 2003).

Considering the findings of the studies discussed thus far, it appears that to participate in a regular exercise regime, individuals have to place some value on exercise behavior and to recognize its importance in terms of health and well-being. However, to understand long-term engagement, researchers should examine not only whether one values exercise, but also the cognitive and affective responses associated with exercise. A particularly attractive facet of self-determination theory, adding to its appeal and relevance in the exercise domain, is that besides considering the behavioral regulations underpinning a particular activity, it provides a theoretical explanation for observed variations in thoughts and feelings about a given activity. That is, self-determination theory hypothesizes that psychological need satisfaction and more self-determined forms of motivational regulation should give rise to more adaptive cognitions and affect.

A limited number of investigations have begun to address cognitive and affective responses to exercise from a self-determination theory perspective. For example, Wilson and Rodgers (2004) demonstrated that autonomous motives (i.e., identified regulation and intrinsic motivation) were most strongly correlated with behavioral intentions to exercise relative to controlling forms of regulation (i.e., introjected and external regulation). Also, Wilson and Rodgers (2002) found autonomous motives to play an important role in explaining variability in physical self-esteem. While these studies add support to the applicability of self-determination theory to the exercise domain, they overlook the role that psychological need satisfaction plays in facilitating desired cognitive and affective outcomes. Consequently, we conducted a study to examine the role of the motivational regulations and psychological need satisfaction in predicting important cognitive and affective outcomes (Edmunds, Duda, & Ntoumanis, 2005b), as discussed in the next section.

Ethnic and Cultural Group Considerations

A further aspect of self-determination theory that has received little attention in the exercise domain relates to its predictive utility across ethnic and cultural groups. Deci and Ryan (2000) argued that although the specific means of expressing and satisfying the three basic needs in self-determination theory may vary considerably by context and culture, all needs are functionally relevant across these surface variations. That is, all of the psychological need constructs

embedded within self-determination theory are relevant to the quality of human engagement in diverse activities, regardless of ethnicity or cultural background (Ryan et al., 1999). However, some authors (e.g., Markus & Kitayama, 1991) have questioned the assumed cross-cultural applicability of contemporary psychological frameworks such as self-determination theory. Such criticism is based on the observation that individuals from Western cultures (e.g., in North America and Europe) tend to stress attending to and asserting the self and appreciating one's difference from others, whereas collectivistic cultures (e.g., in Southeast Asia and much of South America and Africa) emphasize the importance of the self to the group and harmonious interdependence. Consequently, it has been suggested that different cultural groups engender different needs, motives, and values, which in turn are assumed to be differently associated with psychological well-being (Ryan et al., 1999). Considering such distinctions, it has been suggested that autonomy will be more important for individualistic cultures, whereas relatedness may be more pertinent in collectivistic ones (e.g., Iyengar & Lepper, 1999). However, research has shown that autonomy is important in the prediction of behavior in both collective and individualist contexts, even though levels of autonomous motivation tend to be higher among individuals in individualist cultures (Chirkov & Ryan, 2001; Chirkov, Ryan, Kim, & Kaplan, 2003).

Given the suggestion in recent reports that participation rates in regular physical activity are lower for some ethnic groups than among the population as a whole (USDHHS, 2003), establishing whether the tenets of self-determination theory are equally applicable across diverse ethnic groups appears to constitute an important research direction in the exercise domain. Thus, addressing the aforementioned issues, we conducted a study to explore the predictive utility of self-determination theory in explaining cognitive and affective aspects of the group exercise experience across members of three different ethnic groups (Edmunds, Duda, & Ntoumanis, 2005). (Please note: This study also measured the psychological need constructs proposed by Optimal Distinctiveness Theory [ODT; Brewer, 1991, 1993], but the results pertaining to these variables are not presented in this chapter.) Importantly, such ethnic groups are likely to endorse different cultural orientations in line with their cultural background, although this may be partially mitigated if they have lived for a prolonged period in a culture that has values that vary from those of their traditional cultural background.

Female exercise class participants ($N = 260$) of white (i.e., British, Irish, or other white background; 38%), Asian/Asian British (i.e., Indian, Pakistani, Bangladeshi, or any other Asian background; 33%), and black/black British (i.e., Caribbean, African, or any other black background; 29%) ethnic origin completed measures of psychological need satisfaction (Sheldon & Bettencourt, 2002) and motivational regulations specific to the group exercise experience (Li, 1999; Mullan, Markland, & Ingledew, 1997). In addition, their commitment toward the group (Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993) and

behavioral intention (Wilson & Rodgers, 2004) toward the group, as well as their affect (Watson, Clark, & Tellegen, 1988) and subjective vitality (Ryan & Frederick, 1997) derived from the group exercise experience, were assessed.

