Reasons to exercise among college men from Argentina, Brazil, United States of America and France

Pedro Henrique Berbert de Carvalho,
Aline Cavalcante de Souza,
Marle dos Santos Alvarenga

Abstract

This study aimed to evaluate the relationship between reasons for exercising, the body mass index and concerns about exercise routine, food and appearance among male college student from Argentina, Brazil, France and the USA. Five hundred sixty nine male college students (18-30 years old) answered an online questionnaire composed of sociodemographic questions, nutritional status, physical exercise data and eating attitudes. The effect of the country, type of exercise and reasons for exercising over other variables were evaluated by generalized linear models; and the evaluation of categorical variables associations was done by Pearson Chi-square Test. The interaction's effect of the country and the main reasons for exercising over the concerns about food and appearance was greater than the effect of each variable individually (r^2 = .051; p < .05), and it was also observed with regard to BMI (r^2 = .073; p < .05). Our results showed that there were some similarities in the relationship between college students and physical exercise. However, the differences observed were related to the interactions of the country with the main reasons for exercising (or the main type of exercise) that showed the greatest effects over BMI and concerns about exercise routine, food and appearance.

KEYWORDS: Physical activity, Health, Physical appearance, Higher education, Cross-cultural comparison.

Razões para se exercitar entre homens estudantes da Argentina, Brasil, Estados Unidos da América e França

Pedro Henrique Berbert de Carvalho, Aline Cavalcante de Souza, Marle dos Santos Alvarenga

Resumo

Este estudo teve como objetivo avaliar a relação entre as razões para se exercitar, o índice de massa corporal e as preocupações com a rotina de exercícios, alimentação e aparência física de jovens universitários do sexo masculino da Argentina, Brasil, França e EUA. Quinhentos e sessenta e nove universitários (18-30 anos) responderam a um questionário online composto por questões sociodemográficas, estado nutricional, dados de exercícios físicos e atitudes alimentares. O efeito do país, tipo de exercício e razões para se exercitar sobre outras variáveis foram avaliados por modelos lineares generalizados; e a avaliação das associações das variáveis categóricas foi feita pelo Teste Qui-quadrado de Pearson. O efeito da interação do país e a principal razão para se exercitar sobre as preocupações com alimentação e aparência física foi maior que o efeito de cada variável individualmente (r^2 = 0,051; p < 0,05), o que também foi observado quanto ao IMC (r^2 = 0,073; p < 0,05). Nossos resultados mostram haver semelhanças na relação entre estudantes universitários e exercícios físicos. No entanto, as diferenças observadas estão relacionadas às interações do país com a principal razão para se exercitar (ou principal tipo de exercício) que apresentou os maiores efeitos sobre o IMC e preocupações com a rotina de exercícios, alimentação e aparência física.

Palavras-chave: Atividade física, Saúde, Aparência física, Ensino superior, Comparação transcultural.

Razones para hacer ejercicio entre estudiantes varones de Argentina, Brasil, Estados Unidos de América y Francia

Pedro Henrique Berbert de Carvalho, Aline Cavalcante de Souza, Marle dos Santos Alvarenga

Resumen

Este estudio tuvo como objetivo evaluar la relación entre los motivos de ejercicio, el índice de masa corporal y las preocupaciones sobre la rutina de ejercicio, la dieta y apariencia fisica de jóvenes varones universitarios de Argentina, Brasil, Francia y Estados Unidos. Quinientos sesenta y nueve estudiantes universitarios (18-30 años) respondieron un cuestionario online compuesto por preguntas sociodemográficas, estado nutricional, datos de ejercicio físico y actitudes alimentarias. El efecto del país, el tipo de ejercicio y las razones para hacer ejercicio sobre otras variables se evaluó mediante modelos lineales generalizados; y la evaluación de asociaciones de variables categóricas se realizó mediante la prueba Chi-cuadrado de Pearson. El efecto de la interacción del país y el principal motivo de ejercicio sobre las preocupaciones sobre la alimentación y la apariencia física fue mayor que el efecto de cada variable de forma individual (r^2 = 0,051; p < 0,05), lo que también se observó con respecto al IMC (r^2 = 0,073; p < 0,05). Nuestros resultados muestran que existen similitudes en la relación entre estudiantes universitarios y ejercicios físicos. Sin embargo, las diferencias observadas están relacionadas con las interacciones del país con el motivo principal de ejercicio (o el tipo principal de ejercicio) que tuvo los mayores efectos en el IMC y las preocupaciones sobre la rutina de ejercicio, la dieta y la apariencia física.

Palabras-clave: Actividad física, Salud, Apariencia física, Educación superior, Comparación transcultural.

Introduction

Physical activity is an interdisciplinary issue, defined as any body movement produced by skeletal muscles, which results in energy expenditure above rest levels (World Health Organization, 2010). An associated concept is physical exercise, which can be defined as a form of planned, structured, repetitive and proposed physical activity with the aim of improving or maintaining physical fitness, motor skills or organic-functional rehabilitation (World Health Organization, 2010).

