

Research article

Does Body Mass Index Influence Behavioral Regulations, Dispositional Flow and Social Physique Anxiety in Exercise Setting?

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Abstract

The purpose of this study was to examine differences in behavioral regulations, dispositional flow, social physique anxiety of exercisers in terms of body mass index (BMI). 782 university students participated in this study. Dispositional Flow State Scale-2, Behavioral Regulations in Exercise Questionnaire-2, Social Physique Anxiety Scale and Physical Activity Stages of Change Questionnaire were administered to participants. After controlling for gender, analysis indicated significant differences in behavioral regulations, dispositional flow and social physique anxiety of exercise participants with regards to BMI. In summary, the findings demonstrate that normal weighted participants exercise for internal reasons while underweighted participants are amotivated for exercise participation. Additionally, participants who are underweight had higher dispositional flow and lower social physique anxiety scores than other BMI classification.

Key words: Behavioral regulations, dispositional flow, social physique anxiety, self-determination theory, body mass index.

Introduction

Engaging in regular physical activity has yield a number of physiological and psychological benefits (U.S. Department of Health and Human Service, 1996). Although the links between regular exercise and health are well documented, many people are either sedentary or infrequently active to accrue these health benefits (Georgiadis et al., 2001). For example, UK national surveys indicated that 72 % of English; 69 % of the Northern Irish and 61% Scottish populations are highly inactive and are generally failing to meet current physical activity recommendations (Lowther et al., 2007). In their study, Haase et al. (2004) reported that leisure-time physical activity is below the recommended level in university students from 23 countries.

Researchers have interested in the reason of not engaging in physical activity and factors affecting the exercise behavior. Understanding why individuals do not participate in sufficient physical activity is complex and multifaceted-encompassing personal, interpersonal, environmental, and policy determinants (Lovell et al., 2010; Louw et al., 2012).

Body mass index (BMI) is one of the personal factors that may influence the exercise behavior of individuals. Previous studies indicated that BMI is related to changes in lifestyle variables such as exercise behavior

and physical activity level (Dumith et al., 2007; Lahti-Koski et al., 2002). BMI not only influence exercise behavior but it also influence the reason or motives of exercising (Vartanian and Shaprow, 2008).

Self-determination theory (SDT; Ryan and Deci, 2007) is a conceptual framework which is frequently used in exercise setting for studying motivation of exercise participants. According to SDT, motivational states range along a continuum in relation to the degree of self-determination or the extent to which the behavior is regulated by controlling aspects. Amotivation represents one end of the continuum and is a lack all intention to exercise or exercise without intent (i.e., they may “go through the motions”). On the other hand, the continuum lies intrinsic motivation, the most self-determined, or autonomous form of motivation and intrinsically motivated individuals engage physical activity for enjoyment and satisfaction. Extrinsic motivation is in the continuum between amotivation and intrinsic motivation (Ryan and Deci, 2000). Studies have validated the effect of managing the social-contextual variables proposed by SDT in the different exercise promotion setting (Edmunds et al. 2008; Fortier et al. 2007). Therefore, a number of SDT studies have been applied comprehensively in the field of BMI and behavioral regulations in exercise, and these studies have showed the efficiency of SDT to explain the psychological factors relevant to BMI (Hwang and Kim 2013; Williams et al., 1996). Research has shown that the degree of self-determined motivation has been linked with greater diminishment in BMI, and developed persistence at the 23-month follow-up within a weight loss program (Williams et al. 1996).

Importantly, not only behavioral regulations but also the feelings of exercisers such as dispositional flow and social physique anxiety have been influenced by BMI (Greenleaf, 2005; Hausenblas and Fallon, 2002). For example, Fredrickson and Roberts (1997) reported that body shame and anxiety reduce or disrupt awareness of internal bodily states and flow experiences; but less is known about the associations between BMI and optimal psychological states occurring in exercise setting. On the other hand, previous studies clearly reported that BMI influence social physique anxiety (Hausenblas and Fallon, 2002; Sabiston et al., 2005). Research has also shown that social physique anxiety was positively predicted by physical characteristics such as BMI (Haase and Prapavessis, 1998; Thogersen-Ntoumani and Ntoumanis, 2007).

Rising rates of unhealthy behavior (i.e. eating

disorder and obesity) and declining physical activity levels have increased interest in understanding psychological factors that underlay these trends (Haskell et al., 2007). Thereby, to reveal the relationship between the psychological characteristics (i.e. behavioral regulations, dispositional flow and social physique anxiety) and BMI is important in order to use this knowledge to design and implement health programming. Moreover, limited literature is available on the relationship between flow experiences in exercise and BMI. This paper also includes the flow experiences which have not yet to be well studied or understood within exercise psychology framework. In the exercise domain, exercise participation, motivational variables, flow experience and social physique anxiety continue to consistently hold a strong link with health behavior (Pan et al., 2009; Verplanken and Melkevik, 2008). There is a strong necessity for investigating exercise behavior and the role of these psychological characteristics in initiation and maintenance to exercise. Moreover this research would be useful for practitioners working in college health services and recreation centers to understand factors that have an influence on college students behavioral regulations, dispositional flow and social physique anxiety in exercise environments.

