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Examining Intrinsic Versus Extrinsic Exercise Goals: Cognitive, Affective, and Behavioral Outcomes

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Grounded in self-determination theory (SDT), this study had two purposes: (a) examine the associations between intrinsic (relative to extrinsic) exercise goal content and cognitive, affective, and behavioral outcomes; and (b) test the mediating role of psychological need satisfaction in the Exercise Goal Content → Outcomes relationship. Using a sample of 410 adults, hierarchical regression analysis showed relative intrinsic goal content to positively predict physical self-worth, self-reported exercise behavior, psychological well-being, and psychological need satisfaction and negatively predict exercise anxiety. Except for exercise behavior, the predictive utility of relative intrinsic goal content on the dependent variables of interest remained significant after controlling for participants' relative self-determined exercise motivation. Structural equation modeling analyses showed psychological need satisfaction to partially mediate the effect of relative intrinsic goal content on the outcome variables. Our findings support further investigation of exercise goals commensurate with the goal content perspective advanced in SDT.

Keywords: exercise goals, psychological need satisfaction, self-determination theory

The goals on which individuals focus their exercise efforts (e.g., to improve their health or to enhance their appearance) are a common foundation from which to explore the motivation for, and the experiences of, exercise engagement. It is postulated within self-determination theory (SDT; Deci & Ryan, 2000) that “all goals are not created equal” (Ryan, Sheldon, Kasser, & Deci, 1996, p. 7) and that valuing goals with different foci will be differentially associated with well-being and adjustment outcomes (Vansteenkiste, Lens, & Deci, 2006).

Specifically within SDT, goals with *intrinsic* and *extrinsic* content are distinguished. Intrinsic goals are those focused toward developing one's personal interests, values, and potentials and are inherently satisfying to pursue. These characteristics

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align with the organismic foundations of the self within SDT, as humans are considered to be active and have an innate tendency to develop and refine their sense of self (Deci & Ryan, 2000). Extrinsic goals are primarily characterized by having an “outward” orientation, with one’s pursuits being directed toward external indicators of worth such as wealth, fame, and appealing image (Kasser & Ryan, 1993, 1996; Vansteenkiste et al., 2006). Unlike intrinsic goal pursuit, Deci and Ryan (2000) contend that extrinsic goal pursuit neither stems from nor contributes to the development of oneself and may be antithetical to it. Past work focused on people’s life aspirations has considered goals such as community contribution, social affiliation, health and fitness, and self-acceptance to reflect intrinsic goals, whereas financial success, appearance, popularity, power, and conformity have been categorized as extrinsic goals (Grouzet et al., 2005; Kasser & Ryan, 1996; Vansteenkiste, Neyrinck, et al., 2007). The pursuit of intrinsic versus extrinsic life goals has been positively associated with well-being (e.g., self-actualization and vitality) and negatively associated with indices of ill-being (e.g., depression and anxiety (see Kasser, 2002; Vansteenkiste, Soenens, & Duriez, 2008 for an overview). Moreover, recent research has found that intrinsic versus extrinsic goals within specific life domains are associated with adaptive outcomes such as greater job-based satisfaction, vitality, and less emotional exhaustion (Vansteenkiste, Neyrinck, et al., 2007). The purpose of the current study was to extend this line of inquiry to the exercise domain. Specifically, we sought to (a) investigate the associations between relative intrinsic exercise goals and a number of exercise-based outcomes (i.e., self-reported leisure time exercise engagement, exercise-based anxiety, physical self-worth, psychological well-being, and psychological need satisfaction) and (b) test whether any associations identified between exercise goals and outcomes were mediated by exercise-based psychological need satisfaction as forwarded within SDT.

Intrinsic Versus Extrinsic Exercise Goal Content

The effects of what in SDT is termed *goal content* has received some prior research attention in the exercise domain, in which case the term *exercise motives*, or *reasons*, was used (Ingledeew & Markland, 2008; Maltby & Day, 2001; Markland & Ingledeew, 1997, 2007; Silberstein, Striegel-Moore, Timko, & Rodin, 1988). Although informative and often couched in Deci and Ryan’s framework, this work has not always been directly aligned with the goal content perspective advanced in SDT (see Sebire, Standage, & Vansteenkiste, 2008). In an attempt to extend goal content research to the exercise context, in our recent work we made a concerted effort to align goal categorizations with the writings of Deci, Ryan, and their colleagues (Deci & Ryan, 2000; Kasser & Ryan, 1996; Sheldon, Ryan, Deci, & Kasser, 2004). Aligned with definitions of intrinsic and extrinsic life aspirations (Kasser & Ryan, 1993, 1996), we labeled domain-specific exercise goals for health management, skill development, and social affiliation as having intrinsic content (i.e., reflecting a more self-actualizing orientation), and exercise goals of image improvement and social recognition as having extrinsic content (i.e., an outward orientation) (Sebire et al., 2008). By studying goal contents that align with the intrinsic/extrinsic goal definitions for-

warded in SDT, we can attempt to further understand motivation for exercise by gaining conceptual precision, which in turn facilitates the examination of theoretically derived hypotheses.¹

There is a growing body of empirical evidence to suggest that exercising in the service of intrinsic and extrinsic goals yields differential outcomes. For example, although not coming from a SDT perspective, Crawford and Eklund's (1994) work with a sample of college-age females documented that the exercise goal of improved appearance (i.e., an extrinsic goal) was positively related, whereas health goals (i.e., an intrinsic goal) were unrelated, to social physique anxiety. Similarly, among regularly exercising undergraduate students, holding appearance-based exercise goals has been shown to correlate positively with indices of ill-being and negatively with self-esteem (Maltby & Day, 2001). Lastly, in a sample of male and female first-time fitness center members, fitness, competence (measuring skill development) and social interaction goals positively correlated with class attendance and workout enjoyment, whereas appearance goals were unrelated to attendance, exercise adherence, and enjoyment (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997, Study 2).