Physical and psychological benefits of regular engagement in exercise and physical activity are well documented (Divine, Roberts, & Hall, 2018; Morton, Atkin, Corder, Suhrcke, & Van Sluijs, 2016; World Health Organization, 2010). Motivation to achieve a better health and quality of life is one of the main reasons that motivate people to exercise. However, the reasons why people do exercise are diverse, and it can depend on factors such as sex and age (Egli, Bland, Melton, & Czech, 2011). Other factors to consider are the social and environmental attributes and the cultural context in which the person is inserted (Brunet & Sabiston, 2011; Stevens, Rees, Coffee, Steffens, Haslam, & Polman, 2017). According to Sallis and Owen (1998), the determinants most strongly associated with physical exercise are psychological and behavioral variables in response to social and physical environment.

An important variable associated with motivation for doing exercise is physical appearance concerns. According to Self-Determination Theory (Verstuyf, Vansteenkiste, & Soenens, 2012), social body-ideals internalization could be experienced as controlling, thwarting the satisfaction of basic psychological needs, thus resulting in the pursuit of extrinsic goals (i.e., an attractive appearance). In general, for women, reasons to exercise are related to body weight control, and for men, to the desire to acquire a defined musculature and low body fat (Brunet & Sabiston, 2011; Egli et al., 2011; Hurst, Dittmar, Banerjee, & Bond 2017; Murray, Griffiths, Mond, Kean, & Blashill, 2016). It is worth mentioning that these reasons for exercising can lead to negative outcomes for physical and mental health. A recent systematic review (Panão & Carraça, 2019) of the effects of exercise motivations on body image and eating habits/behaviours showed that autonomous motivations (e.g., for pleasure, health, wellbeing) and health-focused exercise were associated with positive body image and healthy eating habits/behaviours, whereas exercising for appearance-related and other controlled reasons was inversely related to both outcomes.

Physical activity and exercise have been standardized and diffused as the most adequate for the good development of the body and the maintenance of health (Pedersen & Saltin, 2015). Nevertheless, it is important to emphasize that excessive preoccupation with physical exercises may represent a risk factor for exercise dependence, which is a pattern of a maladaptive and unadjusted exercise, characterized by tolerance, abstinence, exaggeration, loss of control, high expenditure of time, conflicts, continuity even in the midst of physical, social and psychological damages (Astorino et al., 2019; Divine et al., 2018; Hausenblas & Downs, 2002). Moreover, although less frequent in men, the risk of developing eating disorders should be considered, with the adoption of strategies for weight and body fat control, such as dietary restrictions, purging practices and use of weight loss substances (Brosof, Williams, & Levinson, 2020).

The Western body is in constant transformation (Takeuchi, Davis, & McCreary, 2005). Thus, the ideals of appearance and physical exercise seem to be much more connected to the changing and transient aspects ("fitness fashion") than to the traditions (Rosenmann, Kaplan, Gaunt, Pinho, & Guy, 2018). However, considering the differences of each culture, it cannot be said that there is an integrally universal model of body and "perfect" exercises, since they are redefined by each culture in a specific way (Rosenmann et al., 2018; Swami et al., 2010; Takeuchi et al., 2005).

Given the magnitude of the physical activity construct, the field of research in the health sciences is broad and encompasses distinct populations, among them, the college students (Florindo et al., 2015). However, in the adult population, there is a literary gap in studies that evaluated the relation between the reasons for exercising and concerns with food and body aspects (Panão & Carraça, 2019). This may be of great interest in cross-cultural and comparative studies of college students of different cultures. According to Panão and Carraça (2019) the issue of exercise motivations and its relation with appearance and eating concerns is an emergent research topic, which could make an important contribution to the design of future interventions. Limitations regarding this research field include the fact that, in general, the studies evaluated sample from only one country (Egli et al., 2011; Pauline, 2013; Sibley, Hancock, & Bergman, 2013). Thus, understanding how different cultures express globalized patterns in relation to physical exercises can elucidate important subjective issues related to reason to exercise.

The aim of the present study was to evaluate the relationship between reasons for exercising, the body mass index (BMI), the concern with exercise routine, food and appearance among male college students from Argentina, Brazil, the United States of America (USA) and France. Among the factors that justify the choice of these four countries, some studies deserve to be highlighted because they demonstrate important similarities and differences between these countries in variables evaluated in the present study.

According to the International Health, Racquet & Sportsclub Association (2016), the USA is world leader in number of gyms. Brazil is in second place, followed by Argentina. France has a very diverse position, with slightly more than 10% of the number of US gyms. In sum, USA, Brazil and Argentina stand out in the fitness scenario in relation to the number of gyms. In what extent these data reflect the idiosyncrasies of reasons to exercise of each country are still unclear. Indeed, it is worth noting that the determinants most strongly associated with reasons to exercise are psychological and behavioral variables among which we can emphasize appearance and eating concerns.

