

# Reasons for physical exercise practice in university students according to body mass index

## Motivos para a prática de exercício físico em universitários de acordo com o índice de massa corporal

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### Abstract

The purpose of this study was to identify possible involvement of body mass index (BMI) in identifying the motives which may induce college students to practice physical exercise. A total of 2380 subjects aged 18 to 35 years-old were included in the study. To identify exercise motives we used the version translated into Portuguese of the *Exercise Motivations Inventory* (EMI-2). The statistical treatment of data was performed by univariate and multivariate analysis of variance, in which the exercise motives were the dependent variables and gender and strata of BMI (normal weight, overweight and obesity). The results indicated significant effect of sex (Wilks' Lambda=0.737;  $F_{(10,2369)}=84.736$ ;  $p<0.001$ ) and BMI strata (Wilks' Lambda=0.810;  $F_{(20,6948)}=17.226$ ;  $p<0.001$ ) in the level of importance mentioned by the college students for exercise participation. Motives exercise associated to *Weight Management* ( $F=85.299$ ;  $p<0.001$ ), *Health Rehabilitation* ( $F=12.474$ ;  $p<0.001$ ), *Appearance* ( $F=6.647$ ;  $p<0.001$ ) and *Disease Prevention* ( $F=4.136$ ;  $p=0.002$ ) were significantly higher in overweight and obese college students, whereas college students with normal weight presented significantly higher ratings for *Fun/Wellness* ( $F=8.906$ ;  $p<0.001$ ), *Affiliation* ( $F=5.123$ ;  $p<0.001$ ) and *Stress Management* ( $F=3.269$ ;  $p=0.023$ ). In conclusion, different exercise motives given by normal-weight, overweight and obese college students should be into account in proposing intervention programs in this segment of the population.

**Keywords:** Motivation; Overweight; Obesity.

### Resumo

O objetivo do estudo foi identificar eventual participação do índice de massa corporal (IMC) na identificação dos motivos que podem induzir universitários a prática de exercício físico. Amostra foi constituída por 2380 sujeitos, com idades entre 18 e 35 anos. Motivos para a prática de exercício físico foram identificados por intermédio de versão traduzida do *Exercise Motivations Inventory* (EMI-2). Tratamento estatístico dos dados foi realizado mediante análise de variância univariada e multivariada, tendo como variáveis dependentes fatores de motivação e variáveis independentes sexo e estratos de IMC (peso corporal normal, sobrepeso e obesidade). Os resultados revelaram efeito significativo de sexo (Wilks' Lambda=0,737;  $F_{(10,2369)}=84,736$ ;  $p<0,001$ ) e estratos de IMC (Wilks' Lambda=0,810;  $F_{(20,6948)}=17,226$ ;  $p<0,001$ ) no grau de importância apontado pelos universitários para prática de exercício físico. Motivos para prática de exercício físico associados ao *Controle de Peso Corporal* ( $F=85,299$ ;  $p<0,001$ ), à *Reabilitação de Saúde* ( $F=12,474$ ;  $p<0,001$ ), à *Aparência Física* ( $F=6,647$ ;  $p<0,001$ ) e à *Prevenção de Doenças* ( $F=4,136$ ;  $p=0,002$ ) receberam importância significativamente maior dos universitários com sobrepeso e obesos, enquanto universitários com peso corporal normal demonstraram significativamente maior motivação direcionada à *Diversão/Bem-Estar* ( $F=8,906$ ;  $p<0,001$ ), à *Afiliação* ( $F=5,123$ ;  $p<0,001$ ) e ao *Controle de Estresse* ( $F=3,269$ ;  $p=0,023$ ). Concluindo, diferentes motivos para a prática de exercício físico apontados pelos universitários com peso corporal normal, sobrepeso e obesos devem ser considerados na proposição de intervenções neste segmento da população.

