

COMPARING SELF-DETERMINATION AND BODY IMAGE BETWEEN EXCESSIVE AND HEALTHY EXERCISERS

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Abstract: The influence of self-determination and body image on exercise behavior was examined using a multi-method approach. A series of validated scales was administered to 218 male and female exercisers to compare the exercise motivation and perceived body image of four groups exhibiting low to high levels of both exercise behavior and commitment. Exercisers identified as having the most "excessive" exercise behaviors ($N = 4$) were also interviewed. Analyses of quantitative data revealed that "excessive" exercisers displayed higher levels of introjected regulation and of self-determined forms of motivation than "healthy" exercisers. Qualitative findings revealed health/fitness and appearance-related motives, and guilt as a motivating factor for "excessive" exercisers. Quantitative results are discussed according to self-determination theory and past research. Interview findings suggest body image does influence excessive exercise behavior.

Key words: Exercise, Motivation, Multi-method, Self-determination theory.

INTRODUCTION

Research indicates that a subset of regular exercisers develop unhealthy exercise behaviors despite interference with physical and mental health, social functioning, and job performance (Polivy, 1994). Some authors refer to these exercisers as "excessive" exercisers, who engage in high levels of exercise or physical activity

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compared with others in their age group (Davis et al., 1997). This high level of exercise behavior is coupled with an unhealthy mindset in the “excessive” exerciser which has been described as an over-commitment to exercise (Davis, Brewer, & Ratusny, 1993). Excessive exercise can be viewed as a form of addiction that can preclude an individual’s health, career, and relationships with others (Griffiths, Szabo, & Terry, 2005).

Although research acknowledges the existence of these exercisers, it is still unclear how this subset of the population develops these unhealthy behaviors (Hausenblas & Symons Downs, 2002). Understanding the behaviors and their emergence is an important part of helping these exercisers to develop a healthy relationship with exercise so they can engage in behaviors that will benefit rather than harm them.

Determinants of exercise behavior

Both motivation and body image have been found to influence “healthy” and “excessive” exercise behavior (Hagger, Chatzisarantis, Culverhouse, & Biddle, 2003; McDermott, 2000; Jankauskiene, Kardelis, & Pajaujiene, 2005; Ogles, Masters, & Richardson, 1995). The main motives for adult participation in a regular exercise program include improvement in fitness and health, body-related motives, interest and enjoyment, social reasons, and increases in skill levels (Allender, Cowburn, & Foster, 2006; Frederick & Ryan, 1994; Kilpatrick, Hebert, & Bartholomew, 2005). Although some overlap in motives is identified for “healthy” and “excessive” exercisers, reported motives for “excessive” exercise behavior have mainly centered on weight and diet issues, and narcissistic body concerns (Davis & Fox, 1993; Davis, Fox, Brewer, & Ratusny, 1995; Hubbard, Gray, & Parker, 1999).

Self-determination theory

Self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000) is particularly useful for examining motivation and motivational outcomes and is well-supported in the physical activity domain (Pelletier, Fortier, Vallerand, & Brière, 2001; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002; Vallerand, 2001; Vallerand & Losier, 1999). According to SDT, two fundamental types of motivation, self-determined and non self-determined, are situated at opposite ends of a continuum encompassing varying degrees of self-determination.

Self-determined motivation includes three types of intrinsic motivation and

identified regulation (Pelletier et al., 1995; Vallerand et al., 1992). When motivation is self-determined, exercise is performed out of choice because it is valued, satisfying or pleasurable. When motivation is non self-determined, exercise is regulated by introjected pressures (e.g., feelings of guilt and/or anxiety), and/or external forces (e.g., rewards and/or punishments). The concept of amotivation refers to an absence of both self-determined and non self-determined motivation.

Deci and Ryan (2002) in SDT have proposed the concept of internalization to explain how individuals move from the less self-determined forms of regulation (e.g., external regulation, introjected regulation) to the more self-determined types of regulations (identified regulation and intrinsic motivation). It is predicted, and has been ascertained in many studies in the physical activity context, that as individuals move up the self-determination continuum, positive outcomes ensue (Fortier & Kowal, 2007; Frederick-Recascino, 2002).