In sum, the overall purpose of this study is to examine psychological characteristics of exercisers (behavioral regulations, dispositional flow, and social physique anxiety) in terms of body mass index. It was hypothesized that self-determined exercise motivation (i.e. intrinsic motivation) and dispositional flow would be higher in normal and underweight participants. In contrast, it was expected that non-self-determined motivation (i.e. external and introjected regulation), and in particular amotivation and social physique anxiety would be higher in overweight and obese participants.

Methods

Participants

All questionnaires were administered to 1190 university students who participated voluntarily. Participants were determined in terms of stage of change in exercise. To be eligible for the study, respondents had to be categorized in the preparation, action or maintenance stages of exercise involvement. 782 exercisers ($n_{\text{male}} = 369$; $M_{\text{age}} = 22.42 \pm 2.27$ and $n_{\text{female}} = 413$; $M_{\text{age}} = 21.38 \pm 1.96$) were eligible to data analysis based on their stage of change in exercise. They were aged 17-30 years ($M_{\text{age}} = 21.87$ years, $SD = 2.17$). On average, male exercisers were older than female exercisers and had higher BMI. Most participants were female (53%) and most participants were located in normal category (68%) and 23% of students were overweight and obese, 9% underweight based on BMI.

Instruments

A demographic questionnaire, "Behavioral Regulations in Exercise Questionnaire-2", "Dispositional Flow Scale-2" and "Social Physique Anxiety Scale" were administered to all participants. The details of each questionnaire were as follow:

Behavioural Regulations in Exercise Questionnaire-2 (BREQ-2; Markland and Tobin, 2004):

The 19-item BREQ-2 contains five subscales that measured varying degrees of exercise motivations, namely external, introjected, identified, intrinsic regulations and amotivation (Markland and Tobin, 2004). Former research has provided support for the questionnaire's construct validity and internal reliability (Wilson et al., 2002; Markland and Tobin, 2004). The reliability and validity evidences of the BREQ-2 for Turkish university students were obtained in a study carried out by Ersöz et al., 2012. The Turkish version of BREQ-2 includes four subscales and each subscale contains four items except intrinsic regulation, which includes seven items (Ersöz et al., 2012). The internal consistency coefficient of subscales for current sample were ranged between 0.73 (external regulation) and 0.84 (intrinsic regulation).

The Dispositional Flow Scale-2 (DFS-2; Jackson and Eklund, 2002): DFS-2 includes thirty-six items and is used for assessing individual's tendency in experiencing flow in sport and exercise. The five-point Likert scale with 1 being "never" and 5 being "always." It has nine subscales and the total score of all the items represents the global score for flow disposition. Higher scores correspond to stronger likelihood for experiencing flow in the same activity type (Jackson and Eklund 2002). The reliability and validity of DFS-2 for Turkish sample were determined by Aşçı et al. (2007). The internal consistency coefficient of this scale was 0.82 in this study.

The Social Physique Anxiety Scale (SPAS; Hart et al., 1989): The SPAS self-report measure of social physique anxiety. The original SPAS is a 12-items rated on a 5 point Likert scale, from 1= not at all true to 5= extremely true, with total scores ranging from 12-60 (Hart et al., 1989). In this study, 7-item Turkish version SPAS was used. Composite reliability coefficient of the SPAS is 0.83 for Turkish sample (Hagger et al., 2007). The internal consistency coefficient of subscales was found 0.74 in this study.

Physical Activity Stages of Change Questionnaire (PASCQ; Marcus et al., 1992; Marcus and Lewis, 2003): PASCQ is used to assess individuals' level of readiness to participate exercise. It is a binary type (yes/no) questionnaire. It classifies participants in five stages-of-change: precontemplation (no intention to exercise), contemplation (some intention to exercise), and preparation (exercise some, but not regularly), action (exercise regularly, but for less than six months) and maintenance (exercise regularly for longer than six months) (Marcus et al., 1992; Marcus and Lewis, 2003). Translation and validation study of Turkish version for the university students indicated an evidence for test retest stability (Cengiz, 2007).