A study conducted by Rozin, Fischler, Imada, Sarubin, and Wrzesniewski (1999) found that American people made more associations between food and health than the French people, who associated food more with pleasure than with health. Forbes et al. (2012) evaluated body dissatisfaction and disordered eating among Brazilian, Argentines and Americans (US) and found that the Argentine and Brazilian samples scored lower than the US sample on measures associated with disordered eating and body-ideal internalization. Accordingly to Warren, Gleaves, Cepeda-Benito, Fernandez, & Rodriguez-Ruiz (2005) ethnicity is a protective factor against

internalization of a thin ideal and body dissatisfaction and may protect against the development of eating disorder symptoms.

Taken together, these data point out important differences between the four countries regarding psychological and behavioral variables. Differences between these countries for variables such as eating and appearance concerns may have important implications, for example, in cross-cultural studies regarding reasons to exercise. However, in the literature there are no studies comparing these countries with regard to physical activity, nor the comparison of USA and France with developing countries (such as Brazil and Argentina). So, the results of the present study can bring important contributions.

Method

Study design and participants

This is a cross-sectional study, using secondary data from the cross-cultural research database "Attitudes toward exercise, diet and body image in four different countries", conducted in partnership with the University of Pennsylvania – UPenn – (Ruby et al., 2016).

The sampling was of non-probabilistic type, composed by college students from Argentina, Brazil, the USA and France. Male students between 18-30 years old were included (*N* = 904). Those who did not specify their sex (*N* = 29), who were born out of the country of their university (*N* = 89), as well as participants who left more than 30% of the answers blank (*N* = 217) were also excluded.

The final sample consisted of 569 students enrolled in different courses and in different undergraduation periods: the Argentines (N = 50) were of the Universidad de Buenos Aires, the Brazilians (N = 223) of the *Universidade de São Paulo* (USP), the Americans (N = 129) were students of the University of Pennsylvania, and finally, the French (N = 167) of the *Audencia Nantes School of Management*, in the *Université de Nantes*. A "post hoc" analysis in GPower 3.1.7 software, adopting a significance level of 5% and effect size (Cohen d) of 15%, pointed out that the power of the tests for the N obtained was 100%.

Evaluation Instruments

The participation of all students in the four countries was voluntary, according to local norms. In the USA, the sample was intentionally selected among undergraduate and graduate students, since in this country many undergraduate live on campus premises – and a good representation of students living off *campus* was sought, in other countries –, and because American college students are a little younger than those in other countries. The UPenn, responsible for the main research project, received the exemption from the need for approval of the Ethics and Research Committee from the Institutional Review Board, which was sufficient for the continuation of the research also in the *Universidad de Buenos Aires* and in the *Université de Nantes*. In Brazil, the main project was approved by the Ethics and Research Committee of the Public Health School of USP (CONEP FSP-USP 171/08), and

the present study was also approved by this Committee (opinion 1.553.827/2016).

Data collection from the main survey took place between the years 2010 and 2012, through an online questionnaire, using the surveymonkey.com secure site (Ruby et al., 2016). This questionnaire, initially developed in English, was pre-tested with US university students, and later translated and adapted (when necessary) by native and fluent translators in Portuguese, Spanish and French.

Most of the evaluated variables had predefined response options and were grouped into sociodemographic, nutritional status (self-reported weight and height used to calculate BMI), physical exercise and the concern about what they eat and how it affects their appearance (five-factor Likert scale type response options, from 1 = *not at all true* to 5 = *absolutely true*).

In the case of variables related to physical exercise, the following were questioned: weekly frequency; main type of exercise (with 11 response options: walking, cycling, jogging, swimming, playing on some sports team, aerobic/cardiovascular exercise equipment, weight lifting, dance/gym, yoga/pilates, never exercise, other); main reasons for exercising (options: fun, competition, health, weight loss, getting in good shape, never exercising); concern with the exercise routine and guilt over not exercising (five-factor Likert scale response options, from 1 = *not at all true* to 5 = *absolutely true*).

Data analysis

Data analyses were conducted using SPSS 21.0 (Statistical Package for Social Science Inc., Chicago, USA) software. The level of significance was set at $p < .05$. Due to the fact that most of the variables have a non-normal and/or non-homogeneous distribution, the transformation of the variables was adopted using z-score (Field, 2013).

To evaluate the effect of the independent variables (country, type of exercise or reason to exercise) on the dependent variables (concern with the exercise routine, BMI and concern about what is eaten and how it affects the appearance), univariate general linear models (GLM) were used. As for the effect size assessment, Pearson's correlation coefficient was adopted according to the classification proposed by (Cohen, 2013): $r^2 \geq .01$ is classified as a "small effect", $r^2 \geq .09$ is equivalent to "average effect" and $r^2 \geq .25$ is equivalent to "large effect".

The presence of associations between categorical variables, such as the country, the main type of exercise, main reasons for exercising, and the nutritional status were evaluated using the Pearson Chi-Square test ($\chi 2$), in order to compare the frequencies observed in certain categories with frequencies expected at random. When the expected frequencies were less than or equal to five, the Monte Carlo simulation was used (Field, 2013).