Of particular interest to the present study is the concept of introjection. This type of regulation represents the first attempt at self-regulation; however, internalization is only partial, as the external regulatory process is taken in but not accepted as the individual's. Indeed, it has been observed that individuals who display introjected regulation are self-controlling their behavior, rather than valuing or enjoying the activities for their own sake (Pelletier et al., 2001). This is the type of motivation that we are most likely to observe in excessive exercisers who have internalized societal pressures to conform to an ideal body/health image and thus feel compelled to exercise in order to avoid feelings of guilt and/or anxiety. Indeed, in a study with endurance athletes by Hamer, Karageorghis, and Vlachopoulos (2002) introjected regulation was found to be the strongest positive predictor of exercise dependency, a condition where moderate to strenuous physical activity becomes a compulsive behavior. In another recent study (Edmunds, Ntoumanis, & Duda, 2006), introjected regulation was found to be a marginally significant predictor of strenuous exercise behavior in individuals reporting some symptomatology of exercise dependency.

Body image

While the direction of causality between body image and exercise behavior is still unclear, many studies have showed a strong link between the two (Davis, 1990; Davis & Cowles, 1991; Shaw, 1991; Tucker & Maxwell, 1992). The construct of body image refers to «the image of the human body which we form in our mind, that is to say, the way in which the body appears to ourselves» (Cash & Pruzinsky, 1990, p. 8). McDermott (2000) found that body perception was a factor respon-

sible for the initiation of physical activity involvement. Imm and Pruitt (1991) found that high frequency female exercisers were more dissatisfied with body shape than healthy and non-exercisers and in a qualitative study by Markula (1995) high attending female aerobics participants reported high levels of body image dissatisfaction. A review of the research in this area indicates consistently that there are strong relationships between exercise abuse and body image concerns, particularly among women (Davis, 2000).

Gender differences

Studies have reported gender differences in motivation for physical activity and in perceptions of body image. Specifically, females have been found to be more self-determined in their physical activity participation than males (Brière, Vallerand, Blais, & Pelletier, 1995; Fortier, Vallerand, Brière, & Provencher, 1995; Pelletier et al., 1995) and overall, women are less satisfied with their bodies than men (Davis & Cowles, 1991; Kilpatrick et al., 2005; Mintz & Betz, 1988; Silberstein, Streigel-Moore, Timko, & Rodin, 1988).

The general purpose of this study was to examine the influences of exercise motivation (within the SDT framework) and body image on exercise behavior in order to better understand the phenomenon of “excessive” exercise participation. In order to obtain greater knowledge of the differences between “healthy” and “excessive” exercisers, while allowing for a more in-depth exploration of the motives behind excessive exercise behavior, and the perceptions that potentially “excessive” exercisers have of their bodies, the present study utilized a combined quantitative-qualitative multi-method approach.

Based on the SDT framework and past research (Hamer et al., 2002) it was predicted that “excessive” exercisers would exhibit less self-determined exercise motivation (and more specifically higher levels of introjected regulation) than “healthy” exercisers, who were expected to display more self-determined exercise motivation (Hypothesis 1). Based on results of previous studies using non-clinical exercising populations (Davis et al., 1990; Imm & Pruitt, 1991), it was also predicted that “excessive” exercisers would have a less positive perceived body image than “healthy” exercisers (Hypothesis 2). Gender differences in both exercise motivation and perception of body image among “healthy” and “excessive” exercisers were also examined. It was hypothesized that female exercisers would report higher self-determined exercise motivation but lower body image than male exercisers (Hypothesis 3).

METHOD

Design

A two-phase multi-method approach to data collection and analysis was used. Phase 1 was quantitative (questionnaire) and served to compare the exercise motivation and body image of “healthy” and “excessive” exercisers.

In Phase 2, four individuals whose responses on the Phase 1 questionnaire indicated potentially excessive exercise behaviors were interviewed. This was done in order to obtain a more in-depth conception of the exercise motives and perceived body image of “excessive” exercisers. Four participants were chosen due to feasibility.

Procedure

Coordinators of various fitness and running clubs in the Ottawa area were contacted, and times were selected for data collection for Phase 1 of the study. Questionnaires were completed by participants at fitness/running club facilities following scheduled workouts/training, and took approximately 20 minutes to complete. At this time, participants were made aware that those wishing to volunteer also for Phase 2 of the study could leave their contact information in the space provided on the questionnaire.

Only participants whose scores indicated they were in the most “excessive” category were selected for Phase 2. The four selected participants were among those with the highest exercise behavior and commitment-to-exercise scores from Phase 1, and who had agreed to participate in an interview. Prior to Phase 2, a pilot interview was conducted with a randomly selected participant from the Phase 1 questionnaire sample in order to improve the interview guide, provide practice for the interviewer and ensure consistency throughout and between the interviews. After this, the four interviewees were contacted by telephone to arrange an appropriate time and location. Participants gave written consent of their participation before the interviews took place. The interviews lasted approximately one hour, and were audio-taped and transcribed verbatim. Following transcription, each interviewee received a copy of his/her own transcript to read over, as a validity check.