Although the lack of a measure of exercise-based goal content aligned with the conceptualization of intrinsic and extrinsic goals within SDT has precluded past research from exploring the concomitants of participants' reported goals, experimental work has examined the contextual promotion of intrinsic and extrinsic goals (see Vansteenkiste, Soenens, & Lens, 2007 for a review). For example, Vansteenkiste, Simons, Lens, Sheldon, and Deci (2004, Study 3) compared a group of high school students who, before learning tae-bo exercises, read a motivational script based on intrinsic goals (informing them that learning tae-bo could help improve their fitness / health) with students who read an extrinsic goal-focused motivational script (informing them that learning tae-bo exercise was a useful way to improve their appearance). The intrinsic goal-framing group displayed greater behavioral persistence and graded performance on the tae-bo exercise.

In a further study, Vansteenkiste, Simons, Soenens, and Lens (2004) demonstrated that students exposed to an intrinsic goal manipulation displayed better performance and greater short- and long-term behavioral persistence at the tae-bo exercise than students in a control group who were not exposed to any goal manipulation (i.e., neither intrinsic nor extrinsic goal promotion). Those exposed to an extrinsic goal manipulation displayed reduced performance compared with both those participants involved in the control and intrinsic goal condition. Interestingly, the pattern of persistence of those involved in the extrinsic goal relative to the control group was mixed, with extrinsic goal framing resulting in less short-term persistence, greater medium-term persistence, and equally low long-term persistence. Follow-up within-condition correlation analyses indicated, however, that extrinsic goal-oriented individuals' persistence was not associated with enjoyment and valuation of the activity, whereas it was for those in the control group. Vansteenkiste, Simons, Soenens, et al. (2004) argued that the persistence of those in the extrinsic goal condition was less authentic in nature, presumably because it was more strongly oriented toward attaining the primed external indicators of worth. Nevertheless, the findings showed that extrinsic goal framing might prompt individuals to put forth extra effort in the exercise activity at hand.

Intrinsic and Extrinsic Goal Content and Psychological Need Satisfaction

From the SDT perspective, the aforementioned differential effects of intrinsic and extrinsic exercise goal pursuit are brought about owing to the degree to which the different goal contents promote satisfaction of individuals' basic psychological needs. Within SDT, three psychological needs are forwarded: autonomy (to experience oneself as the originator of one's behavior), competence (to feel that one can master challenges), and relatedness (to feel a sense of meaningful connectedness within one's social milieu) (Deci & Ryan, 2000).

Supporting this theoretical reasoning, Rijavec, Brdar, and Miljkovi (2006) reported intrinsic, relative to extrinsic life goal pursuit to be positively associated with general need satisfaction (also see Kasser, 2002, for an overview). Further, work in the organizational domain has found the suppression of employees' psychological need satisfaction within the work place to mediate the negative relationships between relative extrinsic work goal pursuit and work-related outcomes (viz., job vitality, job satisfaction, and dedication) (Vansteenkiste, Neyrinck et al., 2007). As the satisfaction of one's basic psychological needs represents a critical mechanism by which the disparate effects of intrinsic and extrinsic goal pursuit on outcome variables may be explained (Vansteenkiste, Soenens et al., 2007), in the present work we expected need satisfaction to mediate the Relative Intrinsic Goal → Outcome Variable relationship.

Distinguishing Exercise Goal Content and Behavioral Regulation

It is important to note that within SDT, the content of goals (i.e., intrinsic vs. extrinsic) is conceptually distinguished from the behavioral regulation with which goals are pursued (i.e., whether one's motivation is autonomous or controlled). Whereas *autonomous motivation* stems from the inherent satisfaction or pleasure that a behavior brings (intrinsic motivation) from aligning one's actions with other aspects of the self (integrated regulation) or from personally valuing a behavior (identified regulation), *controlled motivation* reflects behavioral enactment to attain ego enhancement, to suppress intraindividual feelings of guilt, shame, and anxiety (introjected regulation), or to comply with external pressuring demands (external regulation) (Ryan & Deci, 2000). Theoretically, it is maintained that intrinsic and extrinsic goals can be pursued for both autonomous and controlled reasons (Deci & Ryan, 2000). To illustrate the distinction, an individual may attend an exercise class to improve their health (an intrinsic goal) because they personally value good health (autonomous behavioral regulation), or because they feel pressured to improve their health by a medical practitioner (controlled behavioral regulation). Alternatively, an individual may work out to improve their appearance and physical appeal (an extrinsic goal) because they personally value looking good (autonomous behavioral regulation) or because they feel guilty if they do not look good for their partner (controlled behavioral regulation).

Although goal contents and behavioral regulations are conceptually separated within SDT, debate exists as to whether this theorizing is supported empirically. Specifically, Carver and Baird (1998) and Srivastava, Locke, and Bartol (2001) have challenged the findings of previous investigations of goal content and well-being (Kasser & Ryan, 1993, 1996) by suggesting that the detrimental effects of pursuing financial success aspirations were reducible to the controlled behavioral regulation associated with such extrinsic goal pursuit. In response to these suggestions, Sheldon et al. (2004) reported a series of studies showing that even though intrinsic and extrinsic goals are positively correlated with autonomous and controlled behavioral regulations, respectively, both facets predict well-being and adjustment outcomes at the global life level. Such work supports the tenets of SDT and implies that both goal content and behavioral regulation are important in understanding the cognitive and affective correlates of motivational pursuits (Deci & Ryan, 2000).

In the exercise context, mixed support has emerged with respect to the distinction between goal content and behavioral regulation in predicting behavioral outcomes. For instance, in a study of adolescents' exercise goals as individual difference variables, Gillison, Standage, and Skevington (2006) found that in line with the theoretical hypotheses set out in SDT, relationships between intrinsic and extrinsic exercise goal content and self-reported exercise behavior were only partially mediated by self-determined exercise motivation. In contrast, a recent study by Ingledew and Markland (2008) found support for a motivational model specifying exercise goal content as an antecedent to exercise behavioral regulation, which in turn predicted exercise engagement. Similar findings have been reported in investigations in which exercise goals were experimentally manipulated (Vansteenkiste, Simons, Lens, et al., 2004, Study 3). In this instance, after controlling for students' autonomous motivation, manipulated exercise goal content did not directly predict behavioral persistence assessed via student participation in a free-choice exercise activity although it was uniquely predictive of students' rated performance.