Results

Regarding the self-reported socioeconomic classification (options: lower, lower middle, middle, upper middle, upper), the middle class was the most common among Argentines (70%) and Brazilians (56.1%), while the upper middle class was the most common among American and French students (47.9% and 42.6%, respectively).

The distribution of students by country, age (years), current weight (kg), the BMI (kg/m²), number of days of physical exercise in the week, as well as average scores for concerning with the exercise routine, guilt over not exercising, and concern about food and appearance are presented in Table 1

Table 1. Descriptive statistics (M(SD)) of male college students (N = 569) by country

Country	Age (years)	Current weight (kg)	BMI (kg/m²)	Physical activity (days)	Concern with exercises	Guilty for not exercising	Concern about food and appearance
Argentina (*N* = 50)	24.4 (2.92)[a]	77.2 (12.35)	24.5 (3.24)[d]	3.32 (1.63)	1.90 (1.15)	2.76 (1.19)	2.78 (1.31)
Brazil (*N* = 223)	21.2 (2.55)	64.7 (13.41)[b]	22.3 (3.48)	3.69 (1.93)	2.09 (1.17)	2.96 (1.38)	2.95 (1.29)
USA (*N* = 129)	20.9 (3.04)	73.9 (10.32)	23.2 (2.74)[e]	4.12 (2.02)[f]	2.41 (1.14)	3.02 (1.46)	2.64 (1.08)
France (*N* = 167)	21.7 (1.53)	72.2 (8.75)[c]	22.4 (2.28)	2.35 (1.46)[g]	2.32 (1.21)	2.77 (1.31)	2.71 (1.18)

Note. M = Mean; SD = Standard Deviation; BMI = body mass index; USA = United States of America.
a = significantly higher than Brazil, France and USA ($p < .001$).
b = significantly lower than Argentina, France and USA ($p < .001$).
c = significantly lower than Argentina ($p < .05$).
d = significantly higher than Brazil and France ($p < .001$), and USA ($p < .05$).
e = significantly higher than Brazil ($p < .05$).
f = significantly higher than Argentina ($p < .05$) and France ($p < .001$).
g = significantly lower than Argentina ($p < .05$) and Brazil ($p < .001$).

Argentines presented a mean age superior to the others (which did not differ among themselves). As for the average number of days of physical exercise in the week, that of USA students was higher than that of Argentine and that of French students. There was no difference between countries regarding mean scores for concerning with the exercise routine, guilt over not exercising, and concern about food and appearance.

The mean body weight was lower among Brazilians and the mean BMI of Argentines was higher than the others. As for nutritional status (World Health Organization, 1995), 75.3% (*N* = 427) were normal weight range, while 4.8% (*N* = 27) were underweight, 17.4% (*N* = 99) were overweight and 2.5% presented grade I obesity (*N* = 14) – none were classified as grade II or III obesity. As regards the frequencies of overweight (overweight or obese), specifically in each country, there were 34% in Argentina, 20.3% in Brazil, 25% in the USA and 11.4% in France.

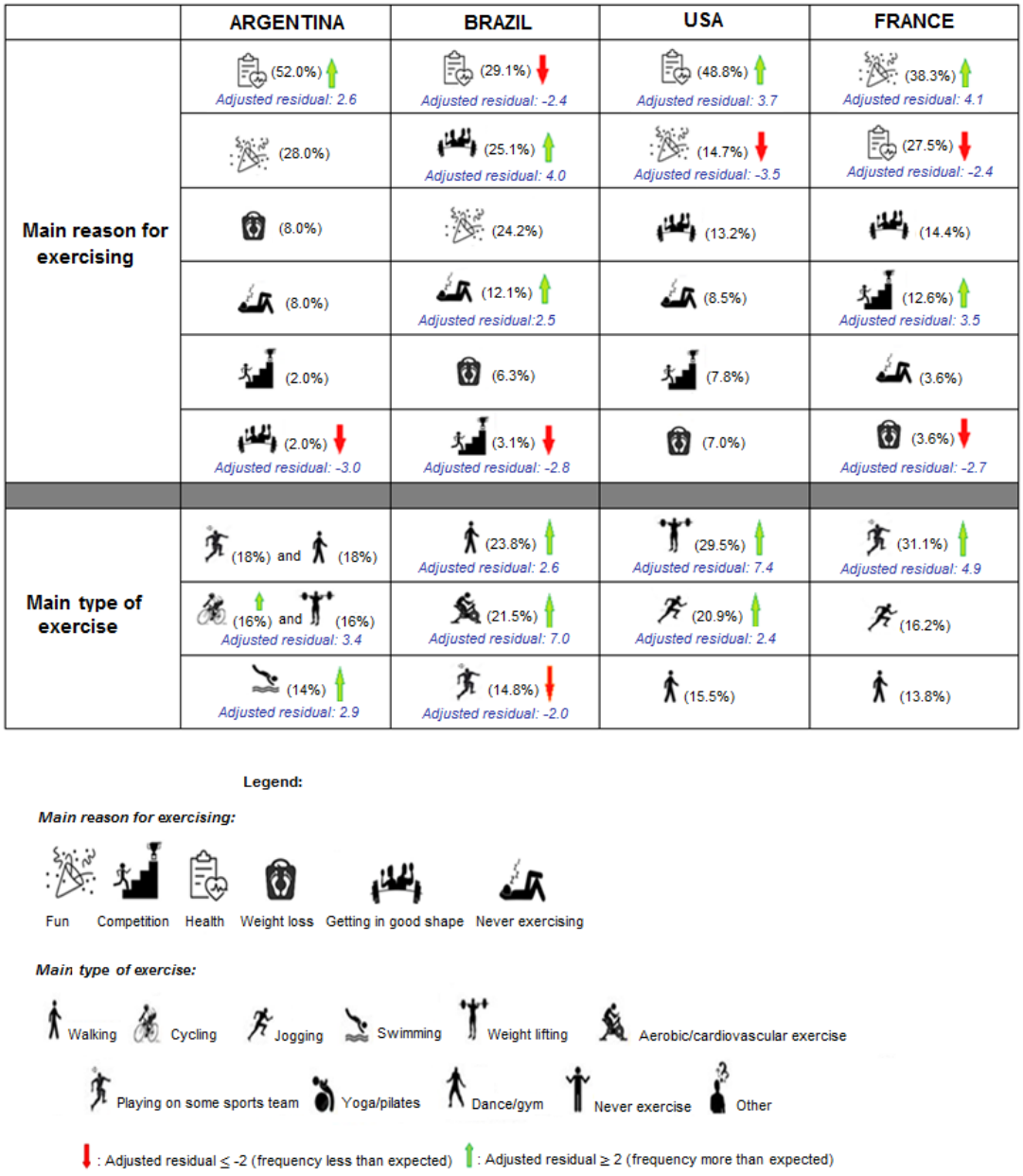
Associations of nutritional status were observed in the four countries ($p < .001$): the frequency of low weight men was higher in Brazil and lower in