Phase 1 – Quantitative Phase

Participants. Participants were 94 males and 124 females ($N = 218$) aged 18 to 70 ($M = 36.3$ years, $SD = 12.06$). They were recruited for Phase 1 from aerobics classes (21%), weight training programs (30%), and running clubs (49%) in the Ottawa area. Participants had various cultural and ethnic backgrounds, and varied exercise involvement. To ensure that a broad range of exercisers were recruited, participants were eligible to participate in the study provided they were active for at least 30 minutes at a moderate intensity, no less than three times per week.

Instruments. A series of previously validated scales was used to assess the elements of type of exerciser, exercise motivation, and body image. Participants rated all items on Likert-type scales, excluding a section on sociodemographic information which they completed at the end of the questionnaire.

Type of exerciser. As in other studies in this area (Davis et al., 1993, 1997), two instruments were used to categorize participants into “healthy” and “excessive” exercise groups. Current exercise behavior was determined by a self-reported exercise measure, the Kuopio Ischaemic Heart Disease 12-Month Leisure-Time Physical Activity History (Salonen & Lakka, 1987), in which participants were given a list of physical activities and asked to indicate their frequency, duration, and intensity of exercise over the past month. The original measure was designed for one year but we modified the time frame to one month to get a more accurate recall and a more proximal assessment of exercise behavior. Total exercise scores were quantified by multiplying the frequency (over one month) by duration (in minutes) by intensity rating (1, 2, 3) for each activity, and summing across all activities. Total scores for this variable ranged from 960 to 24,300 ($M = 6217.73$, $SD = 4132.52$). The one-year version has shown test-retest reliability between $r = .57-.58$ (Lakka & Salonen, 1992a, 1993) and validity of $r = .17-.23$ (Lakka & Salonen, 1992b, 1993) when correlated with aerobic capacity (VO2 max).

The five strongest items of the Commitment to Exercise Scale (CES; Davis et al., 1993) were used to assess individuals’ psychological commitment to exercising by targeting the obligatory and pathological aspects of the “over-exercising syndrome” as identified in the literature (Davis et al., 1993). Example items are: “Do you feel ‘guilty’ that you have somehow ‘let yourself down’ when you miss your exercise session?” “Do you continue to exercise even when you have sustained an exercise-related injury?” On a 7-point Likert-type scale participants ranked from 1 (never) to 7 (always) the degree to which statements described their exercise behavior. A Cronbach’s alpha of .69 was obtained for the global five items used.

Based on these two instruments and as per previous research (Davis et al.,

Table 1. Exercise groups according to mindset and exercise behavior

Group	<i>n</i>	Mindset	Exercise behavior
1	66	Excessive exercise mindset	Excessive exercise behavior
2	44	Healthy exercise mindset	Healthy exercise behavior
3	52	Borderline excessive mindset	Insufficiently active exercise behavior
4	56	Low exercise commitment	Insufficiently active exercise behavior

1993, 1997), participants were divided (using two median splits) into four groups of exercisers based on their total exercise behavior score and their total commitment to exercise score (see Table 1).

Participants in Group 1 were classified as “excessive” exercisers (Davis et al., 1993) due to their high exercise behavior and high (unhealthy) commitment; participants in Group 2 were classified as “healthy” exercisers and in Group 3 were classified as “borderline excessive” exercisers. More specifically, participants in Group 3 possessed components of the “excessive” exerciser mindset based on their high commitment to exercise scores; however, they did not possess the high levels of exercise behavior typically characteristic of “excessive” exercisers. Participants in Group 4 was classified as insufficiently active in terms of both commitment level and actual exercise.

Exercise motivation. To assess exercise motivation, an adapted version of the Sport Motivation Scale (SMS; Pelletier et al., 1995) was used. The SMS contains seven subscales designed to measure (Deci & Ryan, 1985): (a) Three types of intrinsic motivation: Intrinsic Motivation to Know (e.g., “For the pleasure of learning a new activity.”); Intrinsic Motivation Toward Accomplishment (e.g., “Because I feel a lot of personal satisfaction while trying to master different training techniques.”), and Intrinsic Motivation to Experience Stimulation (e.g., “For the excitement I feel when I am really involved in the activity.”). (b) Three types of extrinsic motivation: Identification (e.g., “Because it is one of the best ways I have chosen to develop other aspects of myself.”); Introjection (e.g., “Because it is absolutely necessary to exercise if one wants to be in shape.”), and External Regulation (e.g., “Because people around me think it is important to exercise.”). (c) Amotivation (e.g., “I used to have good reasons for exercising, but now I am asking myself if I should continue doing it.”). The SMS has proven to be a valid and reliable measurement of motivation (Brière, Vallerand, Blais, & Pelletier, 1995; Pelletier et al., 1995).