The Present Research

This investigation had two main purposes. The first aim was to extend SDT-based research that has previously focused on life aspirations to the exercise domain and explore whether intrinsic relative to extrinsic exercise goals were associated with adaptive exercise outcomes. We hypothesized that relative intrinsic exercise goals would positively predict physical self-worth, psychological well-being, exercise behavior, and psychological need satisfaction and would negatively predict exercise anxiety. These variables provide a broad set of outcomes to investigate the effect of different exercise goal pursuit that align with SDT and are relevant to exercise and general life contexts. Within this aim, aligned with previous work in the general life domain (Sheldon et al., 2004), we sought to explore whether the relationships identified between goals and outcomes would remain significant above and beyond exercise-based behavioral regulations. In addition, we expected these relationships to be present after controlling for the effects of two demographic variables (i.e., age and gender). There is evidence to suggest

that advancing age is negatively related to social physique anxiety (Thøgersen-Ntoumani & Ntoumanis, 2006) and physical activity (Davis & Fox, 2006) and is differently associated with aspects of psychological well-being (Keyes & Waterman, 2003). In addition, relative to females, males report greater participation in health-promoting physical activity (Martin, Morrow, Jackson, & Dunn, 2000), greater physical self-worth (Fox & Corbin, 1989; Hayes, Crocker, & Kowalski, 1999), and less social physique anxiety (Thøgersen-Ntoumani & Ntoumanis, 2006). Our second aim was to explore the hypothesized mediating role of need satisfaction in the relationships proposed in SDT to exist between relative intrinsic exercise goals and exercise-related outcomes. It was hypothesized that psychological need satisfaction would mediate these associations.

Method

Participants

The initial pool of respondents comprised 424 council employees (i.e., administrative, professional, clerical, and technical employees of local government). To ensure that the sample consisted only of individuals who reported participation in at least some mild exercise, 14 individuals who reported no mild, moderate, or vigorous exercise sessions were excluded from subsequent analyses. The final sample ($N = 410$) consisted of 118 males and 292 females (M age = 41.39 years; $SD = 11.02$; range = 20–67 years); 97.5% of participants were White.

Procedure

Following the approval of a local ethics committee and the consent of seven Local Authorities from the South West of England, an e-mail was sent inviting employees to participate in an online study of exercise attitudes and behaviors. Data were collected using online questionnaires, accessed through a URL to the study Web site that was included in the recruitment e-mail. Participants were required to tick a box indicating their informed consent. Nonconsenting participants were invited to close their Web browser.

Measures

Exercise Goal Content. The Goal Content for Exercise Questionnaire (GCEQ; Sebire et al., 2008) is a 20-item measure that assesses the importance that people place on three intrinsic (health management, skill development, and social affiliation) and two extrinsic (image and social recognition) exercise goals each indexed by four items. Participants responded to the stem “please indicate to what extent these goals are important for you while exercising” using a 7-point scale ranging from 1 (*not at all important*) to 7 (*extremely important*). In the present work, the internal consistency of the subscales was as follows: health management $\alpha = .80$, skill development $\alpha = .86$, social affiliation $\alpha = .82$, image $\alpha = .87$, and social recognition $\alpha = .92$. A relative intrinsic goals variable² was calculated by subtracting the mean of extrinsic goal subscales ($\alpha = .83$) from the mean of intrinsic goal subscales ($\alpha = .85$). Because the GCEQ is a recently developed instrument, we

performed both first- and second-order confirmatory factor analyses to assess evidence pertaining to structural validity. Results supported the structural validity of the GCEQ scores in the present sample: First-order CFA: $\chi^2(160) = 475.27$, $p < .001$; CFI = .95; SRMR = .05. Second-order CFA: $\chi^2(164) = 596.59$, $p < .001$; CFI = .93; SRMR = .09.

Exercise Behavioral Regulation. The Behavioral Regulation in Exercise Questionnaire (BREQ; Mullan, Markland, & Ingledew, 1997) was used to assess the quality of participants' motivation toward exercise. Aligned with the conceptualization of motivation forwarded in SDT, the BREQ comprises 15-items assessing intrinsic, identified, introjected, and external motivational regulations. Items are preceded by the stem "why do you exercise?" and are scored on a 5-point Likert scale ranging from 0 (*not true for me*) to 4 (*very true for me*). In the current study, the internal consistency of the subscales were as follows: intrinsic regulation $\alpha = .92$, identified regulation $\alpha = .77$, introjected regulation $\alpha = .78$, and external regulation $\alpha = .73$. The motivation subscales were used to compute a relative autonomy index (RAI). Consistent with theory and past work (e.g., McDonough & Crocker, 2007; Standage & Gillison, 2007), and after confirming that the four regulatory styles conformed to a simplex pattern (i.e., more proximal regulations on the continuum correlated to a higher degree than more distal regulations) in the present data, the RAI was calculated using the following equation: (external regulation $\times -2$) + (introjected regulation $\times -1$) + (identified regulation $\times 1$) + (intrinsic regulation $\times 2$).

Psychological Need Satisfaction. Satisfaction of the psychological needs for autonomy, competence, and relatedness in the context of exercise was assessed using the Psychological Need Satisfaction in Exercise Questionnaire (PNSE; Wilson, Rogers, Rodgers, & Wild, 2006). The PNSE assesses each need with six items scored on a 6-point Likert scale ranging from 1 (*false*) to 6 (*true*). In the current study, the internal consistencies of the subscales were autonomy $\alpha = .95$, competence $\alpha = .93$, and relatedness $\alpha = .94$. The 18-items were averaged to create a composite psychological need satisfaction in exercise score ($\alpha = .92$).³

Exercise Anxiety. Exercise-related social anxiety was assessed via the Physical Activity and Sport Anxiety Scale (PASAS; Norton, Hope, & Weeks, 2004). The PASAS is a 16-item measure that assesses individuals' fear of negative evaluation and related avoidance in the physical activity and athletic domains (e.g., "I feel nervous if other people are watching me when I am exercising / working out") using a 5-point Likert scale ranging from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). Item responses were summed to form an anxiety score ($\alpha = .94$).

