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Elucidating the Roles of Motives and Gains in Exercise Participation

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Previous research into the role of exercise motives (what people want from exercise) has overlooked the possible role of gains (what people get) and hence the possible benefits of motive fulfillment (when people get what they want). To redress this imbalance, we examined the additive and interactive effects of motives and subjective gains on exercise-specific outcomes. Young adults ($N = 196$) completed measures of exercise motives and gains, and exercise behavioral regulation, amount, satisfaction, and intention. Four representative motives/gains were selected: appearance, positive health, challenge, and affiliation. Path analysis was used to test the effects of motives, gains, and their products (the interactive effects) on behavioral regulations, and thereby exercise amount, satisfaction, and intention. Controlled regulation increased with appearance motive, unless appearance gain was high. Controlled regulation had a negative effect on exercise satisfaction. Autonomous regulation increased with positive health motive, provided positive health gain was high; with challenge motive and gain; and with affiliation motive. Autonomous regulation had positive effects on exercise amount, satisfaction, and intention. The study corroborates previous findings about the effects of motives. It establishes the value of also studying gains, as moderators of the effects of motives, and in their own right. The findings are interpretable in terms of self-determination theory. Exercise promotion could be more effective if it focused on gains in conjunction with motives.

Keywords: exercise motivation, motive fulfillment, behavioral regulation, satisfaction, intention

Imagine four people. The first begins exercising solely to lose weight, and finds that he/she does lose some weight. The second begins exercising solely to lose weight, but does not find that he/she loses any weight. The third begins exercising for nonweight reasons, and incidentally experiences some weight loss. The fourth begins exercising for nonweight reasons, and does not experience any weight loss. None of the four derive any nonweight benefits from exercise. The first gained what he/she wanted. The third gained something, even if it was not what he/she originally wanted. The second and fourth gained nothing. Consequently, the four individuals would be expected to react differently to their exercise experience. This vignette illustrates the issue addressed in this article. It also, of course, oversimplifies the issue, in that individuals can have motives and gains to varying degrees and in various combinations. Previous research into the role of exercise motives (what people want from exercise) has largely ignored the role of gains (what people get from exercise) and hence the possible benefits of motive fulfillment (when high motive is met by high corresponding gain). The present research aims to redress this imbalance by considering not only the effects of motives but also the effects of gains, including the interactive effects of motives and gains.

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The Role of Participatory Motives

Participatory motives are the contents of individuals' goals for a particular domain of behavior. They are what individuals aim to attain or avoid through participating in the behavior. Markland and Ingledew's (1997) Exercise Motivations Inventory version 2 (EMI-2) distinguishes between 14 specific motives: affiliation, appearance, challenge, competition, enjoyment, health pressures, ill-health avoidance, nimbleness, positive health, revitalization, social recognition, strength/endurance, stress management, and weight management. These specific motives can be aggregated into appearance/weight, social engagement, health/fitness, and enjoyment-related composites (Ingledew & Markland, 2008). Other researchers have made similar distinctions (Duda & Tappe, 1989; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997; Silberstein, Striegel-Moore, Timko, & Rodin, 1988). Such participatory motives have been related to type, stage, and extent of exercise participation. Although appearance-related motives are prominent motives for trying exercise (Ingledew, Markland, & Medley, 1998), other motives involving affiliation, or challenge, or health enhancement are necessary for sustained participation (Frederick, Morrison, & Manning, 1996; Frederick & Ryan, 1993; Gillison, Standage, & Skevington, 2006; Hsiao & Thayer, 1998; Ingledew & Markland, 2008; Ingledew, Markland & Ferguson, 2009; Ingledew et al., 1998; Ryan et al., 1997; Segar, Eccles, & Richardson, 2008).

Markland and Ingledew (2007) have suggested that these participatory motives exert their effects on exercise participation by influencing regulatory motives. In self-determination theory (Deci & Ryan, 2000), regulatory motives are the perceived loci of causality of individuals' behavioral goals. A distinction is made between *extrinsic regulation*, when people engage in an activity as a means of attaining some separable outcome, and *intrinsic regulation*, when people engage in an activity for the inherent satisfaction that they derive from the activity (i.e., because it satisfies basic human needs for autonomy, competence, or relatedness). Extrinsic regulation itself varies in degree of autonomy, from *external regulation*, when behavior is controlled by prospects of being punished or rewarded by external agents, through *introjected regulation*, when those prospects have been somewhat internalized (e.g., as guilt), through *identified regulation*, when the outcomes of the behavior are consciously valued by the individual, to *integrated regulation*, when those outcomes are fully congruent with the individuals' other values. External and introjected regulation are classed as *controlled* forms of regulation, whereas identified, integrated, and intrinsic regulation are classed as *autonomous* forms of regulation. Various instruments have been developed to measure regulatory motives for exercise (Levesque et al., 2007; Li, 1999; Markland & Tobin, 2004). Studies in various populations have related these exercise regulatory motives to exercise participation (reviewed by Ingledew et al., 2009). Generally, the more autonomous the regulation, the more sustained the exercise participation, although identified regulation often has a stronger effect than intrinsic regulation on participation (Teixeira, Carraça, Markland, Silva, & Ryan, 2012; Wilson, Sabiston, Mack, & Blanchard, 2012), perhaps because some populations find aspects of exercise participation inherently unappealing (Ingledew & Markland, 2008) or because some exercise contexts emphasize benefits such as health rather than enjoyment reasons for exercising (Teixeira et al., 2012).

