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EDUCAÇÃO FÍSICA / PHYSICAL EDUCATION

Is motivation to physical activity practice associated with the lifestyle of individuals who undergo weight training in the context of higher education?

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ABSTRACT. This study aimed at investigating the association between motivation to physical activity practice and the lifestyle of the staff and students from the university known as *Universidade Federal do Vale do São Francisco*, Petrolina-PE, who undergo weight training. The sample comprised 659 subjects. the physical activity and leisure motivation scale, as well as the Fantastic Lifestyle questionnaire were used. Data analysis was carried out by using Kruskall-Wallis, Mann-Whitney, Spearman correlation and Path Analysis ($p < 0.05$). Considering all the subjects of the present research, the results showed that the highest motivation indexes were related to health/fitness issues, and the lowest ones with the social factor. It is worth mentioning that the students, when compared to the administrative staff and professors, are more motivated to practice physical activity for having fun and improving their physical appearance, in addition to making new friends. The health/fitness and appearance factors had a significant impact on the lifestyle of the professors, whereas fun/interest had a significant impact on the lifestyle of the students. It was concluded that intrinsic motivation is intervenient in the sense that students develop healthy habits. On the other hand, autonomous motivation shall influence the increase healthy behavior among the professors, whereas extrinsic motives may discourage a healthy lifestyle.

Keywords: physical activity; motivation; lifestyle; university; healthy behavior.

A motivação para prática de atividade física está associada ao estilo de vida de praticantes de musculação no contexto do ensino superior?

RESUMO. Este estudo investigou a associação entre a motivação à prática de atividade física e o estilo de vida de servidores e alunos praticantes de musculação da Universidade Federal do Vale do São Francisco, Petrolina-PE, sendo a amostra constituída por 659 sujeitos. Os instrumentos utilizados foram a escala de motivação à prática de atividades físicas e o questionário 'Estilo de Vida Fantástico'. Na análise dos dados, utilizou-se o teste de *Kruskall-Wallis*, *Mann-Whitney*, a correlação de *Spearman* e a *Path Analysis* ($p < 0,05$). Os resultados evidenciaram que os maiores índices de motivação foram encontrados no quesito saúde/fitness e os menores no fator social para alunos, técnicos e docentes, sendo que os alunos são mais motivados a praticar atividades físicas por diversão, pela aparência física e para fazer novas amizades em comparação aos docentes e técnicos. Os fatores de saúde/fitness e aparência apresentaram impacto significativo sobre o estilo de vida dos docentes, e o fator diversão/interesse apresentou impacto significativo sobre o estilo de vida dos alunos. Concluiu-se que a motivação intrínseca é interveniente no desenvolvimento de hábitos saudáveis em alunos. Já para os docentes, a motivação autônoma pode influenciar o aumento do comportamento saudável, enquanto motivos extrínsecos podem levar à redução dos hábitos saudáveis.

Palavras-chave: motivação; estilo de vida; universidades; comportamentos saudáveis; exercício.

Introduction

Data from the National Health Interview Survey (NHIS) indicate that the Brazilian population has shown a high prevalence of risk factors for noncommunicable chronic diseases in adults with an unhealthy lifestyle (Malta et al., 2015). This scenario is reflected in the academic population, since lack of adoption of healthy behavior by professors and students has also generated low lifestyle standards (Brito, Gordia, & Quadros, 2014).

Research indicates that the main attitudes harmful to health and, consequently, to healthy lifestyle in higher education are the following: high consumption of alcohol and tobacco (Joia, 2010), inadequate eating habits (Martins, Martins, Prates, & Martins, 2012), high stress levels (Both,

Nascimento, & Bogatto, 2008; Barbosa et al., 2015), extended working hours, the temporary withdrawal from family and social peers (Soares & Campos, 2008), and, mainly, the low physical activity levels (Sousa, Mororó, & Barbosa, 2013, Felden, Ferrari Junior, Andrade, Claumann, Pelegrini, & Teixeira, 2015).