Physical Self-Worth. The six-item physical self-worth subscale from the Physical Self Perception Profile (PSPP; Fox & Corbin, 1989) was used to assess perceptions of worth regarding aspects of the physical self (i.e., happiness, satisfaction, pride, respect and confidence). When completing the PSPP, participants are presented with two statements describing how a person perceives their physical self: for example, "Some people feel extremely satisfied with the kind of person they are physically BUT others sometimes feel a little dissatisfied with their physical selves." Participants are first asked to decide which of the

statements best describes them and then to endorse the chosen statement as either *sort of true for me* or *very true for me*. Reverse scoring was applied to appropriate items, and the six items were then averaged to form an overall physical self-worth score ($\alpha = .87$).

Leisure Time Exercise Participation. The Godin Leisure Time Exercise Questionnaire (LTEQ; Godin & Shephard, 1985) was employed to obtain self-reported frequency of participation in mild, moderate, and strenuous exercise in bouts greater than 15 min during a typical week. A total exercise index was computed by assigning the mild, moderate, and strenuous scores weights of 3, 5, and 9 METs (metabolic equivalents), respectively, and summing these weighted scores. The LTEQ has demonstrated validity in comparison with objective assessment tools such as accelerometers (Jacobs, Ainsworth, Hartman, & Leon, 1993).

Psychological Well-Being. Consistent with past work (e.g., Ryan & Deci, 2001), two indicators were combined to provide a composite score of psychological well-being. The seven-item Subjective Vitality Scale (Ryan & Frederick, 1997) was used to assess feelings of vitality (e.g., “I feel energized”). Items are scored on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The alpha coefficient in the current study was $\alpha = .94$. In addition, the Depression-Happiness Scale (McGreal & Joseph, 1993) was employed to assess feelings of depression and happiness experienced in the past week. This scale consists of 25 items (e.g., “I felt cheerful” and “I felt like crying”) rated on a 4-point Likert scale ranging from 0 (*never*) to 3 (*often*). Responses were scored in a bipolar fashion in which depression item scores were reversed and then summed with scores on happiness items ($\alpha = .93$). Higher scores reflect greater perceptions of happiness and lower feelings of depression. Scores for vitality and depression-happiness were summed to form a composite psychological well-being variable.

Results

Descriptive Statistics and Relationships Among Study Variables

Table 1 presents descriptive statistics and bivariate correlations showing associations among the study variables. Participant age was positively, albeit weakly correlated with psychological well-being, and negatively correlated with exercise behavior. In addition, independent *t*-tests revealed that females reported significantly greater exercise anxiety than males ($M_s = 40.82$, $SD = 15.04$, and 35.01 , $SD = 13.65$, respectively) $t(422) = -3.62$, $p < .01$ (Hedges’s $g = 0.40$), and significantly lower physical self-worth ($M_s = 2.42$, $SD = 0.63$, and 2.65 , $SD = 0.55$, respectively) $t(422) = 3.39$, $p < .01$ (Hedges’s $g = -0.38$). Females also tended to report less exercise participation than males ($M_s = 39.71$, $SD = 24.52$, and 44.64 , $SD = 21.70$ respectively) $t(422) = 1.92$, $p = .06$ (Hedges’s $g = -0.21$). As expected, relative intrinsic exercise goals correlated positively with RAI.⁴ Further, both goal constructs displayed correlations with the dependent variables in the expected directions.

Table 1 Descriptive Statistics and Bivariate Correlations Among Study Variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Age	41.39	11.02	—							
2. Relative intrinsic goals	0.92	1.05	.11*	—						
3. Relative autonomy	6.37	3.27	.18*	.41**	—					
4. Need satisfaction	4.17	0.89	-.07#	.29**	.50**	—				
5. Exercise anxiety	39.14	14.87	-.08	-.33**	-.45**	-.28**	—			
6. Physical self-worth	2.50	0.62	.10*	.36**	.52**	.42**	-.54**	—		
7. Exercise behavior	41.13	22.62	-.09	.13**	.38**	.34**	-.23**	.28**	—	
8. Psychological well-being	57.51	13.06	.15**	.29**	.46**	.27**	-.39**	.51**	.23**	—

Note. * $p < .05$, ** $p < .01$.

Effects of Relative Intrinsic Goal Content on Criterion Variables

As previous work has shown goal content and behavioral regulations to be correlated (Sheldon et al., 2004), before conducting the regression analyses the data were screened for evidence of collinearity in line with the recommendations of (Tabachnick & Fidell, 2007). The variance inflation factor (1.00–1.21) and tolerance (0.83–1.00) statistics resided within acceptable ranges. In addition, we simultaneously screened the condition indexes and the variance proportion factors (Edmunds, Ntoumanis, & Duda, 2006; Pedhazur, 1997). The results suggested that collinearity was not evident in our data as when the condition index exceeded 10, no two predictors displayed variance proportion factors greater than .50.

Five separate hierarchical (or sequential) regression analyses were conducted to examine the utility of relative intrinsic goal content in predicting the criterion variables (*viz.*, physical self-worth, exercise anxiety, exercise behavior, psychological well-being, and psychological need satisfaction). This approach is (a) aligned with previous work analyzing the unique contributions of goal content and behavioral regulations (*i.e.*, Sheldon et al., 2004) and (b) appropriate to answer the scientific question at hand by providing the unique variance (or contribution) accounted for by the theoretical set of variables in an incremental and cumulative fashion (*cf.* Cohen, Cohen, West, & Aiken, 2003). In view of the preliminary analysis that showed associations between some dependent variables and gender and age, these demographic variables were entered in Step 1 of each regression analysis. Relative intrinsic goals were entered at Step 2. At Step 3, exercise RAI was entered so as to examine whether relationships between participants' relative intrinsic goal scores and the dependent variables remained significant after controlling for relative autonomous motivation toward exercise.

The results of the hierarchical regressions are displayed in Table 2. In line with our hypotheses, after controlling for age and gender, relative intrinsic goal content positively predicted significant variance in physical self-worth, exercise behavior, psychological well-being, and psychological need satisfaction and was negatively related to exercise anxiety. All of these relationships, except for the relationship between relative intrinsic goal content and exercise behavior⁵ remained significant at the final step after entering relative autonomous motivation.⁶

Mediating Role of Basic Need Satisfaction

Another important aim of this research was to examine whether basic need satisfaction would mediate the observed associations between relative intrinsic goal content and the dependent variables. Because the bivariate correlations and hierarchical regression analyses identified relationships between relative intrinsic goal content and four of the five dependent variables, we sought to further examine the role of psychological need satisfaction in the relations between relative intrinsic goal content and physical self-worth, exercise anxiety, and psychological well-being, thus excluding exercise behavior. Structural equation modeling using AMOS Version 7.0 (Arbuckle, 2006) was used to examine these relationships.