Studies in various populations have related participatory motives to regulatory motives and thereby to participation. In middle-aged women, Segar and colleagues found that clusters with high weight-related motives, compared with some other clusters, had more introjected and less intrinsic regulation (Segar, Eccles, Peck, & Richardson, 2007), and less participation (Segar et al., 2008). In adolescents, Gillison et al. (2006) found that a composite of weight control, attractiveness, and body tone motives was negatively related to relatively autonomous regulation, whereas a composite of fitness, mood, health, and enjoyment motives was positively related to relatively autonomous regulation. Autonomous regulation was in turn positively related to participation. In adult samples, Sebire, Standage, and Vansteenkiste (2009, 2011) found that a variable calculated as the mean of health management, skill development, and social affiliation motives minus the mean of image and

social recognition motives was positively related to relatively autonomous regulation, which in turn was positively related to participation. In office workers, Ingledew and Markland (2008) found that appearance/weight motive (mean of appearance and weight) had a positive effect on external regulation, which in turn had a negative effect on participation. Health/fitness motive (mean of health pressures, ill-health avoidance, nimbleness, positive health, and stress management) had a positive effect on identified regulation, which had a positive effect on participation. Social engagement motive (mean of affiliation, challenge, competition, and social recognition) had a positive effect on intrinsic regulation, but this had no effect on participation. In young adults, Ingledew et al. (2009) found that social recognition motive was associated with greater external regulation, and appearance/weight motive was associated with greater external and introjected regulation, but neither external nor introjected regulation was related to participation. Health/fitness and stress management motives were associated with greater identified regulation, and affiliation and challenge motives were associated with greater intrinsic regulation, and both identified and intrinsic regulation were associated with greater participation. Thus, there is reasonably consistent evidence that image-related motives engender more controlled regulation, whereas health and fitness, affiliation, and competence-related motives engender more autonomous regulation, and more autonomous regulation leads to exercise.

But What About Gains?

Whereas motives are what people seek to attain or avoid through engagement, gains are what they have attained or avoided (Strömmer, Ingledew, & Markland, 2012). This distinction can be found in the literature on prosocial behavior, in which scales measuring motives for volunteering, the Volunteer Functions Inventory, have been supplemented with scales measuring "functionally relevant benefits" or what we would call gains (Clary et al., 1998). We prefer the term gain to the term benefit, so as to avoid possible confusion with perceived benefit. Perceived benefit traditionally refers to what people expect to attain or avoid (Janz & Becker, 1984), whereas gain refers to what people have attained or avoided. We prefer not to add a prefix such as "functionally relevant" or "motivationally relevant" to the term gain, so as to avoid possible confusion with goal attainment or motive fulfillment. Goal attainment refers to people attaining an outcome that corresponds to their original goal (Carver & Scheier, 1998). Similarly, motive fulfillment refers to people experiencing a gain that corresponds to an original motive. However, individuals may experience a gain that does not correspond to an original motive. A distinction can be made between subjective gains and objective gains. Subjective gains are those that an individual appraises as having occurred and as being due to exercise (e.g., I have made new friends through exercise), whereas objective gains would be those that an observer measures by some means and relates to exercise (e.g., the individual's score on a friendship index increased following exercise). Conceptually and empirically, the present study is concerned solely with subjective gains, although we return to the issue of objective gains in the Discussion.

It may not be possible to reach definitive conclusions about the effects of motives without also considering the effects of subjective gains, for two main reasons. First, apparent effects of motives could be spurious because *confounding* effects of gains are ignored. Both motives and gains may influence outcomes. Furthermore, motives and gains may be positively associated, because people who seek something (motive) may be more likely to attain it (gain), or because people who happen to experience and appreciate a benefit of exercise (gain), even one that they had not originally sought, may come to seek it in future (motive). Second, apparent effects of motives could be spurious because *moderating* effects of gains are neglected. Both motives and gains may influence outcomes, but they may do so interactively. For example, individuals who undertake an exercise program to improve their health may react differently depending on the extent to which they perceive that their health has actually improved.

Some findings relevant to these issues can be found in the literature on prosocial behavior mentioned earlier. This research has adopted a functionalist theoretical perspective (Snyder, 2009; Snyder & Cantor, 1998). From this perspective, it is predicted that if motives are met

with corresponding gains, there will be beneficial effects for engagement. Clary et al. (1998, Study 5), in a study of older adults, measured six motives for volunteering (values, enhancement, understanding, protective, social, career), six corresponding gains (which Clary et al. call functionally relevant benefits), and satisfaction with volunteering. They split each motive and corresponding gain at the median, and used a two-way analysis of variance with planned contrast to test whether the high-motive high-gain group was significantly different from all other individuals in terms of satisfaction. For two of the six motives (value and enhancement), people with high motive and high gain did have significantly greater satisfaction. Among younger adults, Clary et al. (1998, Study 6) found that for all of the motives, people with high motive and high gain had significantly greater satisfaction and greater intention to volunteer in the future. Other studies have reported additive effects of motives and gains on satisfaction (Davis, Hall, & Meyer, 2003; Finkelstein, 2006, 2007), but not tested for interactive effects. Studies have also noted strong positive associations between motives and corresponding gains (Davis et al., 2003; Finkelstein, 2006, 2008). Extrapolating to the present study, exercise motives and corresponding gains can be expected to have interactive effects on exercise-related outcomes.