Separate regression analyses for each ethnic group revealed that more self-determined forms of regulation predicted adaptive outcomes for female exercisers of white and black/black British ethnic origin. Specifically, for white female exercise class participants, intrinsic motivation corresponded to greater positive affect and commitment and lower negative affect. Moreover, integrated regulation positively predicted subjective vitality. For black/black British female exercise class participants, intrinsic motivation was linked to positive affect, subjective vitality, and commitment, whereas integrated regulation predicted low negative affect. These findings are in line with the tenets of self-determination theory.

However, the utility of self-determination theory in predicting exercise-related cognitions and affect among Asian/Asian British female exercise class participants was not supported. None of the needs proposed by self-determination theory predicted any of the motivational regulations or targeted cognitive and affective responses for this group. A couple of issues are worthy of consideration to explain this finding. Diener (2000) demonstrated that variables that have typically been viewed as tapping well-being, including positive and negative affect (Watson, Clark, & Tellegen, 1988) and subjective vitality (Ryan & Frederick, 1997), may be more culture bound than originally believed (e.g., Diener & Diener, 1995). Moreover, the extent to which individuals from different cultures have become integrated into Western society may vary, and thus the extent to which the different ethnic groups retained their traditional values and norms may have influenced the observed findings. Further studies in the exercise domain need to address these issues in order to provide a more conclusive answer regarding the relevance of self-determination theory to Asian/Asian British groups.

Promoting Autonomy Support in the Exercise Domain

While the findings discussed thus far suggest that self-determination theory-based behavioral interventions would be beneficial in enhancing exercise engagement and the quality of the exercise experience, all of the studies presented to this point have been nonexperimental in design. As a result, causality cannot be inferred from the findings described thus far. Cause-and-effect relationships can be confirmed only when the variables under investigation are manipulated experimentally (Ellsworth & Gonzalez, 2003).

To address this shortcoming in the literature, we conducted a field experiment (Edmunds, Ntoumanis, & Duda, 2005b) to determine the effects of an exercise instructor's adopting an autonomy-supportive teaching style, versus a realistically controlling one, on exercise class participants' need satisfaction;

motivational regulations; and important behavioral, cognitive, and affective responses. Two "cardio-combo" exercise classes, incorporating a mix of step aerobics and kick boxing, were selected for the study. Each class was part of a 10-week Active Lifestyle Program run at a large U.K. university and was held at a similar time of day, in the same facility, and by the same (female) instructor. One class comprised the autonomy-supportive condition and included 25 females ranging in age from 18 to 53 years, the majority of whom were of white ethnicity (96%). The other class made up the realistically controlling condition and included 31 females who ranged in age from 18 to 38 years. Again, the majority of participants were white (74.2%), while 19.3% were Asian/Asian British and 6.5% were Chinese. It is important to note that the participants were university students and staff who had chosen to sign up for a given class, and thus they were not randomly assigned in a strict experimental sense to a specific condition (although they were not aware of the nature of the intervention).

Following the guidelines of Reeve (2002), we manipulated autonomy support in conjunction with structure and interpersonal involvement. To create the autonomy-supportive condition, the exercise instructor took the perspective of the exercise class participants into account, acknowledged their feelings, and provided them with pertinent information and opportunities for choice. In this condition, the use of pressure, demands, and extrinsic rewards was minimized (Black & Deci, 2000). These strategies are in line with the theoretical propositions of self-determination theory and previous experimental studies in other domains (Deci & Ryan, 1985; Deci, Eghrari, Patrick, & Leone, 1994). The provision of structure involved the exercise instructor's offering clear expectations, optimal challenge, and timely and informative feedback (Reeve, 2002). Interpersonal involvement was manipulated via encouraging the exercise instructor to dedicate psychological resources to the exercise class participants, such as time, energy, and affection (Reeve, 2002). Table 2.1 provides practical examples illustrating how autonomy support, structure, and involvement were manipulated.