Table 2 Hierarchical Regression Analyses Predicting Physical Self-worth, Exercise Anxiety, Exercise Behavior, Psychological Well-Being and Psychological Need Satisfaction From Age, Gender, Relative Intrinsic Goal Content, and Relative Autonomy

Independent variables	Dependent variables														
	Physical self-worth			Exercise anxiety			Exercise behavior			Psychological well-being			Psychological need satisfaction		
	Adj R ²	β	t	Adj R ²	β	t	Adj R ²	β	t	Adj R ²	β	t	Adj R ²	β	t
Step 1	.03			.03			.01			.02			.01		
Age		.10	1.96*		-.08	-1.57		-.09	-1.92		.15	3.01**		-.07	-1.48
Gender		-.16	-3.18**		.18	3.64**		-.10	-2.01*		-.04	-0.71		-.08	-1.63
Step 2	.15			.13			.03			.09			.10		
Age		.06	1.25		-.04	-0.90		-.11	-2.23*		.12	2.47*		-.11	-2.25*
Gender		-.15	-3.20**		.17	3.67**		-.10	-1.95		-.03	-0.59		-.06	-1.55
Relative intrinsic goals		.35	7.67**		-.32	-6.86**		.14	2.83**		.28	5.92**		.30	6.42**
Step 3	.30			.24			.16			.22			.27		
Age		.03	0.60		-.01	-0.33		-.14	-3.04**		.09	2.00*		-.14	-3.29**
Gender		-.12	-2.85**		.15	3.35**		-.07	-1.52		-.00	-0.05		-.04	-1.01
Relative intrinsic goals		.18	3.99**		-.17	-3.63**		-.02	-0.41		.12	2.58**		.12	2.63*
Relative autonomy		.43	9.51**		-.37	-7.82**		.40	8.06**		.40	8.27**		.46	9.88**

Note. Adj R² = Adjusted R². *p < .05, **p < .01.

The covariance matrix was analyzed using the maximum likelihood estimation method. Inspection of the Mardia's coefficient (13.01, critical ratio = 7.92) revealed multivariate nonnormality in the data. Accordingly, analyses were performed using a bootstrapping technique (see Efron & Tibshirani, 1993). In line with recommendations of Preacher and Hayes (2008) 5000 bootstrap samples with replacement based on the original sample were requested. Bootstrapping is beneficial under conditions of nonnormality as the bootstrap-generated standard errors provide a more accurate indication of the parameter estimate stability (Byrne, 2001; Nevitt & Hancock, 2001).

In line with the two-index presentation strategy advanced by Hu and Bentler (1998), model fit was deemed satisfactory where the comparative fit index (CFI) was $>.90$ (Bentler, 1995) and excellent where CFI was close to or $>.95$ (Hu & Bentler, 1999). For the standardized root mean square of the residual (SRMR), values of $.08$ (or lower) are indicative of well-specified models (Bentler, 1995). Commensurate with recent recommendations (Cheung & Lau, 2008; MacKinnon, Lockwood, & Williams, 2004; Shrout & Bolger, 2002) the mediating effect of psychological need satisfaction was explored by examining the 95% upper and lower limits of bootstrap-generated bias-corrected confidence intervals (CI) of the indirect effects.

To permit an adequate participant-to-estimated parameter ratio, latent variables representing relative intrinsic goals, physical self-worth, and exercise anxiety were created using a parceling technique. In a discussion of the arguments for and against the parceling technique, Little, Cunningham, Shahar, and Widaman (2002) contend that when the primary aim of analysis is to understand the associations between latent variables rather than associations between items, parceling is appropriate as it is a pragmatic solution that (a) reduces the number of estimated parameters in structural equation models thus aiding identification and (b) may reduce nonnormality within data. Physical self-worth and exercise anxiety latent variables were indexed by two randomly generated parcels each, formed by averaging the sum of the appropriate randomly selected items. Two parcels representing relative intrinsic goals were created by subtracting the average of half of the extrinsic goal items from the average of half of the intrinsic goal items (ensuring balanced representation of each goal factor in each parcel). This process was repeated with the remaining halves of the extrinsic and intrinsic goal items to create the second parcel. In line with previous research (Deci et al., 2001; Standage, Duda, & Ntoumanis, 2005), a latent variable representing total need satisfaction was indexed using autonomy, competence, and relatedness subscale scores as indicators. Subjective vitality and depression-happiness scores served as two independent observed indicators for the psychological well-being latent variable. Owing to significant correlations between the three psychosocial dependent variables (see Table 1) their disturbance terms were allowed to covary. These minor modifications resulted in an adequate participant to estimated parameter ratio (15:1; Bentler & Chou, 1987) and the model was found to be adequately identified.

Aligned with the hypothesized sequence of motivational processes advanced in SDT, a model (Figure 1) was tested in which relative intrinsic goals predicted psychological need satisfaction, which in turn (positively) predicted physical self-worth and psychological well-being and (negatively) predicted exercise anxiety.