Some relevant findings can also be found in the literature on life goals and well-being. This research has adopted a self-determination theoretical perspective (Deci & Ryan, 2000; Kasser, 2002). From this perspective, it is predicted that both life goal importance (dispositional motive) and attainment (gain) will be beneficial for well-being, but only if life goals are relatively intrinsic in nature. Goals such as personal growth and relationships are classed as intrinsic because they have the potential to satisfy innate needs for autonomy, competence, and relatedness, whereas goals such as wealth and image are classed as extrinsic because they lack this potential. On the whole, research has found that both life goal importance and attainment can enhance well-being, provided goals are relatively intrinsic (Kasser, 2002; Niemiec, Ryan, & Deci, 2009), although tests of interactive effects have not been reported. The concepts of life goal importance and exercise participatory motive are analogous, both being what people want, the former dispositional, the latter domain-specific (Markland & Ingledew, 2007). Indeed, life goal importance has been shown to influence corresponding exercise participatory motives, and thereby regulatory motives and participation (Ingledew et al., 2009). The concepts of life goal attainment and exercise gain are also analogous, both being what people get, although we would not wish to imply that the former influences the latter. Extrapolating to the present study, exercise motives *and* gains can be expected to have beneficial effects on exercise-related outcomes, provided they are intrinsic (e.g., affiliation, challenge) rather than extrinsic (e.g., appearance).

Present Study and Hypotheses

In the present study, we tested the additive and interactive effects of motives and subjective gains on exercise-specific outcomes. The outcome variables included exercise behavioral regulation and exercise amount, commonly found in previous literature on the effects of exercise motives. To these were added intention and satisfaction, commonly found in the previous literature on the effects of prosocial motives. The general model was that motives and corresponding gains would have interactive effects on behavioral regulation, which would in turn influence exercise amount, satisfaction, and intention.

Motives would be represented by the EMI-2 (Markland & Ingledew, 1997) and gains by newly created corresponding scales. Interactive effects of motives and gains would be represented by motive–gain products (Baron & Kenny, 1986). If there were interactive effects, their form would be interpreted. In the absence of interactive effects, main effects would be interpreted. However, it would be unfeasible to include all possible motives, gains, and products in a single analysis, because of the excessive number of predictor variables (42 in all) and the risk of multicollinearity. It would be inadvisable to conduct separate analyses for each motive–gain product, because of the risk of capitalizing on chance and the risk of confounding due to omitted variables. It would be inadvisable to include aggregated motives and aggregated gains, because to do so might mask more specific effects. Therefore, we decided to include only selected motives and correspond-

ing gains. The selection was based on theoretical considerations (Markland & Ingledew, 2007), on empirical groupings of motives (Ingledew & Markland, 2008), and on empirical effects of motives (reviewed earlier). Appearance was selected to represent image-related concerns, likely to produce controlled regulation (Gillison et al., 2006; Ingledew & Markland, 2008; Ingledew et al., 2009; Segar et al., 2007). Positive health was selected to represent health and fitness concerns, likely to produce autonomous (identified) regulation (Gillison et al., 2006; Ingledew & Markland, 2008; Ingledew et al., 2009). Affiliation and challenge were selected as concerns that were likely, through satisfying needs for affiliation and competence, respectively, to produce autonomous (intrinsic) regulation (Ingledew & Markland, 2008; Ingledew et al., 2009).

The specific hypotheses were that:

1. Behavioral regulation would have effects on exercise amount, satisfaction, and intention. Autonomous regulation would have positive effects, whereas controlled regulation would have neutral or negative effects.
2. Motives and gains would have interactive effects on behavioral regulation. Positive health, challenge, and affiliation motives would have positive effects on autonomous regulation, and corresponding gains would augment these effects. Appearance motive would have a positive effect on controlled regulation, and corresponding gain would moderate this effect.

Method

Design and Sample

The study was a cross-sectional questionnaire survey. Ethical approval was obtained from a University departmental research ethics committee. Participants were young adults aged 18 years upward, recruited from communal areas of a British university. Two hundred ten individuals completed the questionnaire, but 14 of these did not complete the gains section because they had not been at all active over the past 12 months. The effective sample size was therefore 196. Of these, 60% were women and 40% men. Mean age was 22.12 years ($SD = 3.08$). Of the sample, 55% belonged to a club for the purpose of participating in sport or recreational physical activity.

Measures in Order of Presentation

Motives for exercise. Participatory motives were measured using the EMI-2 (Markland & Ingledew, 1997). Only the Affiliation, Appearance, Challenge, and Positive Health motive scales were used in the present analyses. The items for these chosen scales are shown in Table 1. The stem was "Personally, I exercise (or might exercise) . . . ." Response options ranged from *not at all true for me* (0) to *very true for me* (5).

Behavioral regulation. Behavioral regulation was measured using the Behavioral Regulation in Exercise Questionnaire version 2 (Markland & Tobin, 2004). The scales were Amotivation, External Regulation, Introjected Regulation, Identified Regulation, and Intrinsic Regulation. Each scale comprised three or four items. The Behavioral Regulation in Exercise Questionnaire version 2 items were intermingled with the EMI-2 items, using the same stem and response options, as in previous research (Ingledew & Markland, 2008; Ingledew et al., 2009). Following common practice (Williams, Grow, Freedman, Ryan, & Deci, 1996), Controlled Regulation was computed as the mean of External and Introjected Regulation, and Autonomous Regulation was computed as the mean of Identified and Intrinsic Regulation.