The realistically controlling condition utilized a treatment style similar to that commonly observed in health care settings and patient–practitioner interactions (Sheldon, Williams, & Joiner, 2003). This condition was intended to replicate the style of teaching regularly observed in the exercise setting, whereby exercise instructors seek to maintain control over large groups of individuals in order to ensure that they are all exercising safely and effectively. Autonomy support, structure, and interpersonal involvement were kept to a minimum. Choices, rationale, and explanations were limited; instead, direct instruction guided the various activities. Goals were not set; minimal feedback was provided; and personal distance from participants prior to, during, and after the class was maintained by the instructor.

Attendance was logged weekly. At the start, at the halfway point, and at the end of the 10-week course, measures were taken of perceived autonomy support, structure, and interpersonal involvement (Markland & Tobin, 2004a);

Table 2.1 Examples of the Autonomy-Supportive Teaching Styles Used in the Intervention

Dimension	Characteristic	Application
Autonomy support	Provide choice	Provide options about pace, frequency, and type of exercise when possible
	Be supportive and praise quality	Praise improvement in techniques and fitness
	Acknowledge and take into account exercisers' feelings and perspectives	Be open to complaints and respond to them in a positive manner
	Provide meaningful rationale	Explain why each activity is beneficial, what muscle groups are working, and what aspects of fitness will improve
Structure	Demonstrate good leadership	Discuss plans and set goals at the start of class
	Answer questions well and directly	As described
	Provide optimal challenge	Work at level that pushes participants maximally but accommodate for those less able; provide easy versus harder options
Interpersonal involvement	Dedicate resources to participants	Spend time chatting at the start of class, learn names, show affection and enjoyment
	Ensure close proximity	Mix with class—don't dominate at front

psychological need satisfaction (Markland & Tobin, 2004a); motivational regulations (Markland & Tobin, 2004b; Li, 1999); exercise behavior (Godin & Shephard, 1985); commitment to the class (Scanlan et al., 1993); behavioral intention to continue exercising in the class (Wilson & Rodgers, 2004); enjoyment (Markland & Tobin, 2004a); and positive and negative affect (Watson, Clark, & Tellegen, 1988).

Manipulation checks, completed by two independent observers who were unaware of the purpose of the study, the exercise instructor, and the exercise class participants, revealed that the autonomy-supportive condition was perceived as providing higher levels of autonomy support, structure, and involvement as compared to the realistically controlling condition. A significant difference in attendance emerged, with those exercisers in the autonomy-supportive condition attending more frequently than those in the realistically controlling condition. Further, multilevel modeling analysis showed that, compared to what occurred in the realistically controlling condition, competence and relatedness need satisfaction, class enjoyment, and positive affect experienced while exercising significantly increased over time in the autonomy-supportive condition. Both groups demonstrated a significant increase in introjected regulation over time and a significant decrease in amotivation, behavioral intention, and commitment; there were no group differences on these variables. For all other study variables, no significant rates of change were observed (table 2.2).

Table 2.2 Descriptive Statistics Demonstrating Changes in Self-Determination Theory Constructs Across the Intervention Conditions Over Time

		AUTONOMY SUPPORTIVE			REALISTICALLY CONTROLLING		
Variable M	Range	Wk 1	Wk 6	Wk 10	Wk 1	Wk 6	Wk 10
Autonomy	1-7	4.85 (1.44)	5.42 (1.07)	5.39 (1.06)	5.56 (1.28)	5.61 (1.16)	5.59 (1.35)
Relatedness	1-7	4.60 (1.51)	5.38 (0.79)	5.72 (0.84)	5.11 (1.27)	5.44 (1.07)	5.40 (1.28)
Competence	1-7	3.80 (1.44)	5.18 (0.90)	5.61 (0.69)	4.54 (1.30)	5.22 (1.23)	5.33 (1.08)
Amotivation	0-4	0.37 (0.57)	0.27 (0.45)	0.13 (0.17)	0.45 (0.70)	0.13 (0.29)	0.03 (0.08)
External regulation	0-4	0.68 (0.85)	0.70 (0.90)	0.71 (0.83)	0.50 (0.66)	0.35 (0.39)	0.58 (0.98)
Introjected regulation	0-4	1.76 (0.78)	2.04 (1.03)	1.89 (1.00)	1.34 (0.91)	1.61 (0.75)	2.10 (1.03)
Identified regulation	0-4	2.75 (0.68)	3.10 (0.69)	3.13 (0.81)	3.15 (0.55)	3.48 (0.45)	3.30 (0.72)
Integrated regulation	0-4	2.21 (0.66)	2.37 (1.15)	2.38 (1.25)	2.49 (0.86)	2.48 (0.63)	2.87 (0.92)
Intrinsic motivation	0-4	2.78 (0.59)	3.05 (0.37)	3.04 (0.50)	3.25 (0.67)	3.48 (0.54)	3.38 (0.81)
Total exercise	–	45.92 (22.96)	51.93 (28.96)	57.92 (30.23)	43.32 (18.91)	44.31 (16.90)	58.88 (20.07)
Behavioral intention	1-7	6.48 (0.79)	6.47 (0.55)	5.67 (1.33)	6.44 (0.74)	6.33 (0.75)	4.67 (1.52)
Commitment	1-5	3.96 (0.49)	4.07 (0.45)	3.63 (0.53)	3.98 (0.64)	4.10 (0.75)	3.50 (0.67)
Enjoyment	1-5	3.65 (0.73)	3.73 (0.67)	3.79 (0.41)	3.87 (0.69)	3.90 (0.95)	3.58 (0.71)
Positive affect	1-5	3.48 (0.50)	3.59 (0.55)	3.72 (0.51)	3.79 (0.59)	3.88 (0.76)	3.67 (0.57)
Negative affect	1-5	1.38 (0.38)	1.17 (0.25)	1.18 (0.20)	1.37 (0.40)	1.21 (0.22)	1.52 (0.69)