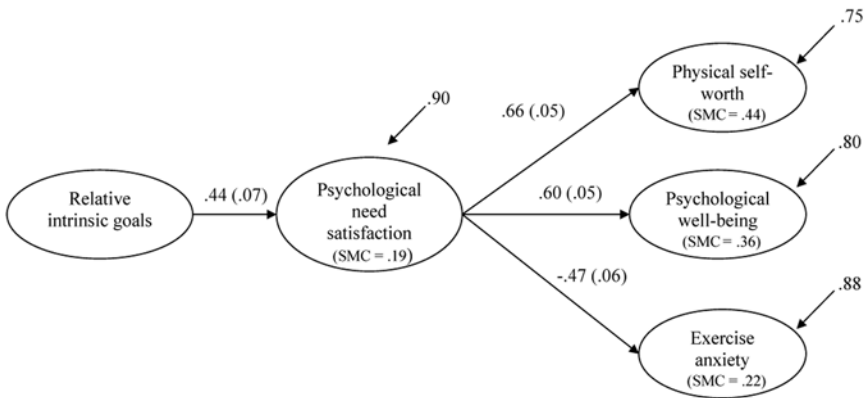


Figure 1 — Preliminary structural model showing relationships between relative intrinsic exercise goals, psychological need satisfaction, and outcomes as hypothesized within self-determination theory. *Note.* All paths are standardized and significant (i.e., $Z > 1.96$). Bootstrap standard errors of the parameter estimates are shown in parentheses. The correlations between the disturbance terms of the dependent variables were $r_{\text{physical self-worth-exercise anxiety}} = -.42$, $r_{\text{exercise anxiety-psychological well-being}} = -.20$, and $r_{\text{physical self-worth-psychological well-being}} = .36$.

This model displayed a satisfactory fit to the data: $\chi^2(37) = 194.26$, $p < .001$; CFI = .93; SRMR = .07. The standardized parameter estimates showed relative intrinsic goal content scores to positively predict psychological need satisfaction, which was in turn positively predictive of physical self-worth and psychological well-being and negatively predictive of exercise anxiety. The significant standardized indirect effects observed between relative intrinsic goals and the dependent variables—physical self-worth, $\beta = .29$, 95% CI = .17 to .42; exercise anxiety, $\beta = -.21$, 95% CI = $-.31$ to $-.12$; and psychological well-being, $\beta = .26$, 95% CI = .16 to .38—supported a mediating role of psychological need satisfaction as advanced in SDT.

To examine whether psychological need satisfaction fully or partially mediated the effects of relative intrinsic goal content on the dependent variables, a second model which specified direct paths from relative intrinsic exercise goals to physical self-worth, exercise anxiety, and psychological well-being was tested. This respecified model (Figure 2) displayed improved fit to the data: $\chi^2(34) = 168.78$, $p < .001$; CFI = .94; SRMR = .05. Examination of the bootstrap-generated bias-corrected CIs revealed that in addition to significant direct effects (which are aligned with the results of the first model), significant standardized indirect effects emerged for relative intrinsic goal content on physical self-worth ($\beta = .17$, 95% CI = .10 to .26), exercise anxiety ($\beta = -.11$, 95% CI = $-.18$ to $-.06$), and psychological well-being ($\beta = .17$, 95% CI = .09 to .28). Such findings support partial mediation. Inspection of the percentage of the total effect that was attributable to the indirect effect (physical self-worth = 40%, exercise anxiety = 31%, and psychological well-being = 56%) suggested that a substantial amount of the variance in the outcome variables was accounted for by the mediating role of need satisfaction.

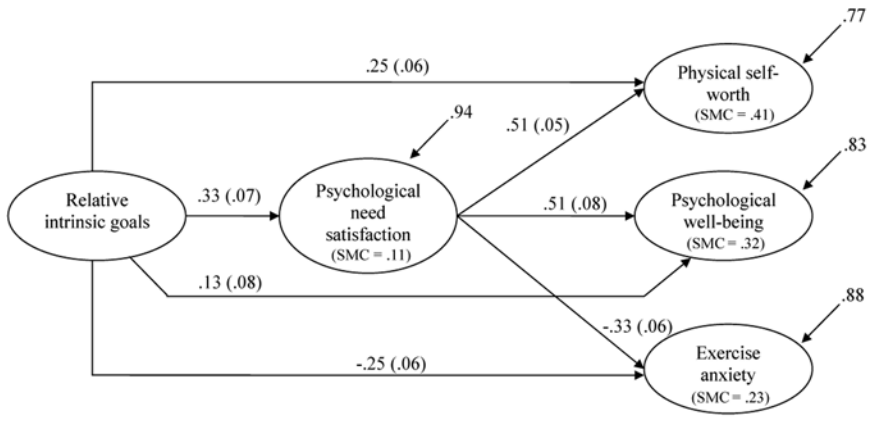


Figure 2 — Revised structural model showing direct and indirect relationships between relative intrinsic exercise goals, psychological need satisfaction, and outcomes. *Note.* All paths are standardized and significant (i.e., $Z > 1.96$). Bootstrap standard errors of the parameter estimates are shown in parentheses. The correlations between the disturbance terms of the dependent variables were $r_{\text{physical self-worth-exercise anxiety}} = -.42$, $r_{\text{exercise anxiety-psychological well-being}} = -.23$, and $r_{\text{physical self-worth-psychological well-being}} = .40$.

Discussion

The present study examined (a) the relationship between relative intrinsic exercise goal content and a range of exercise-related outcomes and psychological well-being and (b) the mediating role of exercise-based psychological need satisfaction in the relationships between relative intrinsic exercise goals and the dependent variables. In general, the findings supported our hypotheses and the theoretical tenets put forth in SDT (cf. Deci & Ryan, 2000).

Relative Intrinsic Exercise Goals

Previous work has documented positive associations between valuing intrinsic relative to extrinsic goals and adaptive outcomes at a global level (Kasser & Ryan, 1993, 1996) and in specific life domains (Vansteenkiste, Neyrinck et al., 2007). Extending this work to the exercise context, our results support such findings, as placing greater importance on intrinsic goals (i.e., improving one's health, advancing one's exercise skills, or fostering meaningful relationships) relative to extrinsic goals (i.e., enhancing one's image and being recognized for one's exercise behaviors) were positively associated with reported exercise engagement, physical self-worth, and psychological well-being and negatively associated with feelings of anxiety. Our study is the first in the exercise context to use a relative-goal approach as recommended within the SDT literature (Deci & Ryan, 2000; Sheldon et al., 2004). The findings support previous research using absolute intrinsic and extrinsic exercise goals (Crawford & Eklund, 1994; Maltby & Day, 2001; Ryan et al., 1997, Study 2) and advance such inquiry by highlighting the adaptive outcomes of adopting an exercise goal orientation dominated by intrinsic pursuits.