On the other hand, the adoption of a lifestyle that includes a regular physical activity practice is associated with several benefits for the physical and psychological health of the individuals (Guedes, Santos, & Lopes, 2006), such as the benefits for the body image (Gonçalves, Campana, & Tavares, 2012; Homan & Tylka, 2014), a better lifestyle (Silva, Silva, Silva, Souza, & Tomasi, 2010; Martins et al., 2012; Dyrbye, Salete, & Shanafelt, 2017), stress reduction (Childs & Wit, 2014; Barbosa et al., 2015), control of anthropometric variables and blood pressure (Howden et al., 2013; Numata Filho, Araújo, Cruz, Araújo, & Moreira, 2016), which leads to the prevention of non-communicable chronic diseases, as hypertension and diabetes (Pitanga, Almeida, Freitas, Pitanga, & Beck, 2014; Chen et al., 2015; Peres, Guedes, Sá, Negrato, & Pereira, 2016).

Motivation is one of the main variables related to the adherence and permanence in physical activity programs (Kinnafick, Thøgersen, & Duda, 2014; Santos et al., 2015), which may differ according to the reality of each subject, as suggested by the Self-Determination Theory-SDT (Deci & Ryan, 1985). The SDT has been the most used theoretical basis for assessing human motivation, which shows great representativeness in the context of exercise and physical activity (Meurer, Benedetti, & Mazo, 2012; Matias, Viana, Kretzer, & Andrade, 2014; Silva, Castanho, Chiminazzo, Barreira, & Fernandes, 2017).

In addition, the SDT is related to the development and functioning of the human personality in different social contexts, postulating that behavior can be regulated from a *continuum* that varies from demotivation (lack of motivation), passing through extrinsic motivation (EM) to self-determination (Intrinsic Motivation-IM), which is the best psychological condition for practicing exercise (Ryan & Deci, 2000; Deci & Ryan, 2012). IM is linked to the subject's permanence in the physical activity practice, whereas EM shall play a negative role, leading to long-term abandonment (Aitken, Pelletier, & Baxter, 2016)

The EM is characterized by regulated behavior controlled by external demands, such as obtaining rewards and/or avoiding punishments (external regulation), by suffering with internal thoughts of rules and duties (introjected regulation), as well as by the importance that the task has in the individual's life (identified regulation) or by the identification with other aspects of his/her personality (integrated regulation) (Deci & Ryan, 2012; Vansteenkiste, & Ryan, 2013). According to the SDT, the controlled (external and introjected) regulations have no relation to adherence, whereas autonomous (identified and integrated) regulations are associated with behavioral changes (Ryan, Patrick, Deci, & Williams, 2008).

The micro-theory of basic psychological needs, included in the SDT, postulates that the satisfaction of the needs related to autonomy, competence and social relationships is determinant for the individuals' engagement in the task, as well as for achieving the motivation intrinsic regulation (Deci & Ryan, 2008). Therefore, when intrinsically motivated for a given task, the individual shows autonomous behavior, performing it in a pleasurable way and by his/her own will, which is based on the needs of feeling competent and self-determined. As a consequence, there is a greater possibility that the individual remains practicing physical activities and, consequently, maintaining a healthy lifestyle (Deci & Ryan, 2000).

Several studies have shown the importance of IM for physical activity practice (Guedes, Legnani, & Legnani, 2012; Passos, Passos, Chaves, Portes, & Oliveira, 2016) and a healthy lifestyle (Malta et al., 2015; Barbosa et al., 2015; Nogueira, Rossato, Soares, Bezerra, & Moraes, 2017) in relation to the general and academic population. However, no study was found that had identified the direct impact of motivation to the physical activity practice on lifestyle, and, thus, this is the gap that the present study aims at exploring. Therefore, this research is relevant in the sense that it shall aggregate knowledge and guide the work of health professionals, especially the physical education professionals and psychologists involved in physical activity related to health, which enables the creation of new public policies and interventions within universities.

In view of the considerations above, this study aimed at investigating the association between motivation to physical activity practice and the lifestyle of the individuals who undergo weight training in the context of higher education.