Note. Statistics are mean scores with standard deviations in parentheses.

Although increases in need satisfaction and adaptive outcomes were observed as a consequence of the autonomy-supportive condition manipulations, no group differences emerged with regard to the most autonomous form of extrinsic motivation (i.e., identified regulation) as would be hypothesized by self-determination theory. The fact that the teaching style did not significantly affect identified regulation suggests that the participants in both classes acknowledged the importance of exercise. This is not surprising given that the participants voluntarily enrolled in the exercise classes sampled. With regard to the nonsignificant difference in intrinsic motivation, it is possible that this was seen because the type of class targeted (i.e., a structured aerobics class that incorporated step and kick boxing choreography) was not perceived as inherently pleasant. These findings suggest that interventions may be more successful when exercise behaviors are nonvoluntary or have yet to be internalized by the exerciser.

Summary and Avenues for Future Research

The research presented in this chapter adds to a growing body of literature supporting the utility of the propositions of self-determination theory in predicting behavioral investment and the quality of the exercise experience. Drawing from this work, a number of potential avenues for future exercise-focused research, grounded in self-determination theory, appear worthy of consideration.

The results of the field experiment described earlier provided preliminary support for interventions based on self-determination theory. A next step in validating the effectiveness of self-determination theory-based interventions would be to conduct larger randomized controlled trials of a patient–practitioner exercise consultation. Such trials may benefit from targeting low-income groups, in which physical activity participation rates are particularly problematic (Department of Culture, Media and Sport, 2004), or individuals who do not value exercise (i.e., have low levels of identified regulation).

Researchers may also attempt to further explore the influence of relatedness need satisfaction on intrinsic motivation and the autonomous regulation of exercise behavior. While exercise-focused studies have addressed the importance of relatedness at a proximal level, that is, within the exercise domain specifically, Ryan and Deci (2000b) also highlight the importance of a secure relational base at a more distal level. Future studies should consider the role of relatedness need satisfaction across general motivational contexts including physical activity.

Researchers may also benefit from integrating self-determination theory's propositions and constructs with other theoretical perspectives in an attempt to better understand physical activity engagement and responses to the exercise experience. For example, Skinner (2002) suggests that the basic psychological needs are central in shaping how we cope with stress. Given the increasing number of individuals that are now classified as obese or overweight (National

Audit Office, 2001), and the associations between obesity and stress (Williams et al., 1996), Skinner's propositions may have significant implications for those trying to deliver behavioral interventions for persons who are obese. Essentially, Skinner's work implies that through the design of interventions that facilitate psychological need satisfaction, obese individuals will appraise weight loss-related stressors more adaptively. As a result, they will utilize more effective coping mechanisms. The use of these adaptive coping strategies is expected to be associated with more advantageous outcomes such as investment in, and more positive perceptions and experiences of, physical activity.