Not only does the present data show intrinsic goal content to contribute to more adaptive affective and behavioral functioning in exercise, but also that most of these effects remain significant when controlling for the effects of exercisers' relative autonomous regulation toward exercise engagement. This is an important finding, as some researchers (e.g., Carver & Baird, 1998; Srivastava et al., 2001) have criticized the differentiation between intrinsic and extrinsic goals for being conceptually analogous to the distinction between autonomous and controlled behavioral regulation. Both types of conceptualizations are indeed empirically related to one another, as also shown in the present research, presumably because they both assess exercisers' quality of motivation. Nevertheless, commensurate with previous findings pertaining to life aspirations (Sheldon et al., 2004), the relationships identified between relative intrinsic exercise goals and physical self-worth, well-being, and exercise anxiety remained significant after accounting for relative autonomous exercise motivation. Relative autonomous motivation yielded a significant effect on all outcomes in the expected directions, thereby supporting the findings of previous research (Thøgersen-Ntoumani & Ntoumanis, 2006; Wilson, Rodgers, Fraser, & Murray, 2004).

No independent effect of relative intrinsic goal content over relative autonomous motivation was found for self-reported exercise behavior. Although departing from our hypothesis, this finding is consistent with previous observations regarding objective behavioral (rather than self-reported) indices of exercise (Vansteenkiste, Simons, Lens et al., 2004) and aligns with a model of motivation forwarded by Ingledeu and Markland (2008). With the latter in mind, Ingledeu and Markland's model specifies goal content as an antecedent to behavioral regulation which in turn positively predicts exercise engagement. While supporting the empirical evidence pointing toward the beneficial cognitive and affective consequences of both relative intrinsic goals and relative autonomous motivation (Sheldon et al., 2004), our findings suggest that relative intrinsic exercise goal content may be predictive of exercise behavior to the degree that it is associated with autonomous vs. controlled exercise behavioral regulation. Perhaps a feasible explanation for this null finding may reside with potential variations in the temporal focus of the "what" and "why" variables couched within SDT. Specifically, it may be that the focus on the content of one's exercise goals (or the "what" facet) are too distal (e.g., the promise of social recognition, the ideal appearance, etc) to predict recently enacted behavior, especially above and beyond the reasons (or "why") by which one is motivated to act. As the present data showed intrinsic and extrinsic goals to be associated with autonomous and controlled motivation respectively, future longitudinal research would do well to examine whether the "why" facet of SDT serves to mediate the effects of one's goal content on recent and longer-term patterns of exercise behavior.

Future work might also want to examine the null effect of goal content on exercise behavior using improved methodological procedures. First, similar to recent work (e.g., Standage, Sebire, & Loney, 2008) examining the relationships between motivational regulations and exercise behavior, future research might want to advance on the current findings, employing more objective estimates of exercise engagement (i.e., rather than self-reported) before any firm conclusions can be drawn regarding the utility of the "what" in predicting behavioral exercise engagement above and beyond the "why". Second, in doing so, it would be

particularly useful to examine the emotional experience that goes along with exercising, because it is possible that, although relatively intrinsic and extrinsic goal-oriented individuals may not engage in exercise to a quantitatively different degree, the exercise engagement might be associated with more feelings of anxiety and negative affect rather than vitality and positive affect. In line with such a suggestion, Vansteenkiste, Simons, Soenens, et al. (2004) found that the exercise engagement of participants involved in an extrinsic goal framing condition was less authentic relative to those involved in an intrinsic goal condition. Third, longitudinal assessment of exercise engagement would be advantageous, as extrinsic goal valuation might prompt some initial exercise engagement but is unlikely to foster long-term exercise adherence (Vansteenkiste, Simons, Soenens, et al., 2004).

Considering the amount of variance in all assessed outcomes that is accounted for by relative intrinsic goal content and relative autonomous behavioral regulation, it should be noted that in each case relative autonomous behavioral regulation accounted for a greater proportion of variance than did goal content. These findings are in line with those of Sheldon et al. (2004), who found autonomous and controlled reasons to be more strongly predictive of well-being than were goal contents. One reason why this might be the case is that goals are by definition more cognitive in nature, while autonomous and controlled regulations rather reflect subjective experiences, which are more likely to be associated with affective outcomes, such as the ones assessed in the present research. For instance, discriminating attitudes toward obese or less active individuals might be more strongly affected by exercisers' goal content than by their exercise regulation (see Duriez, Vansteenkiste, Soenens, & Dewitte, 2007), an issue that might be investigated in future work.

From an applied perspective, our findings suggest that exercisers and exercise practitioners alike may benefit by paying attention to the explicit content of their own, or their clients exercise goals respectively, in addition to the behavioral regulations attributed to the goals. In future work conducted in ecologically valid exercise settings, researchers may wish to study the degree to which exercise environments, promotion schemes, and practitioners advocate intrinsic and extrinsic exercise goals and the associations that such goal promotions may have with people's exercise goals, behavioral regulation, and the engagement, enjoyment, and experience of exercise participation.

Exercise Goals and Psychological Need Satisfaction

The theoretical tenets put forth in SDT hold that relative intrinsic goal pursuit yields adaptive benefits via the facilitation of psychological need satisfaction (Kasser, Ryan, Couchman, & Sheldon, 2004). This study represents the first attempt to test such reasoning in the exercise domain. It was found that relative intrinsic exercise goals positively predicted psychological need satisfaction. Consistent with the other psychosocial dependent variables in the study, this effect remained significant after controlling for participant's level of self-determination. In line with past work in other physical activity contexts (McDonough & Crocker, 2007; Reinboth, Duda, & Ntoumanis, 2004), psychological need satisfaction was positively predictive of well-being and physical self-worth while being negatively predictive of exercise anxiety.

With regards to mediation, the structural equation modeling analysis showed that consistent with past work and theoretical propositions (Vansteenkiste et al., 2006) psychological need satisfaction partially mediated the effect of relative intrinsic goal content on physical self-worth, exercise anxiety, and well-being. These findings align with hypotheses that intrinsic goals promote an inward orientation and facilitate the satisfaction of one's psychological needs, whereas extrinsic goals are oriented toward external indicators of worth and thus thwart psychological need satisfaction (Deci & Ryan, 2000). Research in the organizational domain (Vansteenkiste, Neyrinck, et al., 2007) has identified mediation of the effects of employment goal content on job-related outcomes by psychological need satisfaction at work; our results suggest that ascribing more importance to intrinsic, relative to extrinsic exercise goals has beneficial effects on outcomes both directly, and indirectly via exercise-based psychological need satisfaction.