Participants were asked to respond to the general question, “When you exercise, why do you do it?” and then to indicate on a 7-point Likert-type scale whether they agreed/disagreed with each of 30 items depending on how much/how

little each statement described a reason why they exercise. Internal consistency for all subscales was acceptable, with Cronbach's alphas ranging from .75 to .89. Only one subscale (amotivation) had a lower alpha value which was .61.

To assess overall levels of self-determination towards exercise, a global motivation index was computed using the following equation: $[2 * \text{intrinsic motivation (intrinsic motivation towards knowledge + intrinsic motivation towards accomplishment + intrinsic motivation to experience stimulation)} + 1 * \text{identified regulation} - 1 * \text{external regulation} - 2 * \text{amotivation}]$. The global index measures the level of self-determination participants have towards their exercise behavior, with scores ranging from -18 (non self-determined) to +18 (very self-determined) (Guay, Vallerand, & Blanchard, 2000; Vallerand & O'Connor, 1989).

Body image. A slightly shortened version of the Body Cathexis Scale (Tucker, 1981) was used to assess participants' satisfaction/dissatisfaction with their body image. This scale was chosen because it is «considered to be one of the best instruments for assessing body image» (Tucker & Maxwell, 1992, p. 340) and has proven to be both reliable and valid in a range of empirical studies (Tucker, 1981, 1983, 1985; Tucker & Maxwell, 1992). Participants were asked to rate a total of 14 various body parts as well as items such as body build, overall appearance, and muscle tone on a 5-point Likert scale ranging in responses from feeling very negative about, to feeling very positive about each item. Internal consistency for the 14 items used yielded a Cronbach's alpha of .86.

Phase 2 – Qualitative Phase

Participants. Following the categorization of exercisers in Phase 1, two females (Participant 1 and 2) and two males (Participant 3 and 4) from Group 1 were selected to participate in individual interviews. Selected interviewees were between 25 and 38 years of age ($M = 31.5$ years, $SD = 5.12$) and had a wide range of total exercise behavior scores (7,810 to 21,840 inclusive; $M = 12,250$, $SD = 5,591$). All interviewees except Participant 1 were above the overall mean and above the mean for Group 1 for exercise behavior (see Tables 2 and 3), and all trained for an average of 1.5 hours, six days per week. They also had among the highest scores on the CES (ranging from 5 to 6.6 out of a possible 7), falling above the overall mean and either above or on the mean for Group 1 (see Tables 2 and 3). Three of the four interviewees focused the majority of their activities around weight training, with one focusing mainly on cardiovascular training (i.e., running). All participants discussed training despite injury and illness, and all noted that they would try to make sure they did not miss workouts, even when given the

Table 2. Interviewee scores on selected motivation, body image, and exercise behavior variables

Variable	Participant			
	1	2	3	4
Exercise behavior	7810.00	9900.00	9450.00	21840.00
Exercise commitment	6.60	6.20	5.00	6.60
Motivational index	5.67	14.58	7.33	8.25
Introjected regulation	4.33	4.50	6.17	5.67
Body image	2.50	4.64	2.43	2.79

Table 3. Means (and SD) for groups of exercisers on motivation, body image, and exercise behavior variables