Exercise amount. Participants were asked "During the past 7 days, how many times did you do each of the following types of exercise for at least 30 minutes?." The three types were "*vigorous exercise*, for example, running, jogging, squash, swimming lengths, aerobics, fast cycling, football," "*moderate exercise*, for example, fast walking, dancing, gentle swimming, golf, heavy housework, heavy gardening (e.g., digging)," and "*light exercise*, for example, walking at an average pace, table tennis, light housework, light gardening (e.g., weeding)." This item was taken from the Welsh Health Survey (National Assembly for Wales, 1999), and was previously used by Ingledew and Markland (2008) and Ingledew et al. (2009). It is akin to the Leisure Time Exercise Questionnaire (Godin & Shephard, 1985). To produce a

Table 1
Confirmatory Factor Analysis of Motive and Gain Items

Variable	Factor							
	Affiliation motive	Affiliation gain	Appearance motive	Appearance gain	Challenge motive	Challenge gain	Positive health motive	Positive health gain
	Item–factor loadings							
To spend time with friends	.86 (.77, .94)							
To enjoy the social aspects of exercising	.84 (.75, .93)							
To have fun being active with other people	.83 (.72, .94)							
To make new friends	.76 (.65, .86)							
It has allowed me to spend time with friends		.90 (.83, .98)						
I have enjoyed the social aspects of exercising		.88 (.79, .97)						
I have had fun being active with other people		.85 (.76, .94)						
I have made new friends through exercise		.83 (.76, .91)						
To help me look younger			.45 (.35, .56)					
To have a good body			.86 (.75, .97)					
To improve my appearance			.91 (.81, 1.01)					
To look more attractive			.90 (.80, .99)					
It has helped me to look younger				.49 (.37, .61)				
It has helped me to have a better body				.73 (.60, .87)				
I have been able to improve my appearance				.87 (.76, .97)				
It has helped me to look more attractive				.91 (.82. 1.01)				
To give me goals to work towards					.69 (.55, .83)			
To give me personal challenges to face					.80 (.69, .92)			
To develop personal skills					.66 (.54, .78)			
To measure myself against personal standards					.58 (.45, .70)			

(*table continues*)

Table 1 (*continued*)

Variable	Factor							
	Affiliation motive	Affiliation gain	Appearance motive	Appearance gain	Challenge motive	Challenge gain	Positive health motive	Positive health gain
It has given me goals to work towards						.83 (.69, .96)		
It has given me personal challenges to face						.78 (.66, .89)		
I have been able to develop personal skills						.67 (.55, .79)		
It has allowed me to measure myself against personal standards						.79 (.68, .91)		
To have a healthy body							.91 (.77, 1.04)	
Because I want to maintain good health							.70 (.58, .81)	
To feel more healthy							.70 (.54, .86)	
It has helped me to have a healthy body								.85 (.73, .97)
It has helped me to maintain good health								.76 (.63, .90)
I have felt more healthy								.60 (.47, .73)
Factor–factor correlations								
Affiliation motive	—							
Affiliation gain	.80 (.73, .87)	—						
Appearance motive	−.06 (−.22, .10)	−.14 (−.30, .02)	—					
Appearance gain	.23 (.08, .39)	.27 (.12, .42)	.62 (.49, .74)	—				
Challenge motive	.46 (.32, .61)	.40 (.25, .55)	.24 (.08, .41)	.51 (.37, .66)	—			
Challenge gain	.42 (.27, .57)	.55 (.42, .68)	.14 (−.03, .31)	.63 (.50, .77)	.80 (.70, .90)	—		
Positive health motive	−.05 (−.22, .12)	−.07 (−.22, .08)	.71 (.59, .82)	.48 (.34, .62)	.27 (.09, .45)	.16 (−.02, .34)	—	
Positive health gain	.26 (.11, .41)	.36 (.22, .51)	.39 (.24, .54)	.81 (.72, .91)	.52 (.36, .67)	.68 (.52, .83)	.60 (.47, .74)	—

Note. $N = 196$. Brackets contain the upper and lower limits of the 95% confidence interval.

score for overall extent of exercise participation, the frequencies of vigorous, moderate, and light exercise were weighted and then summed. The weightings were nine for vigorous exercise, five for moderate, and three for light, based on typical metabolic equivalent ratings (Ainsworth et al., 2000). To avoid undue influence of outliers, the distribution of scores was winsorized: six individuals with scores well in excess of 110 had their scores fixed at 110.[1]

Exercise intention. Participants were asked "On a scale from 0 to 10, how strongly do you intend to exercise regularly in the future?" with anchors of *absolutely no intention* and *strongest possible intention*.

Positive and negative affect. Positive and negative affect were measured using the Positive and Negative Affect Scale (Watson, Clark & Tellegen, 1988). This questionnaire served as a buffer between the motives questions and the gains questions. However, data from the questionnaire were not used in the present analyses because, as measured, positive and negative affect were not exercise-specific, in contrast to behavioral regulation, satisfaction, and intention, which were exercise-specific.

Gains. A gain item was generated to correspond to each EMI-2 motive item. For example, a gain item "[My personal experience of exercise has been that] it has helped me to look more attractive" was generated to correspond to the motive item "[I exercise] to look more attractive." The gain items were of one of the following forms: "I have . . . ," or "I have been able to . . . ," or "It has allowed me to . . . ," or "It has enabled me to . . . ." For each gain item, the choice of form and any further adjustments of wording were determined by consensus between the three authors. The instructions were "This section of the questionnaire can only be completed by people who have some current or recent experience of exercise. So if you have not exercised within the last 12 months, please just put a cross here and skip this section. The questions are about what you have actually gained from exercise. This may be the same or different from what you originally wanted or hoped to gain. Please tell us your personal experience of exercise using the following scale . . . ." The stem was "My personal experience of exercise has been that . . . ." The response options ranged from *not at all true for me* (0) to *very true for me* (4). The order of the gain items was randomized so as to be different from that of the motive items. The items for the gains scales used in the present analyses (Affiliation, Appearance, Challenge, and Positive Health) are shown in Table 1. The motives and gains items together have been branded the Exercise Motives and Gains Inventory (Strömmer et al., 2012), which has been placed in the public domain (http://www.bangor.ac.uk/~pes004/exercise_motivation/scales.htm).