France; while overweight was higher in Argentina and the USA, and lower in France. Normal weight was more frequent among French, and smaller than expected among Brazilians.

In the total sample, "health" was indicated as the main reason for exercise (35.1%; N = 200) and, in second place, "fun" was indicated (26.5%; N = 151), while the main types of exercise were playing in some sports team (18.8%, N = 107) and walking (18.5%, N = 105), followed by running (14.4%, N = 82). There was an association between the country and main reasons for exercising ($p < .001$), as well as between the country and the main type of exercise ($p < .001$; see Figure 1).

For the Argentines, Brazilians and Americans, "health" was the main reason to exercise. Yet, the French students mentioned mainly "fun" ("health" was in second place). "Getting in good shape" was the second most frequent reason among Brazilians, the third among the French and the Americans, and the last among the Argentines. The "competition" was more quoted by the French students than by the others.

Figure 1.Hierarchy of the main reason for exercising and the three main types of exercise.



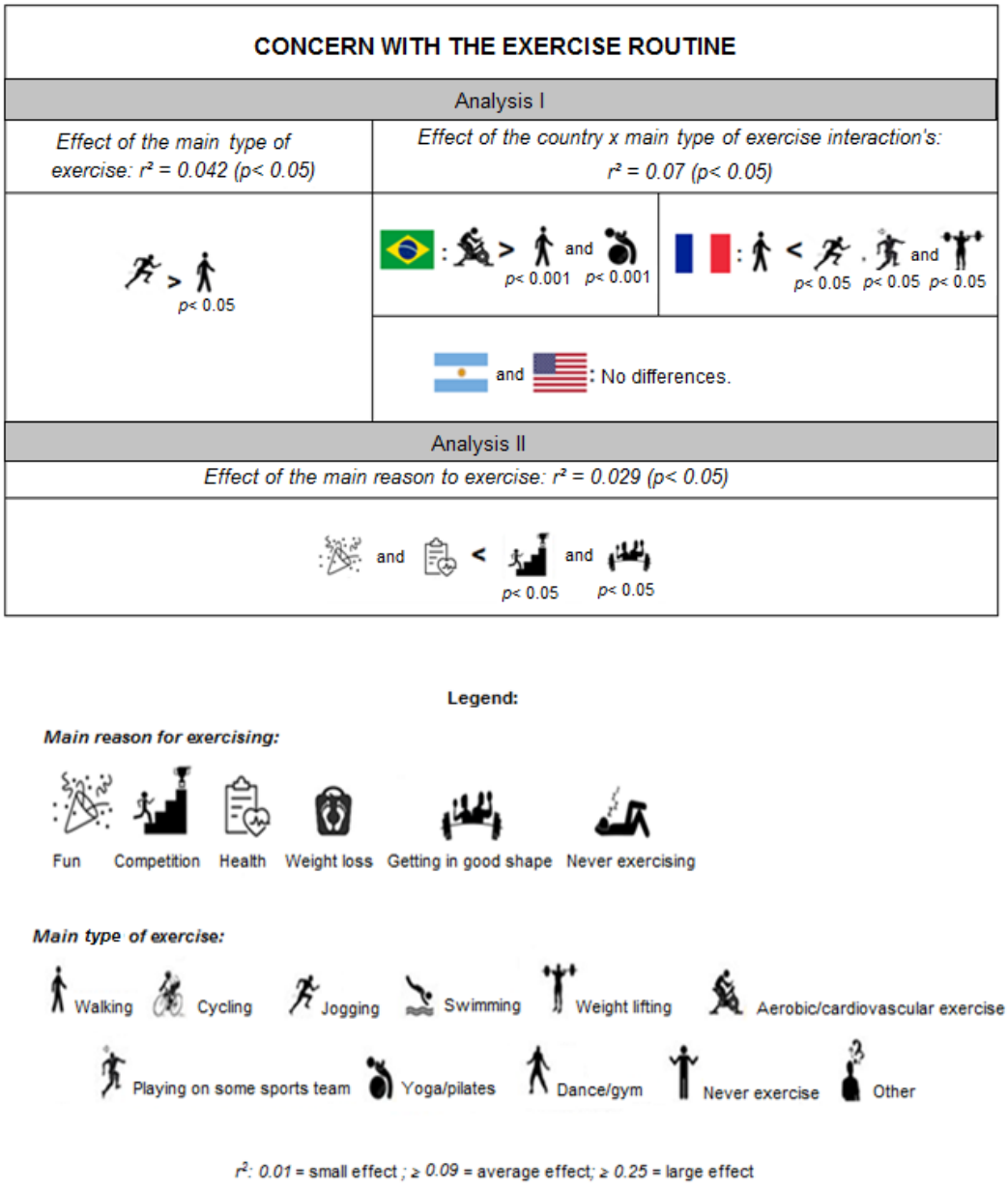
Specifically, regarding the associations between the country and the reason for exercising, the number of men who answered "health" was higher in Argentina and the USA than in Brazil and France. Also, in Argentina, the frequency of "getting in good shape" was lower than in Brazil; and the "fun" response was higher in France and lower in the USA.