Implications for Exercise Practitioners

Although further intervention studies are needed, the findings of the research presented in the current chapter have implications for behavioral interventions and health promotion programs aiming to increase physical activity. For example, research findings suggest that to optimize the exercise experience and facilitate exercise adherence, health and exercise professionals should endeavor to ensure that the basic psychological needs of exercise participants are met. Studies have indicated that competence need satisfaction is especially important to the prediction of autonomous regulation and exercise behavior. Showing novice exercisers that individuals of a similar ability level have previously managed to master exercise-related tasks and achieve desired outcomes, designing well-structured exercise programs that allow for gradual and continual improvement, setting appropriate goals, and providing positive feedback are all strategies that may satisfy the need to feel competent in the exercise domain.

To achieve satisfaction of all three basic needs and the facilitation of autonomous forms of motivation, exercise programs and consultations should be delivered in an autonomy-supportive manner. Three contextual factors are central to an autonomy-supportive leadership style, namely the provision of choice, a meaningful rationale, and acknowledgment of the feelings and perspectives of others (Deci et al., 1994). Thus, the available literature suggests that it would appear beneficial for health and exercise professionals to provide participants with choices and options about the type and content of their exercise programs. For example, the health professional or exercise instructor could discuss with the individual what types of exercise best fit with his or her current preferences and commitments. Moreover, the health professional or exercise instructor may provide a detailed description of the benefits associated with a particular form of exercise, as well as its relevance to the needs of the individual. The health professional or exercise instructor should also acknowledge any negative feelings that an individual or group has about exercise or encounters during the exercise experience, provide reassurance, and take these concerns into consideration when designing and delivering the exercise program.

On the basis of the tenets of self-determination theory and research adopting this theory, exercise specialists should also provide structure whereby expectations and goals are made clear to the individual and praise is given for effort

and improvement. Structure needs to be delivered in an autonomy-supportive manner (Reeve, 2004). Instructors may achieve this by involving the exerciser in the goal-setting process and providing a rationale for their specific expectations about the individual's progress and improvement.

It is also imperative to ensure that health professionals or exercise instructors are perceived as supportive and as investing personal resources in exercisers. While maintaining their professionalism, exercise instructors should be warm and open, showing exercisers that they are dedicated to and care about their progress and exercise experience.

Practical Recommendations for Exercise Professionals

- Practitioners like physical education teachers and those prescribing exercise in primary care are encouraged not to pressure exercisers into engaging in a specific type of activity and not to use controlling language including words like "should" and "must." When instructing exercisers, health professionals are advised to involve them in the decision-making process and allow them to choose which forms of exercise would best suit their personal needs and preferences. For example, a person may be given a definition of the general type of health-related activity required (e.g., "sustained activity of 20 minutes or more using large muscle groups") and then encouraged to choose an activity that fits with this requirement.
- When choice cannot be provided because of limited facilities, constraints on the type of activity, or safety considerations, for example, it is suggested that practitioners offer a rationale for participating in the exercise. Even when choices are available, it is important to explain to the individual why the activity or activities offered will be beneficial and to explain how the activity will bring about desired changes (e.g., increased fitness). For example, it may be important to highlight the immediate personal benefits of exercise (e.g., "If you exercise for 20 minutes at a time, three times a week for one month, you are likely to reach your goal of losing 2 kilograms [4 pounds], which is important to you").
- Practitioners are advised to be responsive to the thoughts and feelings of exercisers at all times and to ask regularly for their comments and feedback. For example, a personal trainer might ask a client, "What did you like and dislike about this activity? What would you like to change about the exercise program?" Practitioners need to recognize and address any issues, concerns, or negative feelings the individual has about the exercise experience without compromising goals.
- It is suggested that practitioners make every effort to ensure that people develop a sense of competence and that activities are tailored to meet individuals' current experience and ability levels. Realistic and achievable goals need to be set and effort- and persistence-based feedback provided. For example, an exercise specialist who is training personal trainers might encourage them to inquire about a client's background and ask for the client's help in determining goals that are suitable for his or her level of experience. These goals would be personally relevant to the client and therefore likely to be engaged in with a sense of autonomy.
- It is also important for exercisers to perceive that the professional is personally interested in the exercise program and cares about each exerciser's improvement and development. Professionals are encouraged to facilitate interaction between the individual and other exercisers or members of an exercise group. For example, an exercise advisor might tell clients that they are more likely to attain their goals if they identify someone of like ability and experience with whom to exercise and agree on times and places to exercise. This will enhance their sense of relatedness and autonomy because they have made the choice to commit to a mutually beneficial routine.