Satisfaction. Participants were asked "Overall, on a scale from 0 to 10, how satisfied are you with your experience of exercise?" with anchors of *not at all satisfied* and *completely satisfied*.

Analytical Procedure

Data preparation. It was necessary first to establish that motive and gain items reflected their intended constructs and that motive and gain constructs were distinct. To this end, the motive and gain items were subjected to a confirmatory factor analysis. The model comprised four motive and four gain factors. All factors were free to covary. Each item was allowed to load on its intended factor and no other. The measurement errors of corresponding motive and gain items (e.g., "To make new friends" and "I have made new friends") were also free to covary, to accommodate their matching content; otherwise measurement errors were not free to covary. Construct reliability was expected to be high, because the motive scales were well established and the gain scales were derived from them. High construct reliability would increase the accuracy of parameter estimation within the limitation of sample size (Gagné & Hancock, 2006). Analysis was in LISREL version 8.72 (Jöreskog & Sörbom, 2005). Maximum likelihood estimation was used, with Satorra–Bentler adjustment of χ^2(Satorra & Bentler, 1994). Fit was deemed adequate if the Standardized Root Mean Square Residual (SRMR) was $\leq$0.09 *and* the Comparative Fit Index (CFI) was $\geq$0.95 (Hu & Bentler, 1999). We also report the Root

[1] Because a few scores were extreme but all scores were plausible, winsorizing was preferable to trimming (losing some individuals) or transforming (changing all scores). Rerunning the path analysis with nonwinsorized data made little difference to parameter estimates and no difference to conclusions.

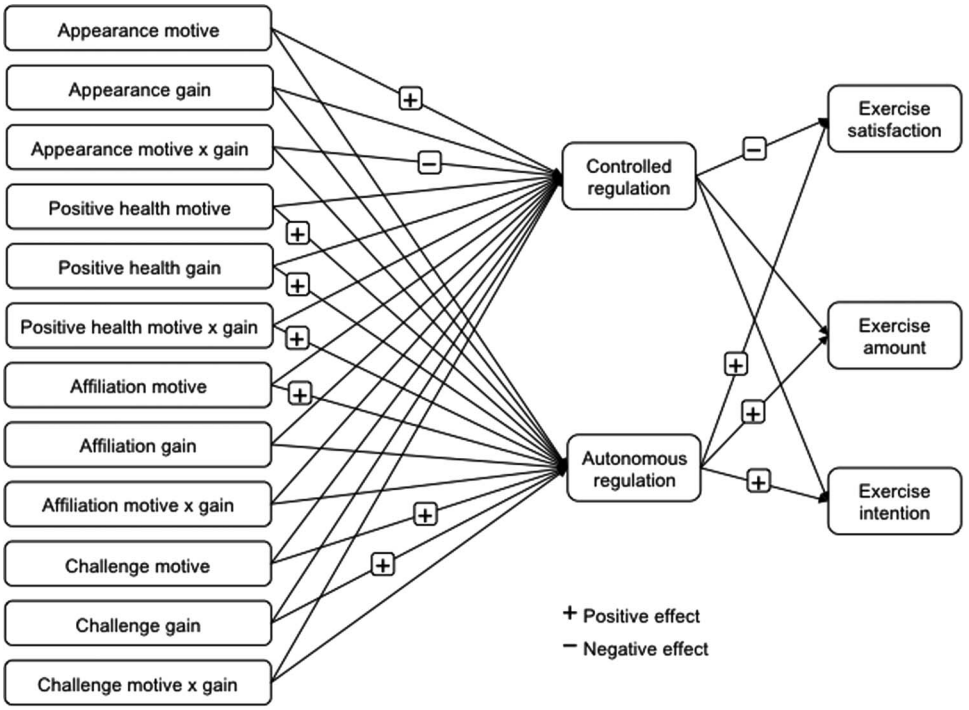

Figure 1. Model showing free paths and salient effects (95% CI excluded zero).

Mean Error of Approximation (RMSEA) and the Non-Normed Fit (Tucker–Lewis) Index (NNFI).[2]

Motive, gain, and motive–gain product variables were prepared for inclusion in structural equation modeling as follows. Only appearance, positive health, challenge, and affiliation were included, for the reasons given earlier. Each scale score was computed as the mean of its item scores. The product of each motive with its corresponding gain was computed. This product was then subjected to residual centering (Little, Bovaird, & Widaman, 2006), that is to say it was regressed onto the motive and gain, and the residuals saved. This residualized product would have no collinearity with the motive or the gain. Means, standard deviations, Cronbach's alphas, and intercorrelations of all variables to be included in the structural equation modeling were examined.

Modeling procedure. The resulting motive, gain, and product variables were included in structural equation modeling with observed variables (path analysis). Modeling with latent variables represented by multiple indicators was precluded by the sample size. Motives, gains, and products were free to influence Autonomous Regulation and Controlled Regulation, which were in turn free to influence Exercise Amount, Exercise Satisfaction, and Exercise Intention, but no direct effects of motives, gains, and products on Exercise Amount, Exercise Satisfaction, or Exercise Intention were allowed (Figure 1). Analysis was in LISREL version 8.72 (Jöreskog & Sörbom, 2005). Again, maximum likelihood estimation was used, with Satorra–Bentler adjustment of χ^2, and fit was deemed adequate if SRMR was $\leq$0.09 *and* CFI was $\geq$0.95. Any interactive effect of motive and corresponding gain was elucidated by examining the simple effect of the motive at different levels of the gain (following Aiken & West, 1991).