Variable	Total	Group 1	Group 2	Group 3	Group 4
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Amotivation	1.49 (.67)	1.54 (.74)	1.40 (.62)	1.42 (.55)	1.57 (.73)
External regulation	2.47 (1.21)	2.80 (1.47)	2.40 (1.08)	2.25 (1.02)	2.34 (1.10)
Introjected regulation*	3.71 (1.41)	4.53 (1.35)	3.13 (1.30)	3.84 (1.29)	3.07 (1.13)
Identified Regulation*	4.39 (1.28)	4.97 (1.23)	4.34 (1.22)	4.09 (1.18)	4.02 (1.26)
IM-to know*	4.38 (1.54)	4.88 (1.54)	4.47 (1.67)	4.04 (1.21)	4.03 (1.56)
IM-accomplishment*	5.21 (1.37)	5.73 (1.29)	5.17 (1.36)	4.99 (1.12)	4.85 (1.54)
IM-stimulation*	5.26 (1.28)	5.73 (1.27)	5.16 (1.22)	5.09 (1.03)	4.94 (1.42)
Motivation Index *	8.84 (3.88)	9.99 (3.80)	9.00 (4.02)	8.42 (2.85)	7.75 (4.36)
Body Image	3.49 (.70)	3.47 (.71)	3.65 (.65)	3.36 (.63)	3.52 (.65)
Exercise Behavior	6217.73 (4132.52)	9539.32 (4008.37)	8797.86 (3337.54)	3035.85 (1008.25)	3230.36 (1166.29)
Exercise Commitment	4.03 (1.09)	5.00 (.67)	3.07 (.70)	4.59 (.50)	3.09 (.63)

Note: IM = intrinsic motivation; * $p < .05$.

choice of social activities, whenever possible. We decided to keep Participant 1 as she still had high levels of exercise behavior and high levels of exercise commitment and we wanted a minimum of 4 interviewees.

Interview guide. The interview guide consisted of semi-structured questions developed to complement the initial questionnaire topics. Interviewees were asked questions regarding what motivates them to exercise, how they feel about their bodies (i.e., satisfaction/comfort levels), and how much of a role body image plays in their exercise participation. Probes from the initial questions were determined a priori in an attempt to minimize interviewer bias by ensuring that all follow-up questions would be similar. A semi-structured format was selected to facilitate comparison across participants while still allowing for flexibility of responses.

RESULTS

Phase 1 data were analyzed using the SPSS software package. A factorial 4(group) x 2(gender) multivariate analysis of variance (MANOVA) was performed on the seven types of motivation, the motivation index, and the body image variable. Following minor clarifications made by the interviewees to their individual transcripts, Phase 2 data was analyzed using both inductive and deductive processes. Inductively, all interviews were transcribed and coded to construct major categories and meaning units that emerged. Specifically, categories surrounding exercising profile (including potential “excessive” behaviors/attitudes); reasons for exercise participation (motivation); and the relationship between body image and exercise behavior were prominent. Within these major themes, subthemes from the literature and self-determination theory were also used to code meaning units. Information collected from the interviews was then compared to results on significant motivation and body image variables from the quantitative phase of the study.

The MANOVA analyses with the Phase 1 data indicated an overall significant main effect of exercise groups, Pillai’s trace = .297, $F(3, 210) = 2.82, p < .05$, partial $\eta^2 = .10$, and of gender, Pillai’s trace = .183, $F(1, 210) = 5.67, p < .05$, partial $\eta^2 = .18$, on the combined dependent variables, but not on their interaction, Pillai’s trace = .168, $F(3, 210) = 1.52, ns$. Based on these initial results, univariate analysis of variance (ANOVA) was conducted on the dependent variables.

Motivation

Quantitative results. Regarding group effects, the ANOVA revealed significant differences between the four groups on six of the motivation subscales, including the global motivation index (see Table 3). Post hoc tests (using Tukey’s HSD criterion) were conducted to determine between which groups there were significant differences for the various types of motivation. “Excessive” exercisers from Group 1 displayed significantly higher levels of intrinsic motivation towards knowledge, $F(3, 210) = 3.89, p < .05$, partial $\eta^2 = .05$, intrinsic motivation towards accomplishment, $F(3, 210) = 4.28, p < .05$, partial $\eta^2 = .06$, and intrinsic motivation towards experiencing stimulation, $F(3, 210) = 4.49, p < .05$, partial $\eta^2 = .06$, than lower exercise behavior exercisers in Groups 3 and 4 (see Table 3 for a complete list of means).

Regarding identified regulation, $F(3, 210) = 7.37, p < .05$, partial $\eta^2 = .09$, significant differences were found between “excessive” exercisers in Group 1 and “healthy” exercisers in Group 2 and “insufficiently active” exercisers in Group 4.

Significant differences were also found between “excessive” exercisers in Group 1 and “borderline excessive” exercisers in Group 3. “Excessive” exercisers in Group 1 also had significantly higher scores on the global motivation index than “insufficiently active” exercisers in Group 4, $F(3, 210) = 3.37, p < .05$, partial $\eta^2 = .05$.