Procedure

Questionnaire booklets were distributed to volunteer exercisers at the end of exercise classes. Participants were informed that the instruments contained in the booklet. The names of participants were not recorded. The questionnaire booklet took approximately 15-20 min to complete. To be eligible for the study, respondents had to be categorized in the preparation, action or maintenance stages of exercise involvement based upon the nature of

our sample (i.e. exercisers). BMI was calculated as weight in kilograms divided by square of height in meters. Participants were classified into different BMI groups based on the following criteria: under 18.5 is underweight, 18.5-24.9 is normal, 25-29.9 is overweight, 30 and over is obese (WHO, 2004). Obese and overweight participants grouped together because of the low frequency in categories of obese and overweight exercisers. Participants signed an informed consent form prior to their participation in the study.

Data analysis

The descriptive statistical analyses were conducted to provide information about the overall characteristics of the sample. The differences in behavioral regulations in terms of BMI were tested using Multivariate Analysis of Covariance (MANCOVA). Then, if there were a main effect of group on the MANCOVA, post-hoc univariate Analysis of Covariance (ANCOVA), adjusting for the effect of gender was used to explore between group differences on these sub-scales. Analysis of covariance (ANCOVA) was used to test the differences in social physique anxiety and dispositional flow with regard to BMI. If there was a main effect on the ANCOVA, post-hoc least significance difference tests were conducted. Gender was entered as a covariate in all analysis since previous studies reported gender differences in behavioral regulations, dispositional flow and social physique anxiety in exercise setting (Hagger and Stevenson, 2010; Gillison et al., 2009; Murcia et al., 2008).

The Box's Test of Equality of Covariance Matrices checks the assumption of homogeneity of covariance across the groups using $p < 0.001$ as a criterion. The test is significant ($p = 0.000$). However, as reported by Tabachnick and Fidell (2001), if the larger samples produce larger variances and covariances, then the alpha level is conservative and the null hypothesis can be rejected confidently. In other words, the significant finding of Box's test can be trusted for using MANOVA. In this study, sample size is large and also produces larger variances and covariances. In this case, the use of Pillai's criterion is suggested and the reason Pillai's values were

used.

Results

Descriptive statistics

Means and standard deviation of behavioral regulations, dispositional flow and social physique anxiety in exercisers were shown in Table 1. In general, the participants had low amotivation and external regulation, moderate introjected regulation, high intrinsic regulation and partially high self-determined motivation. Therefore, the means of dispositional flow appears high scores. Lastly, the female participants, who were underweight and normal, reported higher levels of social physique anxiety than overweight and obese exercisers.

Body mass index differences in behavioral regulations

MANCOVA results showed significant differences in the behavioral regulations (*Pillai's value* = 0.02, $F = 2.81$, $p < 0.01$) in exercise with regards to BMI (Underweight, Normal, Overweight and Obese) with η^2 -values of 0.01 each which is not very impressive. The follow up univariate analysis produced significant difference in intrinsic regulation ($F_{(2,778)} = 4.39$, $p < 0.01$, $\eta^2 = 0.01$) and amotivation ($F_{(2,778)} = 5.17$, $p < 0.01$, $\eta^2 = 0.01$) subscales. Participants who have normal weight had higher score in intrinsic regulation and lower score on amotivation than underweight and overweight & obese participants (Table 1).

BMI differences in social physique anxiety and flow state

ANCOVAs with the covariate of gender were performed to test differences in social physique anxiety and dispositional flow state among BMI groups. Results indicated significant differences in the social physique anxiety ($F_{(2,778)} = 4.66$, $p < 0.05$) and flow state ($F_{(2,778)} = 4.25$, $p < 0.05$) with regards to BMI (Underweight, Normal, Overweight and Obese). Participants who are underweight had higher dispositional flow state than overweight & obese. Furthermore, underweight scored lower on social physique anxiety than normal and overweight and obese (Table 1).

Table 1. Means of the subscales of the BREQ-2, Dispositional Flow and Social Physique Anxiety for participants divided by gender and BMI. Data are means (\pm SD).