[2] RMSEA and NNFI are commonly reported indices, and were requested by a reviewer. However, Hu and Bentler (1999) have found that both these indices tend to overreject true population models when sample size is $<$250, and have cautioned against relying on them in such a situation. Hence our reliance on SRMR and CFI.

Table 2
Reliabilities, Descriptive Statistics, and Correlations of Variables Used in Path Analysis

Variable	Cronbach's alpha	*M*	*SD*	Correlations															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Affiliation motive	.89	1.87	1.15	—															
2. Affiliation gain	.92	2.14	1.30	.75	—														
3. Affiliation motive × gain	—	0.00	1.31	.00	.00	—													
4. Appearance motive	.85	2.21	.99	−.01	−.10	−.19	—												
5. Appearance gain	.83	2.15	.98	.25	.28	−.13	.58	—											
6. Appearance motive × gain	—	0.00	1.08	.05	.06	.11	.00	.00	—										
7. Challenge motive	.77	2.21	0.92	.43	.38	.00	.24	.43	−.07	—									
8. Challenge gain	.85	2.44	1.02	.42	.55	.00	.11	.53	.01	.69	—								
9. Challenge motive × gain	—	0.00	1.02	.01	.02	.33	−.15	−.01	.22	.00	.00	—							
10. Positive health motive	.81	3.23	0.74	−.06	−.07	.00	.58	.37	−.06	.23	.14	−.08	—						
11. Positive health gain	.79	2.80	0.85	.24	.33	.00	.33	.68	−.01	.40	.57	−.03	.51	—					
12. Positive health motive × gain	—	0.00	0.66	−.01	−.03	−.03	.02	.01	.35	−.01	−.05	.17	.00	.00	—				
13. Controlled regulation	.45	1.23	.78	.01	.00	−.16	.43	.14	−.23	.15	.06	−.22	.28	.08	−.11	—			
14. Autonomous regulation	.77	2.58	.92	.45	.46	.03	.20	.46	.03	.60	.67	−.01	.38	.61	.10	.16	—		
15. Exercise amount	—	41.64	24.40	.09	.10	.10	−.01	.16	.06	.25	.33	.06	.06	.22	.00	−.02	.34	—	
16. Exercise satisfaction	—	7.57	1.96	.29	.36	.17	−.01	.38	.11	.42	.57	−.05	.13	.54	.10	−.12	.65	.28	—
17. Exercise intention	—	8.13	1.59	.22	.23	.12	.20	.38	.01	.47	.45	.05	.38	.52	.04	.12	.59	.16	.55

Note. $N = 196$. For correlations .14 or greater in absolute value, the 95% confidence interval excluded zero.

Table 3
Path Coefficients in Path Analysis

Predictor variable	Predicted variable: Controlled regulation (R^2 = .28) Unstandardized coefficient	Controlled regulation (R^2 = .28) Standardized coefficient	Autonomous regulation (R^2 = .63) Unstandardized coefficient	Autonomous regulation (R^2 = .63) Standardized coefficient
Affiliation motive	−0.03 (−0.17, 0.11)	−.05 (−.26, .16)	0.15 (0.04, 0.27)[a]	.19 (.04, .34)[a]
Affiliation gain	0.08 (−0.05, 0.21)	.14 (−.08, .36)	0.01 (−0.10, 0.12)	.01 (−.15, .18)
Affiliation motive × gain	−0.02 (−0.10, 0.06)	−.04 (−.18, .11)	0.02 (−0.05, 0.08)	.02 (−.07, .11)
Appearance motive	0.41 (0.24, 0.57)[a]	.52 (.31, .72)[a]	−0.04 (−0.16, 0.07)	−.05 (−.17, .08)
Appearance gain	−0.17 (−0.37, 0.02)	−.22 (−.46, .02)	−0.07 (−0.21, 0.07)	−.08 (−.22, .07)
Appearance motive × gain	−0.14 (−0.24, −0.04)[a]	−.20 (−.33, −.06)[a]	0.00 (−0.07, 0.08)	.00 (−.08, .09)
Challenge motive	0.03 (−0.13, 0.19)	.04 (−.15, .23)	0.17 (0.03, 0.31)[a]	.17 (.03, .31)[a]
Challenge gain	0.05 (−0.11, 0.21)	.06 (−.15, .27)	0.31 (0.17, 0.45)[a]	.34 (.18, .50)[a]
Challenge motive × gain	−0.07 (−0.17, 0.03)	−.09 (−.22, .04)	−0.02 (−0.11, 0.07)	−.03 (−.13, .07)
Positive health motive	0.07 (−0.12, 0.25)	.06 (−.11, .24)	0.29 (0.13, 0.46)[a]	.23 (.10, .37)[a]
Positive health gain	−0.06 (−0.24, 0.13)	−.06 (−.27, .14)	0.27 (0.11, 0.42)[a]	.25 (.10, .39)[a]
Positive health motive × gain	−0.03 (−0.17, 0.11)	−.03 (−.15, .09)	0.17 (0.04, 0.30)[a]	.12 (.03, .22)[a]
Controlled regulation	—	—	—	—
Autonomous regulation	—	—	—	—

Note. N = 196. Brackets contain the upper and lower limits of the 95% confidence interval.
[a] 95% confidence interval excluded zero.