Significant differences were also found with introjected regulation, $F(3, 210) = 17.03, p < .05$, partial $\eta^2 = .20$, between Group 1 and Group 2, 3, and 4, as well as between Group 3 and Group 2 and 4. These results showed that “excessive” exercisers were more likely to exercise because of internal pressures than exercisers in all other groups. These results also indicated that “borderline excessive” exercisers in Group 3 with higher CES scores were more likely to exercise for reasons associated with introjected regulation than exercisers with low CES scores. No significant group differences were revealed for amotivation, $F(3, 210) = 1.05, ns$. Initial univariate ANOVA for external regulation indicated significant differences between groups on this variable, $F(3, 210) = 2.98, p = .03$, partial $\eta^2 = .04$; however, additional post hoc tests yielded no significant differences.

Regarding gender effects, univariate ANOVA ($p < .05$) yielded significantly different results on five of the motivation variables (see Table 4). The women in the sample were significantly more intrinsically motivated towards both knowledge and stimulation than the men. The men were significantly more externally regulated and amotivated towards exercise than the women. Results with regards to the global motivation index were also in line with these findings. Specifically, the women exhibited a more self-determined motivational profile towards exercise than the men. Gender effects on intrinsic motivation towards accomplishment, identified regulation and introjected regulation were nonsignificant, all $F < 3.60, ns$.

Table 4. Means and standard deviations for male and female exercisers on motivation, body image, and exercise behavior variables

Variable	Males		Females	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Amotivation	1.65	.77	1.37	.56
External regulation	2.75	1.30	2.25	1.10
Introjected regulation*	3.77	1.33	3.66	1.46
Identified Regulation*	4.22	1.20	4.52	1.33
IM-to know*	3.96	1.43	4.69	1.54
IM-accomplishment*	5.07	1.22	5.33	1.47
IM-stimulation*	5.04	1.34	5.43	1.21
Motivation Index *	7.54	3.32	9.83	3.99
Body Image	3.49	.64	3.50	.69
Exercise Behavior	6707.40	4804.06	5846.52	3515.24
Exercise Commitment	4.02	1.04	4.04	1.13

Note: IM = intrinsic motivation; * $p < .05$.

Qualitative results. All interviewees except Participant 2 were below the overall mean and the mean for Group 1 on the global motivation index (see Tables 2 and 3), indicating that they were less self-determined towards exercise than other participants in the study. Further, only female participants (Participant 1 and 2) discussed that part of their reasons for exercising is because they enjoy it. All interviewees mentioned health and fitness reasons, and body image or appearance and weight control reasons for exercising, and all interviewees except Participant 3 discussed the intense feelings of guilt and/or pressure they felt when they missed training sessions. An example of such feelings is displayed in the following quote from Participant 1:

“I feel that I have to [exercise] otherwise I sit there with guilt, and whatever it is that I’m doing, because I didn’t go, I think, my god, I could have gone, why am I doing this? ”

Similar feelings are discussed in an example from Participant 4 when he misses training:

“...Monday night something came up, couldn’t make it, didn’t feel very well after because I made a choice, and it was choosing to do something else...basically to go out, and I felt guilty afterwards.”

Participant 2 discussed feeling fear that she will lose any “gains” she has made, which has in the past led to negative psychological reactions (i.e., guilt feelings) when she has had to miss training sessions. Higher scores of interviewee participants on the introjected regulation subscale (see Table 2) indicate that this is a prominent type of motivation for these participants.

Body image

Quantitative results. The univariate ANOVA revealed no significant differences on the body image variable for group, $F(3, 210) = 1.20, p > .05$; for gender, $F(1, 210) = .03, p > .05$, or for their interaction, $F(3, 210) = 3.25, p > .05$.

Qualitative results. Despite the nonsignificant quantitative results, all interviewees except Participant 2 scored below the overall mean and the mean for Group 1 on the body image scale (see Tables 2 and 3), indicating a general dissatisfaction with body image. Interviews reflected the important link between body image (and dissatisfaction with certain body parts) and “excessive” exercise behavior of

all four participants. Specifically, male participants wanted specific parts of their bodies to be “bigger,” “stronger,” or more defined, whereas women preferred “tone” and “definition.” All participants indicated that they felt better about their bodies after high intensity workouts, and could actually see physical changes based on their training. Participants discussed feeling “tighter,” “harder,” and “larger” overall, with some participants noticing specific changes in body parts. All participants noted that their body image fluctuates erratically depending on how intensely/how often they have been training. An example of this extreme fluctuation is discussed by Participant 4, who mentioned that his body image changes daily, and sometimes even hourly:

“Yeah...I’ll see flab...I’ll look in the mirror – it can be an hour’s difference... Yeah, it’s almost schizophrenic, you know, like it’s up and down. I’m trying to control it and I feel that it is a control. It’s mind – it’s the mind playing with me, cause I have to realize that there can’t be that much change in an hour...”