Group		Behavioral Regulations				Dispositional Flow	SPA
		IR	INR	ER	AM		
Male	U	2.77 (.87)	1.46 (1.04)	.42 (.65)	.44 (.69)	34.34 (5.21)	15.89 (5.84)
	N	2.75 (.88)	1.48 (1.13)	.71 (.85)	.65 (.94)	33.89 (5.08)	16.55 (5.46)
	O&O	2.75 (.88)	1.48 (1.13)	.71 (.85)	.65 (.94)	33.89 (5.08)	16.55 (5.46)
	Total	2.75 (.88)	1.47 (1.06)	.50 (.72)	.51 (.79)	34.31 (5.21)	16.04 (5.75)
Female	U	2.57 (.99)	1.34 (1.06)	.39 (.80)	.61 (.95)	34.00 (5.18)	16.47 (5.12)
	N	2.89 (.88)	1.67 (1.12)	.50 (.73)	.37 (.69)	33.68 (5.24)	18.46 (5.79)
	O&O	2.46 (1.38)	1.38 (.94)	.31 (.35)	.75 (1.34)	38.63 (5.21)	14.25 (6.71)
	Total	2.78 (.92)	1.55 (1.08)	.46 (.72)	.42 (.75)	33.39 (5.38)	18.29 (5.68)
Total	U	2.56 (1.03)	1.35 (1.04)	.38 (.76)	.63 (1.00)	34.56 (5.37)	16.20 (5.33)
	N	2.83 (.88)	1.57 (1.08)	.46 (.69)	.41 (.69)	34.00 (5.23)	17.22 (5.95)
	O&O	2.67 (.91)	1.40 (1.03)	.57 (.78)	.57 (.87)	33.03 (5.47)	17.63 (5.58)
	Total	2.77 (.90)	1.51 (1.07)	.48 (.72)	.46 (.77)	33.82 (5.31)	17.23 (5.82)

IR = Intrinsic Regulation, INR = Introjected Regulation, ER = External Regulation, AM = Amotivation, SPA = Social Physique Anxiety, U: Underweight, N: Normal Weight, O&O: Overweight & Obese

Discussion

In this study, behavioral regulations, dispositional flow state, social physique anxiety of exercisers were investigated in terms of BMI. The finding of this study indicated that BMI influenced the behavioral regulations in exercise. As expected, exercisers in normal weight group displayed a more self-determined and less controlling motivation and amotivation than those in the underweight and overweight and obese groups. The findings of this study were in line with the previous studies which reported the relationship between dissatisfaction with body size and exercising extrinsic reasons such as weight management (Cash et al., 1994; Ingledew et al., 1995; Ingledew and Sullivan, 2002; McDonald and Thompson, 1992; Smith et al., 1998). With respect to results on autonomous motivation, the findings of this study was also supported by the results of Markland and Ingledew (2007)'s study. Markland and Ingledew (2007) indicated that negative relationship between BMI and relative autonomy which means a negative body image leads to less autonomous motivation for exercise which in turn leads to less exercise. The present research's findings were also supported by the results of Ingledew and Sullivan (2002)'s study.

Consistent with the hypothesis of this study, underweight participants had higher dispositional flow state than overweight and obese. Few previous studies (Greenleaf, 2005) have analyzed flow state in the context of exercise associated with BMI. Greenleaf (2005) reported that flow experiences in exercise setting were negatively correlated with BMI. Being underweight may make individuals concentrate on only exercise and it may be a challenge to experience flow. Studies focused on physical appearance argue that body shame and anxiety reduce or disrupt awareness of internal bodily states and flow experiences (Fredrickson and Roberts, 1997) and individuals high in self-objectification tend to have fewer flow experiences (Greenleaf, 2005). These findings supported the findings of the present study.

Findings also revealed that underweight participants had lower score on social physique anxiety than normal and overweight and obese. It is not surprising to find this result because prior studies have shown that BMI has positive relationship with social physique anxiety among exercisers (Hart et al., 1989; Hausenblas and Fallon, 2002; Sabiston et al., 2005; Thøgersen-Ntoumani and Ntoumanis, 2007). Desires for thinness may lead to body-related anxiety as a result of perceptions of excess adiposity or feeling overweight.

Notwithstanding, there have been some limitations of this study and these should be considered in the interpretation of findings. First, the sample consisted of only university students and this limits the generalization of the findings to older or younger exercisers. Another limitation pertains to the cross-sectional nature of the study. Future analyzes should examine the size of the cross-lagged effects between the psychological variables assessed in this study. In addition, BMI does not distinguish between fat and fat-free mass (Prentice and Jebb, 2001). Individuals with a low body fat but high lean body mass can have a high body mass index. Therefore, differ-

ent classification system should be used for determining body fat mass in future studies. Additionally, the use of self-report BMI represents another potential limitation. Future studies should attempt to sample larger groups that are more diverse demographically and in terms of built environment (e.g., rural vs. urban). Finally, more longitudinal study designs and different statistical analyses are needed in order to draw conclusions for the potential link between body size and psychological aspects of exercisers as means to guide future interventions.

Conclusion

It was concluded that after controlling gender BMI influenced behavioral regulations, dispositional flow and social physique anxiety in exercise setting. Exercisers with normal weight more intrinsically motivated to exercise, while underweight participants had higher amotivation, dispositional flow and lower social physique anxiety scores than normal weight, overweight and obese participants.

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Key points

- Normal weighted participants exercise for internal reasons.
- Underweighted participants are amotivated for exercise participation.
- Underweighted participants had higher dispositional flow.
- Underweighted participants have lower social physique anxiety scores than normal weighted, overweight and obese participants.

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