**Palavras-chave:** Motivação; Sobrepeso; Obesidade.

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- Recebido: 02/04/2012
- Re-submissão: 07/06/2012  
23/07/2012
- Aceito: 14/08/2012

## INTRODUCTION

Exercising and nutritional guidance are key procedures aimed at body weight management<sup>1</sup>. In this case, the contribution of exercising should be emphasized, not only because of the greater energy expenditure put into the energy balance equation, but especially because of the favorable adaptations that can lead to the metabolism of energy nutrients<sup>2</sup>. Additionally, apart from the concern for health, Western societies follow aesthetic models promoted by the media, which causes a growing concern about one's image in the search for the "ideal" body. As a result, this compels overweight and obese individuals to become interested in physical activities<sup>3,4</sup>. Studies available in this area show that psychological attributes associated with motivation are important determinants for individuals to begin exercising, adhere to their physical activity practice and minimize abandonment<sup>5,6</sup>. In this sense, several reasons may be associated with exercising. This diversity of reasons is described by many instruments that have been suggested to identify them<sup>7</sup>. Among the existing instruments, the Exercise Motivations Inventory (EMI-2), originally developed in English and subsequently translated into several languages<sup>8</sup> including Portuguese<sup>9</sup>, is widely used, enabling safer and more reliable comparisons among studies as it puts together identical motivational factors<sup>10-15</sup>.

Each reason selected for physical activity practice can act differently, according to the goals and expectations established by those who exercise, thus becoming an important indicator associated with adherence. As an example, Ryan et al. observed that, among individuals who regularly go to fitness centers, the reasons for exercising associated with leisure/well-being and affiliation were more frequently pointed out by those who showed greater adherence to physical exercise programs, unlike the reasons associated with physical appearance and aesthetics<sup>16</sup>. In a longitudinal study, Ingledew, Makland and Medley found that, whereas physical appearance and body weight management were important reasons in the initial stages of physical exercise practice, reasons associated with leisure/well-being and affiliation were more relevant to progress and remain in the program<sup>17</sup>. In addition, Andrade Bastos et al. compared the reasons reported by individuals who regularly walked and practiced gymnastics. Individuals who practiced walking emphasized reasons associated with health and physical fitness as the most important, whereas those who practiced gymnastics mentioned reasons associated with physical appearance and aesthetics as the most important ones<sup>18</sup>.

Consequently, assuming the hypothesis that concern for body weight may represent an intra-personal factor that could change motivational determinants aimed at physical exercise practice, the present study aimed to identify a possible contribution of the body mass index (BMI) to the identification of the reasons that may cause university students to exercise.

## METHODS

The reference population for this study included university students enrolled in 42 undergraduate courses at the Londrina State University. This institution belongs to the State of Paraná Public Higher Education Network and its student community is comprised of nearly 15,000 university students. The sample was obtained from a cluster-based probabilistic process, using the number of students by sex, course, area of study and period of classes (day-time or night-time) as reference.

The sample size was established with a 95% confidence interval, sampling error of 3% and the inclusion of an additional 10% due to losses during data collection. Considering the fact that the sampling plan included clusters, a sampling design effect of 1.5 was defined, when a minimum sample of 2,200 university students was initially expected. However, the final sample used in the data treatment was comprised of 2,380 university students (1,213 women and 1,167 men), 45% of which were aged  $\leq 20$  years, 48% between 21 and 29 years, and the remaining 7%  $\geq 30$  years.

All information associated with reasons for exercising was obtained with the application of the Exercise Motivations Inventory (EMI-2), translated, adapted and validated to be used with the young Brazilian population<sup>9</sup>, with additional questions associated with self-reported height and weight measurements. The BMI was calculated by dividing the body weight in kilograms by the square of the height in meters ( $\text{kg}/\text{m}^2$ ). The following three BMI strata were considered in the analysis:  $< 25 \text{ kg}/\text{m}^2$  (normal weight);  $25\text{-}30 \text{ kg}/\text{m}^2$  (overweight) and  $> 30 \text{ kg}/\text{m}^2$  (obesity)<sup>19</sup>.

The translated version of the EMI-2 is comprised of 44 items, grouped into ten motivational factors that represent a wide range of reasons for exercising defined a priori and validated with confirmatory factorial analysis resources: leisure/well-being, stress management, social recognition, affiliation, competition, health rehabilitation, disease prevention, body weight management, physical appearance and physical fitness. Respondents are expected to state their opinions about the 44 items comprising the inventory, using the Lickert scale of six points (from 0 = "not true at all" to 5 = "completely true") and according to the heading "*Personally, I practice (or could practice) physical activities...*". According to its creators and following the Self-Determination Theory<sup>20,21</sup>, the EMI-2 enables the identification, assessment and ordering of intrinsic and extrinsic motivational factors for exercising.