Female participants discussed practicing “mirror avoidance” when they had not been training as often, or to avoid general body image dissatisfaction. All participants mentioned that they perceived negative physical changes (e.g., decreases in muscle definition), and experienced negative feelings towards their bodies when they missed regularly scheduled workouts, which in turn had negative psychological effects (i.e., lower confidence). For example, Participant 3 admitted to feeling less confident and secure about himself, based on specific changes in his body image when he missed workouts:

“...when I’ve missed training in the past I’ve become less outgoing because I don’t feel like I can back myself up, and then I’m not so critical of other people because I can’t be – because I’m shrinking.”

DISCUSSION

We investigated the influences of exercise motivation, within the SDT framework, and body image on exercise behavior in order to better understand the phenomenon of “excessive” exercise participation. We also examined gender differences in both exercise motivation and perception of body image among “healthy” and “excessive” exercisers.

Quantitative findings

In comparing the exercise motivation and body image of “healthy” and “excessive” exercisers, we found that the “excessive” group displayed higher levels of introjected regulation than all other groups, and that the two groups with the highest CES scores (“excessive” and “borderline excessive”) reported the highest levels of introjected regulation. This is likely because those exercisers with high “commitment” have more compulsive tendencies towards exercise, or feel more of an obligation towards exercise than those with lower “commitment” levels. This finding is in line with our hypothesis (Hypothesis 1) and is supported by results showing that introjected regulation was the strongest predictor of exercise dependency among competitive endurance athletes (Hamer et al., 2002) and that this form of controlled regulation distinguished non exercise-dependent symptomatic individuals from asymptomatic individuals (Edmunds et al., 2006). These combined results suggest that SDT, and the concept of introjected regulation specifically, could be useful in furthering our understanding and ability to detect more excessive forms of exercise behavior.

We expected (Hypothesis 1) that “excessive” exercisers would display lower levels of all self-determined types of motivation compared to other groups. However, “excessive” exercisers (Group 1) showed higher levels of intrinsic motivation than “healthy” exercisers (Group 2) and “borderline excessive” exercisers (Group 3), and higher overall self-determined exercise motivation than “insufficiently active” exercisers in Group 4. “Excessive” exercisers also scored significantly higher on the identified regulation variable than all other exercising groups.

While it is possible that these findings may be due to the fact that the “excessive” group in this study may not have actually been as “excessive” as a selective clinical sample would be, Edmunds et al. (2006) also found that their non exercise-dependent symptomatic group reported higher levels of autonomous motivational regulations than their asymptomatic group and identified regulation was also found to be a positive predictor of exercise dependency in the study by Hamer et al. (2002). While the findings from these studies seem to run against SDT’s predictions which hold that more self-determined forms of motivation should lead to more positive consequences (i.e., healthy exercise participation), while non self-determined types should lead to more negative consequences (i.e., excessive exercise, exercise dependency), in this study, as in others, exercise behaviors represented a positive (vs. a negative) consequence as they were not extreme.

We also hypothesized (Hypothesis 2) that “excessive” exercisers would have a less positive perceived body image than “healthy” exercisers. However, no sig-

nificant differences were found between the groups on the body image measurement. These results are not in line with studies that indicate links between body image dissatisfaction and higher-frequency exercise behavior (Davis, 2000; Imm & Pruitt, 1991; Markula, 1995; Shaw, 1991). These findings may suggest that the construct of body image may not be as important as the study of other factors (e.g., personality) and/or that the “excessive” exercisers in this study were not excessive enough.

What would be interesting in future studies is to examine how exercise motivation and body image interact in predicting exercise behavior over time. Indeed in a recent study using SDT, social physique anxiety (concern that others are negatively evaluating one’s physical appearance) was positively predicted by introjected regulation and negatively predicted by intrinsic motivation (Thøgersen-Ntoumani & Ntoumanis, 2006, 2007). A subsequent examination of aerobic instructors found that introjected regulation negatively predicted physical self-worth, and positively predicted social physique anxiety, drive for thinness, and body dissatisfaction. The next step would be to use cross-lagged designs to determine direction of causality between motivational regulations and body image and to integrate prospective measures of exercise behavior.