Results

Data Properties

Table 1 shows the results of the confirmatory factor analysis. The model met the criteria for adequate fit: Satorra–Bentler scaled $\chi^2(362, N = 196) = 503.66$, $p < .01$, SRMR = .07, CFI = .99, RMSEA = .04; NNFI = .98. Items loaded .60 or above on their intended factors, except for the "look younger" appearance motive (.45) and gain (.49) items, which may be less applicable in a youngish adult sample, and the "measure myself against personal standards" challenge motive item (.58). Motive and gain constructs were distinct: The correlations of motive factors with corresponding gain factors were all positive, but the 95% confidence intervals of these correlations had upper boundaries clearly below 1.00. Table 2 shows the internal consistencies, means, standard deviations, and intercorrelations of the variables to be included in the structural equation modeling. Cronbach's alpha was above .70, except for Controlled Regulation (.45, based on External and Introjected Regulation correlating .31).

Modeling Results

The model met the criteria for adequate fit: Satorra–Bentler scaled $\chi^2(40) = 95.37$, $p < .01$; SRMR = .04; CFI = .97; RMSEA = .09; NNFI = .91. We did not attempt to add any paths, because we were wary of capitalizing on chance. Nor did we delete the nonsignificant paths, because the effects of motive, gain, and product had to be tested simultaneously. Figure 1 shows the salient paths (95% CI excluded zero), and Table 3 shows all path coefficients. Autonomous regulation had a positive effect on exercise amount, intention, and satisfaction. Controlled regulation had a negative effect on satisfaction. Affiliation motive, challenge motive, and challenge gain had positive main effects on autonomous regulation. Positive health motive and gain had an interactive effect on autonomous regulation. The effect of positive health motive on autonomous motivation became less positive as gain decreased (Figure 2), becoming nonsignificant when gain fell to 0.63 *SD*s below its mean. Appearance motive and gain had an interactive effect on controlled regulation. The effect of appearance motive on controlled regulation became less positive as gain increased (Figure 3), becoming nonsignificant when gain rose to 1.44 *SD*s above its mean.

Discussion

Main Findings in Relation to Hypotheses

With regard to *Hypothesis 1*, behavioral regulation did have effects on exercise amount, satis-

Predicted variable					
Exercise amount (R^2 = .13)		Exercise satisfaction (R^2 = .49)		Exercise intention (R^2 = .34)	
Unstandardized coefficient	Standardized coefficient	Unstandardized coefficient	Standardized coefficient	Unstandardized coefficient	Standardized coefficient
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
−2.41 (−6.66, 1.83) 9.43 (6.10, 12.75)[a]	−.08 (−.21, .06) .35 (.23, .48)[a]	−0.59 (−0.90, −0.27)[a] 1.46 (1.22, 1.71)[a]	−.23 (−.35, −.11)[a] .68 (.57, .80)[a]	0.05 (−0.16, 0.26) 1.01 (0.81, 1.21)[a]	.03 (−.08, .13) .58 (.47, .70)[a]

faction, and intention. Autonomous regulation had positive effects on amount, satisfaction, and intention, whereas controlled regulation had no effect on amount and intention, and a negative effect on satisfaction. With regard to *Hypothesis 2*, there were two instances of an interactive effect of motive and gain. Appearance motive had a positive effect on controlled regulation, and gain attenuated this effect. Positive health motive had a positive effect on autonomous regulation, and gain augmented this effect. Challenge motive also had a positive effect on autonomous regulation, and gain had an additive but not a moderating effect. Affiliation motive also had a positive effect on autonomous regulation, but gain had no additive or moderating effect.

Theoretical Implications

Previous research into the effects of motives (Ingledew & Markland, 2008; Ingledew et al., 2009) concluded that appearance-related motives generate controlled regulation, that health-related motives generate autonomous (identified) regulation, and that affiliation and challenge motives generate autonomous (intrinsic) regulation. If we had excluded gains from the current analysis (we reran the analyses to see), we would have concluded, similarly, that appearance motive generates controlled regulation, and affiliation, challenge, and positive health motives generate autonomous regulation. By including gains, we get a fuller picture. Appearance motive generates controlled regulation, *unless* gain is high. Positive health motive engenders autonomous regulation, *unless* gain is low. Challenge motive generates autonomous regulation, *regardless* of gain, and gain itself also generates autonomous regulation. Affiliation motive generates autonomous regulation, *regardless* of gain, but gain itself does not generate autonomous regulation.

The findings are on the whole consistent with self-determination theory (Deci & Ryan, 2000), with some post hoc interpretation. Autonomous regulation was productive in terms of participation, intention, and satisfaction, whereas controlled regulation was nonproductive in terms of participation and intention, and detrimental in terms of satisfaction. Seeking challenge (the motive) generated autonomous regulation, perhaps because it has the potential to satisfy the basic human need for competence. Experiencing challenge (the gain) also generated autonomous regulation. However, these effects were not mutually conditional (no interactive effect). Arguably, such lack of conditionality is the essence of intrinsic motivation. Seeking affiliation (the motive) gen-