In the analysis of the options of answers regarding the main type of exercise, it was observed that the sum of the three most frequent modalities represents more than 60% in each country (Figure 1). Walking was a modality common to the four countries, with greater prominence in Brazil. Among the Argentines, Brazilians and French, walking or playing in some sports team were the main modalities; while in the USA, it was weight lifting.

Figure 2 presents the analysis of the country's effects, the main type and reason for exercising (as well as the interactions of these variables) on the concern with the exercise routine – a variable whose *absolutely true* response corresponded to 4.7% (*N* = 27) and the very true response corresponded to 10.4% (*N* = 59) of the total sample evaluated (Analysis I). The concern with the exercise routine was different due to the main exercise (r^2 = .042) and the interaction of this variable with the country (r^2 = .07) – greater effect –, but not just the country separately.

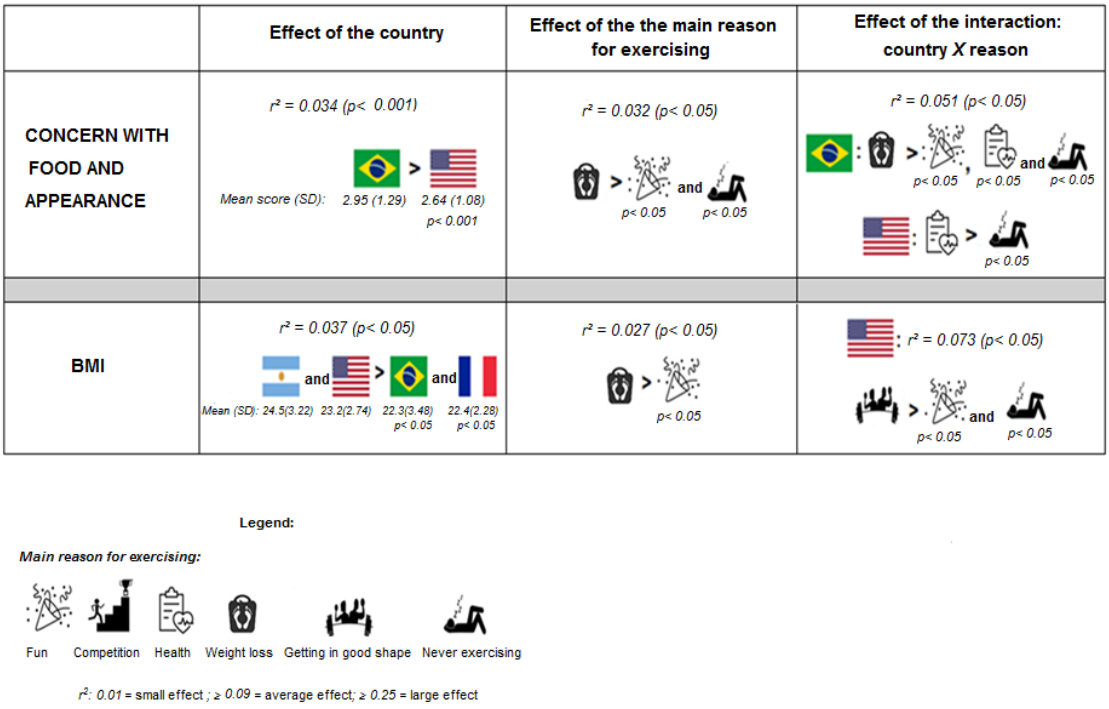
Still in Figure 2 (Analysis II), it can be observed that in the four countries, those who answered that they exercised mainly for "fun" or "health" reported less concern with exercise routine than those who answered that they exercised mainly for "competition" or "getting in good shape" (r^2 = .029). However, there was no isolated effect of the country or its interaction with the reason for exercising over this concern.