Qualitative findings

Despite nonsignificant quantitative results regarding body image, interview data suggested that body image is associated with “excessive” exercise behavior, and scores on the body image scale indicated a general dissatisfaction with body image among “excessive” exercising interviewees. Moreover, while all interviewees proposed that body image influences their exercise behavior, they also discussed feeling better about their bodies during more intense workouts, and reported negative fluctuations in body and self-image when they had missed workouts. These findings confirm that the relationship between body image and exercise behavior is in fact bi-directional (Davis, 2000; McDermott, 2000) and suggests that further study into the causality of this relationship is required.

Future studies should also address the possibility that “excessive” exercisers do not necessarily have higher levels of body image dissatisfaction, but rather higher levels of “body focus” than “healthy” exercisers. Davis and Fox (1993) suggested that while “excessive” exercisers were more satisfied with their body image, they placed more importance on their appearance, and associated the way they felt about their bodies to their global self-image more often than “healthy” exercisers, therefore indicating higher levels of “body focus.”

Inconsistencies between the findings of the quantitative and qualitative phases are most likely due to the fact that the interviewees were a small and select group compared to the broader sample in Phase 1 and due to the fact that participants might have had more of an opportunity to nuance their responses during the interviews.

Gender differences

Another aim of this study was to provide further insight into gender differences in both exercise motivation and perception of body image. Regarding motivation, and in line with Hypothesis 3, findings indicate that the women in the sample had a more self-determined profile towards their exercise behavior than the men. These results concur with past findings that indicate that female athletes are more self-determined in their sport participation than male athletes (Brière et al., 1995; Fortier et al., 1995; Pelletier et al., 1995). They are not in keeping, however, with exercise motivation literature which indicates that women's motives for exercise are more often related to appearance and body-related concerns, which are more extrinsic, non-self-determined motives for participation (Davis & Cowles, 1991; Kilpatrick et al., 2005; McDonald & Thompson, 1992; Silberstein et al., 1988).

Results of the present study suggest that women may have a more self-determined motivational profile overall, towards various forms of physical activity. In addition, interviews revealed that only the two female interviewees mentioned "enjoyment" and "fun" as reasons for their exercise participation. Based on these findings, future research should aim to investigate reasons why women may develop more self-determined motivation than men towards exercise and sport.

With respect to gender differences in body image, quantitative results of the study revealed no significant differences between males and females. These results are not in line with Hypothesis 3, nor with the body image literature which suggests that overall women are less satisfied with their bodies than men (Davis & Cowles, 1991; Mintz & Betz, 1988). However, interview data revealed that male participants wanted specific areas of their bodies to be "bigger" and "stronger" while women wanted parts to be more "defined" or "toned," and both of the female participants mentioned practicing "mirror avoidance" when they felt dissatisfied with their appearance. While a small qualitative sample size makes it difficult to generalize interview findings, these results suggest that while men and women do not necessarily differ in their overall levels of body dissatisfaction, they do in fact differ in the way in which they are dissatisfied with their bodies. Indeed, these results support the findings of Silberstein and colleagues (1988) which

revealed differences in direction of body dissatisfaction between exercising men and women. Future research on body image could address how men and women are dissatisfied with their bodies and in what ways it affects their overall image.

Limitations and future research

As mentioned previously and as in other research (Edmunds et al., 2006), the “excessive” exercise group was not extreme enough. Adding a measure of exercise dependency (Hausenblas & Symons Downs, 2002) would be worthwhile as well as using a solid exercise motivation measure such as the Behavioural Regulation Exercise Questionnaire-2 (Markland & Tobin, 2004). While examination of mean differences allows a better understanding of motivational and body image differences between groups, future research should determine how the different motivational regulations and body image variables predict exercise behavior over time in each group (as Edmunds et al., 2006) and how these two predictors interact and influence each other over time (as Thøgersen-Ntoumani & Ntoumanis, 2006).

Conclusion

The use of a multi-method strategy for data collection and analysis proved to be useful in providing more thorough, in-depth insights into understanding the complexity of the psychological characteristics behind the over-exercising phenomenon. Theoretically, this study contributes to an understanding of the excessive exercising phenomenon through the use of SDT as a framework for exercise motivation. Further research using this theory with truly “excessive” exercising populations is required. On a practical level, findings from the present study may assist health and fitness professionals in acknowledging certain psychological characteristics associated with “excessive” forms of exercise behavior. Increased insight into the motivation profile and body issues characteristic of potential over-exercisers could enable practitioners to better address the physical and psychological consequences of this phenomenon with their clients.

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