Material and methods

Subjects

All the students, professors and administrative staff who undergo weight training and are part of the Extension Project referred to as *Academia Universitária* (University Academy) from the university known as *Universidade Federal do Vale de São Francisco* (UNIVASF), Petrolina city, state of Pernambuco, (PE) were invited to participate in this cross-sectional study with a total of 702 subjects. However, 43 individuals were excluded from the study because they did not answer all the questionnaires. Therefore, 659 subjects were included

in this research, 460 students (24.41 ± 5.59 years), 49 professors (38.82 ± 8.82 years) and 150 individuals who are part of the administrative staff (36.10 ± 9.06 years) of both sexes (270 men and 389 women). The sample was non-probabilistically and conveniently selected. All the participants voluntarily signed the free informed consent form (FICF).

Instruments

In order to measure motivation to physical activity practice, the physical activity and leisure motivation scale (PALMS-26) (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997), validated for the Brazilian context by Gonçalves and Alchieri (2010), was used. This instrument has been developed based on the SDT and comprises 30 items that measure the motivation to physical activity practice regarding five factors (fun, competence, appearance, health and social status). The items are answered on a 7-point likert scale ranging from 1 = strongly disagree to 7 = strongly agree. The higher the score in each dimension the higher the motivation level.

Lifestyle was assessed through the fantastic lifestyle questionnaire (Añez, Reis, & Petroski, 2008), which evaluates the habits and behavior of the target population in relation to the appropriate health lifestyle. The questionnaire has 25 items that explore nine domains of physical, psychological and social components of lifestyle. It is identified with the acronym 'FANTASTIC': (F) family and friends; (A) activity/associativism; (N) nutrition; (T) tobacco; (A) alcohol and other drugs; (S) sleep/stress; (T) type of behavior; (I) insight; (C) - career/work. Such items have five response options with a numeric value ranging from 0 for the first column to 4 for the last column. The sum of all scores resulting from all domains enables reaching a global score that ranks individuals from 0 to 100 points, and the closer to 100, the better the lifestyle.

Procedures

The procedures used in the present study were based on the Ethical Conduct in Human Research according to Resolution Nº. 466/12 of the National Health Council. This research is integrated to the Extension Project referred to as *Academia Universitária* (University Academy) under Opinion nº383969/2010 of the Human Research Ethics Committee of UNIVASF, Petrolina-PE. Initially, authorization from the coordination of the extension project was requested. Data collection was carried out in the first half of 2015, at the university and at the locations where such a project were being developed. The subjects were invited to participate in the study by signing the Free Informed Consent Form. The questionnaires were collectively applied in a private room, individually filled in on average for 30 minutes. The order of the questionnaires was randomized among the participants.

Data analysis

Preliminary data analysis was carried out by using the Kolmogorov-Smirnov normality test. Since the data did not have a normal distribution, median (Md) and quartis (Q1-Q3) were used. For comparing the groups (students, professors and administrative staff), the Kruskal-Wallis test was used, followed by the Mann-Whitney U test for pairs of groups. Spearman's rank correlation ($p < 0.05$) was used to evaluate the relationship between the motivational factors and the subjects' lifestyle. Such analyzes were carried out with the SPSS software version 22.0.

In order to verify the impact of body satisfaction on the lifestyle of the students, professors and administrative staff, multiple regression models were used with the variables that obtained a significant correlation ($p < 0.05$). The existence of outliers was assessed by using the Mahalanobis square distance (MD^2). The univariate normality of the variables was verified by applying the univariate and multivariate asymmetric coefficients ($ISkI < 3$) and kurtosis ($IKuI < 10$). Since the data did not have a normal distribution, Bollen-Stine Bootstrap method was used to correct the value of the coefficients estimated by the Maximum Likelihood Method implemented in AMOS software version 22.0. In order to verify the suitability of the sample for the analysis, the Bootstrapping technique (Maroco, 2010) was applied. There were no MD^2 values indicating the existence of outliers or sufficiently strong correlations among the variables that indicated multicollinearity (variance inflation factors < 5.0). Based on the recommendations by Kline (2012), the regression coefficients were interpreted as having little effect for coefficients < 0.20, medium effect for coefficients up to 0.49 and strong effect for coefficients > 0.50 ($p < 0.05$).