Figure 2. Effect of the main type of exercise and its interaction with country and the main reason to exercise over the concern with the exercise routine.



The effects of the country, the main reason for exercising and interaction of these variables on BMI and the concern about what is eaten and how it affects the appearance (Figure 3) were also analyzed. There was effect of the country and the main reason for exercising over the concern about food and the way it affects the appearance – the Brazilians reported more concern than the Americans (r^2 = .034) and those who answered that they exercise to "lose weight" also reported greater concern than those who mentioned to exercise for "fun" or never exercise (r^2 = .032) – however, the greatest effect was the interaction of these variables (r^2 = .051

Figure 3. Effects of the country, the main reason for exercising and its interaction with concern with food, appearance, and body mass index



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Similarly, when these effects on BMI were compared, the country's interaction with the ratio to exercise was greater than the effect of the variables in isolation (r^2 = .073). However, this interaction occurred only for Americans. Regarding the individual effects, Argentines and Americans presented higher BMI averages than Brazilians and French (r^2 = .037); and the mean BMI of men who exercised for "weight loss" was greater than that of those who responded exercising for "fun" (r^2 = .027). (Table 1).

Discussion

When assessing different aspects of the relation with exercise (as questioning the main reason for doing it), this study found that for the majority of students, in all four countries, "health" was mentioned as the main reason for exercising. Guedes, Legnani, & Legnani (2012) found in a probabilistic sample of Brazilian college students aged between 18 and 35 years that the main reasons for the practice were related to physical condition and competition. In a study with Americans, Egli et al. (2011) observed that the practice of exercise among men was mainly motivated by intrinsic factors (health and fun/well-being), in addition to strength and resistance. Kilpatrick, Hebert, & Bartholomew (2005) also evaluated US college students and found that competition, social recognition, and physical fitness were the most important motivations for exercise practice. No studies were found that specifically evaluated the reasons or motivations to exercise among Argentine and French university students. To the best of our knowledge, this is the first study to evaluate such reasons in these samples.

The literature shows that, just as among women, the practice of physical exercises among men has an objective related to physical appearance issues but, in addition, overcoming challenges is a striking feature (Brunet & Sabiston, 2011; Egli et al., 2011; Pauline, 2013). Thus, it is also interesting to think of the "environment" for practicing physical activity in the four countries. Among these, one that became "the place" were gyms and bodybuilding centers, environments in constant process of "sportification", using elements such as dedication of time, self-imposed sacrifices, fear of failure or being below the "ideal" performance, and also the surveillance of the body made by scales, adipometers, measuring tapes and mirrors (Lamarche, Gammage, & Ozimok, 2018).

According to the International Health, Racquet & Sportsclub Association (2016), the USA is world leader in number of gyms (*N* = 36,180). Brazil is in second place (*N* = 31,809), followed by Argentina (*N* = 7,900). France has a very diverse position, with slightly more than 10% of the number of US gyms (*N* = 3,800) – which is reflected in the findings of this study. It is, the three main types of exercise among French include those practiced outside the gyms (i.e. playing in sports team, running and walking). The high frequency of French who prefer these modalities may also contribute in a way to the fact that France has presented the highest frequency of answers "competition" as the main reason for exercising, considering the meaning of this in team exercises.

Our sample was composed exclusively of college students. Therefore, it is important to contextualize the practice of exercises among them. Sports are an important part of American culture, whose incentive to practice begins in the school stage and remains during the university. In the university context in USA, sport is also a means of joining and staying in institutions, since a good sports performance can guarantee full or partial scholarship – depending on the division/group to which the university belongs (Medic, Mack, Wilson, & Starkes, 2007). Yet, for Brazilians, soccer is a major sporting event from childhood (especially among males), and so it can be understood as an element of Brazilian national identity (DaMatta, 2009). It is necessary to emphasize a historical rivalry between Brazilian and Argentine soccer, in which its disputes have symbolic meaning, contributing to the "honor", image and sovereignty of it in the South America (DaMatta, 2009).