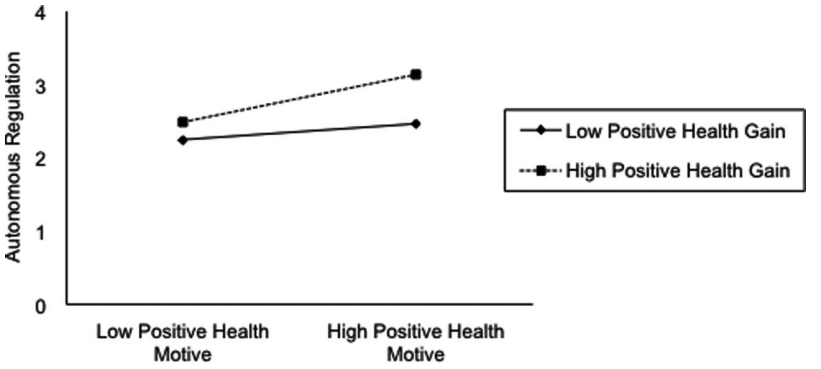

Figure 2. Effect of positive health motive on autonomous regulation when gain is low (1 *SD* below mean) and when gain is high (1 *SD* above mean).

erated autonomous regulation, perhaps because it has the potential to satisfy the basic human need for relatedness. However, experiencing affiliation (the gain) had no effect. This is surprising, although it may be that affiliation gains are actually valued and enjoyed, but not attributed to the exercise itself ("I have made new friends through exercising, which is wonderful, even though I still find the exercise itself a bit of a chore"). Seeking positive health (the motive) has some potential to satisfy basic human needs for autonomy, competence, or relatedness, although less directly than seeking challenge or affiliation. Accordingly, seeking positive health (the motive) tended to generate autonomous regulation, provided there was some experience of positive health (gain). Put another way, the effects of motive and gain were mutually conditional. Seeking positive health without experiencing it (unfulfilled motive) and experiencing positive health without having sought it (unsought gain) were not so autonomously motivating. Appearance motive has little potential to satisfy needs for autonomy, competence, or relatedness. Accordingly, it generated controlled regulation. Appearance gain did not generate further controlled regulation. Rather, it attenuated the detrimental effect of the motive on satisfaction. However, it did not contribute to autonomous regulation, so was still nonproductive in terms of actual engagement in exercise.

Further Research Needed

In the present study, all data were self-report. In particular, the present study considered only subjective gains and not objective gains. The

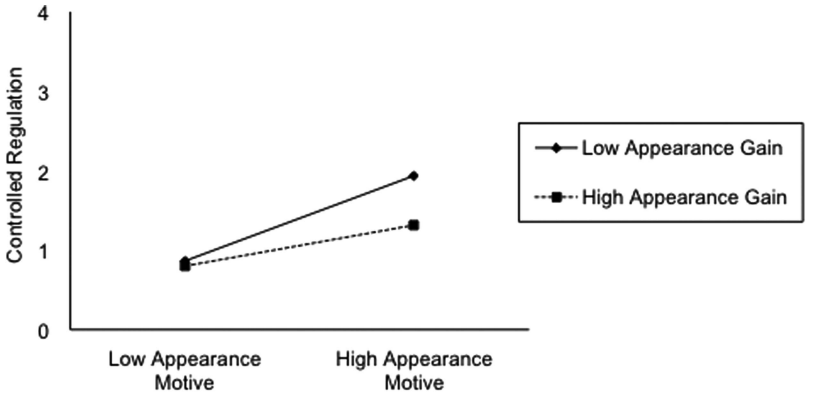

Figure 3. Effect of appearance motive on controlled regulation when gain is low (1 *SD* below mean) and when gain is high (1 *SD* above mean).

model, wherein motives and subjective gains are proximal determinants of behavioral regulation, was consistent with the data and with self-determination theory. Nevertheless, future research should consider how objective gains impact on subjective gains. In the present study, the data were cross-sectional, so causal interpretations are tentative. In particular, the present study was noncommittal about the form of the relationship *between* motives and gains. In the model, motives and gains were free to covary. This they did, strongly and positively. That this was not mere response bias was supported by the confirmatory factor analyses and by the differential effects of motives and gains. Nevertheless, future research needs to explain this covariation. It could be that motives facilitate gains because those with a particular motive are more likely to experience (through exercise) corresponding gains. But it could also or additionally be that gains that were not originally sought are experienced and appreciated, leading to new motives. In short, the present model could be extended to incorporate objective gains, and to include motive–gain feedback loops. Testing such an extended model would require other designs. These could include qualitative designs (e.g., exploring people's experience of change), longitudinal designs (e.g., cross-lagged panel), or experimental designs (e.g., manipulating gains). In the present study, the sample size was modest and the population limited to young adults. Consequently, it was not possible to test for moderating effects of sociodemographic variables such as age, gender, and ethnicity. Future studies should overcome this limitation.

Health Promotion Implications

The present findings lead to some refinement in thinking about interventions (cf., Ingledew et al., 2009), as follows. Adults may consider exercising for a variety of motives (underpinned, according to Ingledew et al., 2009, by dispositional motives). Appearance-related motives are likely to be prominent but not alone among these initial motives. However, even such appearance-motivated individuals may have other less prominent initial motives. Therefore, for those not yet exercising, interventions can highlight a range of possible gains, so as to appeal to a range of possible motives. There can be some emphasis on the possible gains relevant to the most prominent motives, including suggestions for appropriate types of exercise, but there is merit in noting all possible gains. As individuals actually begin to exercise, and gains start to materialize, these gains can be highlighted (through a review of progress). Again, although gains most relevant to initial motives can be emphasized, there is merit in noting all gains. If individuals recognize these other gains as being relevant to them (perhaps because they fulfill other dispositional motives), they may acquire new motives that are more conducive to autonomous regulation.

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