When attempting to explain why goals with diverse content might differently satisfy psychological needs, goal content researchers have proposed various cognitive-attentional processes (labeled *micromediation mechanisms*) hypothesized to be proximally related to intrinsic and extrinsic goal pursuit (see Vansteenkiste, Soenens, & Duriez, 2008, for an overview). Specifically, three micromediation mechanisms have been forwarded to help understand the effects of relative intrinsic goal pursuit on basic need satisfaction; that is, the proposition that extrinsic relative to intrinsic, goals (a) focuses people's attention toward factors external to the exercising task, thus undermining a strong absorption in the task at hand (Vansteenkiste, Matos, Lens, & Soenens, 2007), (b) induces stressful interpersonal comparisons within the exercise setting, and (c) promotes a rigid approach to both the exercise activity (i.e., superficial task engagement) and other people in the exercise setting (i.e., objectifying others rather than fostering meaningful relationships). The attentional shift, engagement in social comparison processes, and rigid approach that is more likely to go along with the pursuit of extrinsic, relative to intrinsic, goals might help to explain why extrinsic, relative to intrinsic, goal-oriented individuals fail to get their basic needs for competence, relatedness, and autonomy met. At present, however, research exploring these mechanisms is in its early stages. Therefore, future studies exploring experiences of, and approaches to exercise of those oriented toward pursuit of relatively strong intrinsic or extrinsic exercise goals would help to further develop previously identified processes and perhaps discover alternative micromediation mechanisms.

Limitations

The present results are based on data from a homogeneous sample. As such, future work would do well to extend the findings from our sample to more diverse populations. A second limitation of this work is the cross-sectional study design, meaning directional effects can only be inferred from the hypotheses but were not explicitly tested with the present dataset. Although the tenets set out in SDT and the present findings suggest that relative intrinsic goal pursuit yields psychological need satisfaction, the goal content–need satisfaction relationship is forwarded as bidirectional, such that extrinsic goal pursuit may lead to need satisfaction, or

be compensation for previously thwarted psychological needs (Kasser, 2002; Williams, Cox, Hedberg, & Deci, 2000). Longitudinal research designed to explore the temporal interplay between exercise-related psychological need satisfaction and exercise goal content in naturally occurring exercise contexts may facilitate understanding of the possible cyclical nature of these variables. Finally, the current study and past research exploring the effects of both the *what* and *why* on exercise behavior has employed self-reported measures of exercise behavior/participation (Gillison et al., 2006; Ingledew & Markland, 2008). Future work embracing technological advances in the objective estimation of exercise behavior (see Standage et al., 2008) may assist in further understanding the interrelationships among the *what* and *why* facets of SDT and exercise behavior.

Conclusion

In support of SDT, the present research shows that the content of exercisers' goals can be useful in understanding adaptive psychosocial exercise outcomes, and that such inquiry is informative alongside the study of exercise behavioral regulations. The results also showed that the positive effects of relative intrinsic exercise goal content on physical self-worth, exercise anxiety, and psychological well-being were partially mediated by satisfaction of exercisers' psychological needs. Together, these findings highlight the explicit content of exerciser's goals as worthy of consideration when attempting to understand important outcomes in the exercise domain.

Notes

1. As conceptual clarity is central to the present work, the term *exercise goal content* will be used to refer to the explicit content of exercise goals.
2. A relative extrinsic goal composite variable will give equivalent results to a relative intrinsic goal score but with opposite sign. We decided in this study to focus on the relative *intrinsic* goal perspective.
3. This approach represents a deviation from that used by the authors of the PNSE (Wilson et al., 2006), although past SDT work has employed a composite need satisfaction score (Deci et al., 2001). As such we performed a higher order CFA to investigate whether the three PNSE scores could be represented by a composite need satisfaction variable. After constraining the uniqueness of the competence variable to zero owing to a negative variance estimate, the fit of the model to the data were as follows: $\chi^2(133) = 553.42, p < .001$; CFI = .94; SRMR = .05, supporting the use of a composite psychological need satisfaction variable.
4. We conducted a CFA using the GCEQ and BREQ items simultaneously to explore the constructs representing the "what" and "why". Nine latent variables were specified reflecting the five GCEQ and four BREQ subscales. The fit of the CFA model to the data were good; $\chi^2(524) = 157.40, p < .001$; CFI = .92; SRMR = .06. All items loaded significantly ($p < .001$) on their intended factor with a value of $>.42$ (71% of factor loadings were $\geq .70$). Inspection of modification indices revealed no problematic cross-loading items.
5. Given that exercise behavioral regulation has been found to be predictive of vigorous and purposeful engagement in exercise rather than lower intensity incidental behaviors (Edmunds et al., 2006), we repeated our regression analysis using separate mild, moderate, and strenuous exercise components of the LTEQ. Both relative intrinsic exercise goal content and exercise

RAI were significant and positive predictors of moderate and strenuous exercise engagement intensities. In line with our finding pertaining to total exercise behavior, after entering RAI, the relationship between relative intrinsic goals and both moderate and strenuous exercise behavior indices were no longer significant.

6. At the request of an anonymous reviewer, we repeated the hierarchical regression analysis using individual intrinsic and extrinsic goal content variables at Step 2 and individual autonomous and controlled behavioral regulation variables at Step 3. The results largely replicated the analyses using relative goal content and behavioral regulation variables. Intrinsic goals positively, and extrinsic goals negatively, predicted physical self-worth at Steps 2 and 3. Intrinsic goals negatively, and extrinsic goals positively, predicted exercise anxiety at Steps 2 and 3. Psychological well-being was positively predicted by intrinsic goals and negatively predicted by extrinsic goals at Steps 2 and 3. Exercise behavior was positively predicted by intrinsic goals at Step 2 but not at Step 3. Finally, intrinsic goals were a positive predictor of psychological need satisfaction at Steps 2 and 3 whereas extrinsic goals did not predict this variable. A table of these results is available from the first author on request.

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