In addition to this contextualization, it is worth noting that in the present study other factors were assessed. Our study innovates when assessing the frequency and type of exercise, nutritional status and exercise and eating concerns, evaluating the interaction between them, and which factor had the greatest impact on the reasons for exercising in these four countries. The joint approach of the relation between body, physical activity and food in the college population is a strong point of this study, since the literature usually addresses these aspects in a more isolated way. To the best of our knowledge, this is the first study to evaluate all of these constructs together, including the most qualitative aspects of the exercise (main reason, type of exercise, concern and guilt related to not exercising). Another favorable point is the significant sample of young people from different countries, which includes advances in the field of cross-cultural studies.

In the universe evaluated here, although the Americans presented the highest average for the weekly frequency of physical exercise, they were not the most worried about the exercise routine – there was no difference among countries. Regarding this concern, the lowest effect was that of the reason for exercising, followed by the type of exercise; and the greatest determinant (greater effect – $r^2 = .07$) was the interaction of the country with the type of exercise and it occurred only among Brazilians and French. For the Brazilians, mainly adept at aerobic devices, the concern was greater than that reported by those who responded "walking" and "yoga / pilates"; while, among the French, the concern of the adepts to "walking" was less than the concern of those who responded "running", "playing in a sports team" or "weight lifting". Among Argentines and Americans, the concern with the exercise routine was independent of the main exercise.

The country's interaction with the main reason for exercising was also the major determinant of concern about food and how it affects appearance. Brazilians who responded "weight loss" were more concerned than those who responded "health", "fun" and those who never exercise. Whereas, among Americans, the only difference was the greatest concern of those who exercise for "health" over those who never exercise. For Argentines and French, the concern with food and appearance was no different depending on the main reason for exercising. Likewise, in relation to BMI, the main determinant was the country's interaction and the main reason for exercising (only among the Americans).

Therefore, in the relation that these students have with exercising, above the effects of the country, there were the effects of the interactions of the country with the main reason to exercise (or type of exercise, specifically in relation to the exercise routine), that is, the country alone was not the most relevant aspect in the differences found. When considering only the country in this comparison, even stronger determinants would not have the right emphasis, for example, Brazilians are more concerned about food and appearance than Americans. However, the country's interaction with the reason for exercising was stronger than this difference, thus the finding with the greatest effect was that Brazilians who exercise to "lose weight" showed greater concern about food and appearance than those who exercise for "health", "fun" or "never exercise".

This research is not without limitations. One limitation is the use of an instrument not yet validated, whose response options were predefined (closed questionnaire) – and perhaps a qualitative exploration would bring underlying answers. Nevertheless, this methodology has been used in other contexts, producing important data (Panão & Carraça, 2019; Rozin, Bauer, & Catanese, 2003; Rozin, Fischler, Shields, & Masson, 2006). As limitations, we also mention the online application with chances of some bias, such as refusal and withdrawal of questionnaire completion, recognition of invitation to participate (e-mail) as spam, distraction during the completion of the questionnaire. Although subject to criticism, studies with online questionnaires have grown in the scientific environment and contributed to cross-cultural investigations (Varela et al., 2017). Specifically, regarding the sample, the number of students was different among the countries, and the number of Argentines was small ($N = 50$). In addition, the sample of students from each country

came from a single university. Thus, the results found may not include all the cultural variability present in different regions of these countries.

Future investigations may include the joint evaluation of the constructs discussed here, with other samples (including different regions of the countries) and other assessment tools.

Conclusion

In the cross-cultural comparison of certain aspects of the relation with physical exercise among college students in the four countries, the interaction of these variables had a greater influence on the observed differences than the country, the type of exercise or the reason for exercising in isolation. Thus, highlighting only the country or the other variables alone does not seem to be enough to understand how the relations with physical exercise, BMI and the concern with food and appearance are manifested in different cultures, but rather an analysis that contemplates the interaction of these factors.

The importance of a broader picture is highlighted, in which, in addition to the quantitative aspects, the qualitative aspects and their interactions are considered by health professionals regarding the recommendations related to the practice of physical exercise, in a sphere of health care that goes beyond the measurable biological perspective.

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About the author

Pedro Henrique Berbert de Carvalho
Life Sciences Institute, Department of Physical Education, Universidade Federal de Juiz de Fora - campus Governador Valadares (UFJF-GV), Governador Valadares, Brazil

Aline Cavalcante de Souza
Nutrition in Public Health Graduate Program (PPGNSP), School of Public Health, Universidade de São Paulo (USP), São Paulo, Brazil (at time the work was completed)

Marle dos Santos Alvarenga
Nutrition in Public Health Graduate Program (PPGNSP), Universidade de São Paulo (USP), São Paulo, Brazil

Corresponding author

ENDEREÇO PARA CORRESPONDÊNCIA
Pedro Henrique Berbert de Carvalho
Life Sciences Institute, Department of Physical Education, Universidade Federal de Juiz de Fora - campus Governador Valadares (UFJF-GV), Governador Valadares, Brazil
Rua São Paulo, n° 745 – Centro – CEP: 35010-180 – Governador Valadares, MG, Brazil**.**
TELEFONE
+55 (33) 991143073
E-MAIL
pedro.berbert@ufjf.edu.br