Results

In general, the students and staff who undergo weight training showed the following motivational scores for physical activity practice: health/fitness (Md = 6.57); fun (Md = 5.50); appearance (Md = 5.00); competence (Md = 5.00); social status (Md = 4.00). It is worth mentioning that the most relevant reasons are those referring to the intrinsic factors (health and fun). Regarding lifestyle, the sample showed a good lifestyle (Md = 71.00). Table 1 highlights that the students showed a significant difference in relation to the professors and administrative staff in what regards the motivational factors of fun and interest, physical activities ($p = 0.001$), appearance ($p = 0.001$) and competence ($p = 0.001$).

Table 1. Comparison between motivation to physical activity practice and the lifestyle of the students and staff from UNIVASF who underwent weight training during the first semester of 2015 (n = 659).

Variables	Students (n = 460)	Professors (n = 49)	Administrative staff (n = 150)	*p*
	Md (Q1-Q3)	Md (Q1-Q3)	Md (Q1-Q3)	
		Motivation		
Fun and interest	5.63 (4.91-6.13)[a/b]	5.25 (4.50-5.75)[a]	5.44 (4.85-6.00)[b]	0.001★
Health and fitness	6.57 (6.00-6.86)	6.43 (6.14-6.86)	6.57 (6.14-6.86)	0.464
Appearance	5.25 (4.50-6.00)[a/b]	4.50 (3.87-5.25)[a/c]	5.00 (4.19-5.50)[b/c]	0.001★
Competence	5.33 (4.00-6.00)[a/b]	4.33 (2.83-5.33)[a]	5.00 (3.33-5.75)[b]	0.001★
Social status	4.00 (3.00-4.75)[a]	3.25 (2.25-4.50)[a]	4.00 (2.69-4.75)	0.032★
Lifestyle	71.00 (64.00-76.00)	72.00 (64.50-77.00)	72.00 (65.00-78.00)	0.234

★Significant difference – $p < 0.05$ (Kruskal-Wallis Test followed by Mann-Whitney U Test) between: a) Students and Professors; b) Students and Administrative Staff; c) Professors and Administrative Staff. Md = Median; Q1 = First Quartile; Q3 = Third Quartile.

There was also a significant difference in relation to the social factor ($p = 0.032$) between students and professors (Table 1). There was no significant difference for the motivational factor of health and fitness ($p = 0.464$) and lifestyle ($p = 0.234$) between the groups.

When assessing the correlation between the motivational factors and the students' lifestyle (Table 2), there was a significant ($p < 0.05$) and weak correlation ($r < 0.40$) between lifestyle and fun ($r = 0.30$) and competence ($r = 0.31$). Among the professors, there was a significant correlation between lifestyle and health ($r = 0.31$) and appearance ($r = -0.30$). No significant correlation ($p > 0.05$) was found among the variables for the administrative staff.

Table 2. Correlation between the motivational factors and lifestyle of the students from UNIVASF who underwent weight training during the first semester, 2015 (n = 659).

Dimensions	Fun	Health	Appearance	Competence	Social status
Lifestyle					
Students (n =4 60)	0.30★	0.12	-0.08	0.31★	0.01
Professors (n = 49)	0.25	0.31★	-0.30★	0.25	-0.27
Administrative staff (n = 150)	0.02	0.04	-0.10	0.14	-0.04

★ Spearman's Rank Correlation Coefficient: $p < 0.05$.

In order to verify the association magnitude of the motivation factors with the physical activity practice in relation to the lifestyle of the students and professors (Figure 1), after the correlation analysis, a regression model was carried out among the variables that had shown a significant correlation ($p < 0.05$).

The model performed for the students showed that the fun/interest and competence factors explain 9% of the variability of lifestyle perception (Figure 1). Regarding the individual trajectories (Table 3), the fun factor/interest trajectory showed a significant effect ($p = 0.01$), however, the competence factor trajectory was not significant ($p = 0.186$). It should be emphasized that the increase in motivation for fun has a moderate effect ($\beta > 0.20$) on the students' perception of lifestyle, that is, the increase of 1 standard deviation in the motivation unit for fun causes an increase of 0.21 standard deviation in the lifestyle unit.