The assessment instrument was applied individually in only one moment by a single researcher who had been previously trained for this purpose. To achieve this, the groups randomly selected for this study were visited by the researcher, who clarified the study objectives and the principle of confidentiality. The university students who signed the Informed Consent Form received a copy of the EMI-2 with instructions for its completion and information about the researcher's availability for clarification. After being completed and returned, all instruments were stored in a sealed box. Data were collected between May and June 2008.

The statistical treatment of data was performed with the Statistical Package for the Social Sciences (SPSS), version 19.0. The frequency distribution was initially tested with the Kolmogorov-Smirnov test. Considering the fact that the data showed a normal frequency distribution, parametric statistics was used with the calculation of the mean and standard-deviation. Subsequently, multivariate (MANOVA) and univariate analysis of variance (ANOVA) were used to establish comparisons among the strata formed, including the motivational factors as dependent variables and sex and BMI strata (normal weight, overweight and obesity) as independent variables. This was followed by Scheffe's multiple comparison test, which was performed to identify specific differences. The study design was approved by the Londrina State University Human Research Ethics Committee (Official Opinion 214/07).



= 12.474;  $p < 0.001$ ) that were significantly higher than those of students with a BMI  $< 25 \text{ kg/m}^2$ . However, in the case of Stress Management ( $F = 3.269$ ;  $p = 0.023$ ), Leisure/Well-Being ( $F = 8.906$ ;  $p < 0.001$ ) and Affiliation ( $F = 5.123$ ;  $p < 0.001$ ), university students with a normal weight (BMI  $< 25 \text{ kg/m}^2$ ) showed statistically higher mean values than others with overweight ( $25 \text{ kg/m}^2 > \text{BMI} > 30 \text{ kg/m}^2$ ). With regard to Body Weight Management, the mean values observed rose with the increase in the BMI, indicating significant differences among the three strata compared ( $F = 85.299$ ;  $p < 0.001$ ). In terms of the hierarchical organization of the dimensions of mean values of motivational factors for exercising, female students who were overweight or obese pointed to Body Weight Management as the most important factor for physical activity practice. However, students who had a normal weight considered this same factor to be significantly less important.

## DISCUSSION

The present study sought to provide the means for better understanding of motivational factors that may influence the physical activity practice of university students with overweight and obesity, as exercising is an important excess weight prevention and control measure. In both sexes, significant differences in the level of importance given to motivational factors for exercising were identified among university students with a normal weight, overweight and obesity, assessed according to BMI values.

In general, Disease Prevention was the main motivational factor for exercising pointed out by university students. Subsequently, other factors that motivated or could motivate students to exercise were Physical Fitness and Body Weight Management. Leisure/Well-Being and Stress Management were two interesting factors associated with intrinsic motivation, as they were equally considered by students to be more important for exercising, although being significantly less important than the factor traditionally associated with extrinsic motivation (Disease Prevention) and nearly as important as Physical Fitness and Body Weight Management. On the other hand, factors associated with Social Recognition, Competition and Health Rehabilitation were attributed a lower level of motivation for exercising. Physical Appearance and Affiliation were put together into an intermediate group, tending to show lower levels of motivation as well.

These results are similar to those found in the literature, regardless of the assessment instrument used in the identification of motivational factors for exercising. Particularly in the academic world, Ebben and Brudzynski<sup>5</sup> observed that questions about general health and physical fitness were emphasized by university students with regard to exercising. Similarly, in a study conducted with 15,000 adults from 15 European countries, Zunft et al.<sup>22</sup> observed that the reasons most frequently given for exercising were associated with health promotion. Caglar, Canlan and Demir<sup>23</sup> also found that, among adolescents and young adults who regularly went to fitness clubs, the most important reasons for exercising were health promotion and disease prevention.