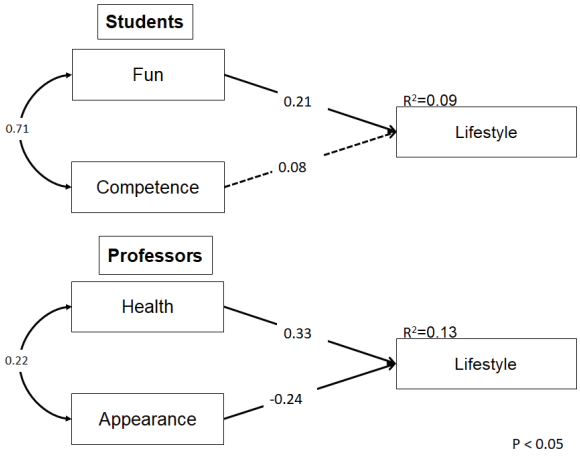

Figure 1. Association model between the motivational factors and the lifestyle of the students and professors from UNIVASF who undergo weight training.

Table 3. Results of the multiple linear regression of the variables with a significant correlation according to the bivariate analysis of the students and professors.

Predictive variable	Outcome variable	r	ß	r^2	Standard error	Critical ratio	p
Students							
Fun and interest	Lifestyle	0.30	0.21	0.09	0.59	3.37	0.001★
Competence		0.31	0.08		0.41	1.32	0.186
Professors							
Health and fitness	Lifestyle	0.31	0.33	0.13	2.34	2.38	0.017★
Appearance		0.30	0.24		1.67	-2.04	0.045★

When assessing the model in relation to the professors, it was verified that the health/fitness and appearance factors explain 13% of the variability of lifestyle perception (Figure 1). Regarding the individual trajectories (Table 3), it was seen that the trajectory of the health/fitness factors and appearance had a significant effect ($p < 0.05$). On the one hand, the increase in health/fitness motivation has a moderate effect ($\beta > 0.20$) on the students' lifestyle perception, that is, the increase of

one standard deviation in the health motivation unit causes an increase of 0.33 standard deviation in the lifestyle unit. On the other hand, the increase in appearance motivation has a moderate ($\beta > 0.20$) and negative effect on the students' lifestyle perception, that is, the increase of one standard deviation in the appearance motivation unit causes a reduction of 0.24 standard deviation in the lifestyle unit.

Discussion

Based on previous research, the present study could go further in investigating the impact of motivation to physical activity practice on lifestyle, in addition to comparing the motivation and lifestyle of the individuals in the context of higher education who undergo weight training. In general, the motivation to practice physical activities for fun/interest was positively associated with the students' lifestyle. Moreover, concern on health and appearance was associated with the professors' lifestyles. The highest motivation rates were found for the health/fitness issue and the lowest ones for the social factor.

It should be highlighted that the fun/interest factor was determinant for the increase of the students' healthy lifestyle (Table 3). This variable represents the motivation intrinsic regulation; the students believe that activity is intrinsically rewarding and its practice provides pleasure (Ryan & Deci, 2000). Although the competence factor did not have a significant effect on lifestyle (Figure 1), a correlation was found among the variables (Table 2). As the micro-theory on psychological basic needs states (Deci & Ryan, 2008), competence perception is directly associated with IM, and it is facilitated by autonomy. Therefore, once they feel autonomous, the individuals are voluntarily engaged and more likely to apply new competences, which make them more comfortable in the social environment, and able to reach the IM, thus, improving their lifestyle (Ryan et al., 2008). Considering the administrative staff, motivation was not an intervening factor for a healthy lifestyle (Table 2).

Regarding the professors, the factors related to health/fitness were predictors of a higher healthy lifestyle perception (Table 3). This association indicates the stage of behavior change, since the individuals are aware of the importance of physical activity (integrated regulation) for the maintenance of their health (Ryan et al., 2008). This regulation has already been considered an intrinsic form of motivation (Deci & Ryan, 2012). Another relevant finding concerns the negative correlation between extrinsic motivation and lifestyle, evidencing that the higher the concern with appearance, the lower the professors' lifestyle perception (Table 2). According to the SDT, the interest in exercise motivated by aesthetic factors refers to behavior controlled by external factors (external regulation), in which participation in an activity occurs so as to obtain social approval (Deci & Ryan, 2000). It is worth mentioning that such findings prove that the IM of the students to practice physical activity is determinant for a healthy lifestyle, whereas for the professors, the EM shall be considered harmful to a healthy lifestyle.

Another interesting result concerns the relevance of the motivational factors for the physical activity practice in the university context. Health/fitness was the most important factor for all the subjects, which shows internalization at an integrated level, since the individuals may perceive the importance of physical activity for their lives, indicating a change in behavior (Deci & Ryan, 2008). The social factor was the least relevant one, which highlights that the individuals had low levels of extrinsic motivation, that is, there was not much concern in practicing physical activity to gain social media approval (Deci & Ryan, 2000). These results corroborate with another study (Guedes et al., 2012), in which the main motivational factors were 'disease prevention' and 'physical condition', and 'social recognition' was the least important one. In addition, a study carried out with some students, professors and administrative staff of a Higher Education Institution (Costa, Samulski, Noce, & Costa, 2012) corroborated with the present study by showing that 'health' is the most significant factor for the professors and administrative staff, and 'increasing the social status' was the least one.

Considering the comparison among the groups (Table 1), the students are in evidence in what concerns the fun/interest, appearance and competence variables in relation to the professors and administrative staff, which shows the prevalence of autonomous behavior on the part of the students, besides a greater concern with aesthetics. Some of these results corroborate with other findings (Costa et al., 2012), who pointed out that fun-related factors were more significant for students compared to the professors and administrative staff. The social factor was higher for the students only in relation to the professors, which shows that making friendship and having social relationships is more relevant for the students than for the professors, when considering the practice of physical activities. In addition, health and fitness motivation was similar for both groups, evidencing that despite the factors associated with being students, professors or

pertaining to the administrative staff, all of them showed a concern to perform physical activity as a means of improving health.

Lifestyle was similar in all groups (Table 1), showing a very good level for the population investigated (Añez et al., 2008). This factor may be associated with the fact that the individuals had necessarily been practicing physical activity. Therefore, as the subjects were already physically active, their lifestyle levels are not low, since practicing exercise is one of the most relevant factors for a healthy lifestyle (Silva & Petroski, 2011). These results corroborate with another study by Venturim and Molina (2005), which showed that after six months of an exercise orientation service, the subjects significantly improved their lifestyle.

Finally, it should be emphasized that despite the contributions of the findings of the present study, there are some limitations. Initially, only one modality was investigated, which makes it impossible to generalize the findings for the other modalities. It is also worth mentioning that the data collection was carried out in only one university in the Northeast region, thus, such variables may differ from the reality of other institutions. In addition, only the motivation impact was investigated, thus, other variables may also influence lifestyle. At long last, the cross-sectional characterization was used, which limits the analysis to a specific moment of time. Therefore, it is suggested that further investigations include other modalities of exercise, so that the motivation shall play a different role according to the individualities of the modalities. Other variables that shall bring more information about the lifestyle should also be included, in addition to applying longitudinal cuts to verify the real cause and effect relationship among the variables.

Conclusion

Intrinsic motivation to physical activity practice is an intervening factor so that the students develop healthy habits and behavior. Considering the professors, autonomous motivation may influence the increase of healthy behavior, whereas extrinsic reasons may lead to a reduction in healthy lifestyle. Regarding a practical application, findings contribute to the creation of public policies and projects that shall provide access to physical activities in the university environment, with interventions aimed at promoting a healthier lifestyle. Such interventions should be provided by health professionals, who should teach the individuals the role of physical activity for maintaining health, and encourage the adoption of a healthy lifestyle.

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