When the reasons for exercising were associated with the sex of students, researchers observed that women attributed a significantly higher level of importance to Body Weight Management and Physical Appearance than men, whereas these considered Competition and Physical Fitness to be more important reasons. Evidence found in the literature corroborate women's tendency towards greater identification with aesthetic reasons for exercising, unlike men, who tend

to value attributes associated with challenge and personal competence<sup>6,15,18,24-26</sup>. These results are interesting, as they suggest the occurrence of similarities in the level of importance of intrinsic motivation attributes among women and men and the existence of significant differences in extrinsic motivation attributes between sexes.

With regard to the impact that the BMI, an indicator associated with overweight and obesity, can have on motivational factors for exercising, the level of motivation of the two factors associated with aesthetics, Body Weight Management and Physical Appearance, became significantly higher when body weight increased, especially among women. This observation corroborates results from previous studies in terms of the concern for and dissatisfaction with the body image felt by young adults with overweight and obesity<sup>12,27</sup>, which has repercussions on the level of importance given to aesthetic reasons for exercising.

Additionally, health reasons were more valued by university students with excess weight. Students with a BMI  $> 30 \text{ kg/m}^2$  reported being more motivated to exercise for the purpose of Disease Prevention and Health Rehabilitation than others with a BMI  $< 25 \text{ kg/m}^2$ . These findings show that obese students have a clear perception of the health risks of excess body weight and, consequently, could adhere to physical activity practice when motivated for this reason. On the other hand, types of behavior regulated by intrinsic motivational factors, represented by factors associated with Stress Management, Leisure/Well-Being and Affiliation, were more significant motivational agents for university students with a normal weight to exercise or to be able to exercise than those with overweight or obesity.

These findings can be interpreted with the Self-Determination Theory<sup>20,21</sup>. According to this theory, when motivated intrinsically, individuals apparently become involved with physical activities for the inherent pleasure and satisfaction that comes from the practice itself, when in fact this practice fulfills psychological needs for autonomy, competence and self-realization. When extrinsically motivated, individuals basically become involved with physical activities to meet the demands imposed externally or to be rewarded through their practice. Thus, different motivational approaches can lead to distinct cognitive, emotional and behavioral consequences.

Experimental studies have shown that intrinsic reasons for exercising are more likely to continue for a longer period of time than extrinsic reasons<sup>28</sup>. Thus, intrinsically motivated individuals have a higher probability of adhering to their practice than those externally motivated. Supporting these findings, Weinberg and Gould<sup>7</sup> observed that many individuals began to practice physical activities for health and weight loss reasons. However, after a while, few continued exercising regularly unless they found pleasure and satisfaction in their practice.

The present study has certain limitations that must be taken into consideration. It should be emphasized that the data on motivational factors for exercising were self-reported, as were the indicators associated with BMI (body weight and height). However, self-assessment is a procedure found in studies with these characteristics and the most viable way to conduct large-scale surveys. On the other hand, the larger sample size enables a possible lack of accuracy in the estimates calculated to be minimized in a certain way. Additionally, the cross-sectional approach to data could hinder the establishment of associations without considering the possibility of inverse causality.

In conclusion, the pieces of evidence found in the present study point to university students with overweight and obesity tending to identify factors associated with the external dimensions of motivation (Disease Prevention, Health Rehabilitation, Body Weight Management and Physical Appearance) as key motivational agents, whereas university students with a normal weight perceive factors associated with the internal dimensions (Stress Management, Leisure/Well-Being and Affiliation) as the most important motivational agents for exercising. As a result, based on the assumptions of the Self-Determination Theory, the findings of the present study suggest that university students with overweight and obesity could have more difficulty in effectively adhering to physical activity practice as they prioritize extrinsic motivational factors. In this way, it is recommended that motivational strategies that could improve intrinsic motivational factors should be used, apart from focusing on extrinsic motivational factors.

### Author contributions

Dartagnan Pinto Guedes was responsible for the study coordination, participated in all research stages and wrote the final version of the manuscript. Rosimeide Francisco Santos Legnani participated in the field research, data analysis and writing of the manuscript. Elto Legnani participated in the data analysis and writing of the manuscript.

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