

ARTIGO DE INVESTIGAÇÃO (ORIGINAL)

Validation of the Personal Life Questionnaire in University Students (PLQ-Universitários)

Validação do Questionário de Estilos de Vida Pessoal em Estudantes Universitários (PLQ-Universitários)

Validación del Cuestionario de Estilos de Vida Personal en Estudiantes Universitarios (PLQ-Universitarios)

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Abstract

Background: University students experience several situations that can change their lifestyles. The search for a suitable research tool to analyze the lifestyle of this population is justified by the importance of this phase.

Objective: To describe the validation process of the *Questionário de Estilos de Vida Pessoal em Estudantes Universitários (PLQ-Universitários)* in Brazilian university students.

Methodology: This study was conducted with 286 Brazilian university students. Reliability was analyzed using Pearson's correlation coefficient and intraclass correlation coefficient (ICC). Internal consistency was analyzed through Cronbach's alpha of the total scale and test-retest stability using the ICC.

Results: Cronbach's alpha for internal consistency was 0.686 for men and 0.647 for women.

Conclusion: This tool can be used to identify behaviors related to the lifestyle of Brazilian university students.

Keywords: healthy lifestyle; health promotion; validation study; students

Resumo

Enquadramento: Estudantes universitários experimentam diversas situações que podem levá-los à modificação no estilo de vida. A procura de um instrumento de investigação adequado para analisar o estilo de vida desta população justifica-se pela importância desta fase.

Objetivo: Descrever o processo de validação do Questionário de Estilos de Vida Pessoal em Estudantes Universitários (PLQ-Universitários) em estudantes universitários brasileiros.

Metodologia: Estudo realizado com 286 universitários(as) brasileiros(as). A confiabilidade do PLQ-Universitários foi analisada pelos itens do coeficiente de correlação de Pearson e coeficiente de correlação intraclass (CCI). A consistência interna foi analisada pelo alfa de Cronbach da escala total e estabilidade do teste-reteste pelo CCI.

Resultados: Os valores de alfa de Cronbach para consistência interna foram de 0,686 para homens e de 0,647 para mulheres.

Conclusão: Este estudo pode ser utilizado para identificar as condutas relacionadas com o estilo de vida dos (as) universitários (as) brasileiro (as).

Palavras-chave: estilo de vida saudável; promoção da saúde; estudo de validação; estudantes

Resumen

Marco contextual: Los estudiantes universitarios experimentan diversas situaciones que pueden llevarlos a cambiar su estilo de vida. La búsqueda de una herramienta de investigación adecuada para analizar el estilo de vida de esta población se justifica por la importancia de esta fase.

Objetivo: Describir el proceso de validación del Cuestionario de Estilos de Vida Pessoal em Estudantes Universitários (PLQ-Universitários) en estudiantes universitarios brasileños.

Metodología: Estudio realizado con 286 estudiantes universitarios brasileños. La fiabilidad del PLQ-Universitarios se analizó mediante el coeficiente de correlación de Pearson y el coeficiente de correlación intraclass (CCI). La consistencia interna se analizó mediante el alfa de Cronbach de la escala total y la estabilidad test-retest mediante el CCI.

Resultados: Los valores del alfa de Cronbach para la consistencia interna fueron 0,686 para los hombres y 0,647 para las mujeres.

Conclusión: Este estudio puede servir para identificar los comportamientos relacionados con el estilo de vida de los(as) universitarios(as) brasileños(as).

Palabras clave: estilo de vida saludable; promoción de la salud; estudio de validación; estudiantes

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Introduction

Lifestyles are among the major determinants affecting population health (Moral et al., 2014). They are defined as collective patterns of behavior based on the different preferences of individuals according to their context and opportunities of life (Cockerham, 2005). Lifestyles include behaviors that can reduce the risk of disease, such as the control and management of stress and negative emotions, leisure, healthy use of time, sleeping well, good eating habits, physical activity, avoiding alcohol abuse and the use of caffeine, tobacco, and psychoactive substances, as well as safe sex and self-care in health, among others (Cockerham, 2005). According to the Brazilian Ministry of Health (2012), lifestyle is the “way in which individuals or groups experience reality and make choices that are determined by social, economic, cultural, and environmental factors” (p. 22). There is a similarity between definitions regarding the factors external to the individual that influence how they make choices and experience their reality. As Pôrto et al. (2015) point out, lifestyle is capable of strongly influencing an individual’s health and can reduce the risk factors for disease:

Ten days of intervention with lifestyle changes such as low energy intake, low-fat diet, stress-free environment, and a small amount of physical activity can significantly reduce serum cholesterol, blood glucose, and blood pressure in individuals over 50. (p. 200)

However, lifestyles can also promote or reinforce the habit of excessively caloric diets, sedentary lifestyles, (licit and illicit) drug use, and inadequate working conditions that can pose risks to health due to overload and burnout, among other situations (Pôrto et al., 2015). Therefore, lifestyles represent a set of actions influenced by factors and the context in which the individual lives, with an impact on their health status.

Buss and Pelegrini Filho (2007) explain Dahlgren and Whitehead’s Model of Social Determinants of Health (1991), in which the Social Determinants of Health (SDH) are arranged in different layers, starting with the layer closest to the individual determinants and moving towards the furthest layer, which contains the macro-determinants. Individual factors are the characteristics of each person: age, gender, and genetic factors, and form the basis of the model. At the first level are individual behavior and lifestyles. The next layer includes social and community networks. The next layer contains factors related to living and working conditions: food production, education, work, sanitation, social and health care services, and housing. The last layer includes general socio-economic, cultural, and environmental conditions, which have a strong influence on the previous layers. The lifestyle lies between the base of the model (individual factors) and the SDH, which shows that the lifestyle is influenced by factors that go beyond individual choices. Thus, although not isolated, lifestyles are a crucial factor affecting health promotion and health behaviors. This study aimed to describe the process of validation

of the *PLQ-Universitários* questionnaire. The process of translation and cross-cultural adaptation of the *PLQ-Universitários* was described by Chaparro et al. (2023) and is available for consultation.

Background

University students are in a phase rich in learning, both academically and socially. Youth is characterized by profound changes that define identity at both a personal and professional level (Hernán et al., 2004). During this period, many young people, mainly those attending university, experience greater independence from their families and acquire more autonomy in their decisions, which can lead to the adoption of less healthy habits. This transition phase can consolidate behaviors linked to food choices, exercise, substance use, and safety behaviors, among others (Hernán et al., 2004).

Looking for an appropriate research tool to analyze the lifestyles of this population is justified by the importance of this moment in each individual’s life. Despite the relevance of this topic, there are few instruments in Portuguese to assess lifestyles. The Fantastic Lifestyle Questionnaire was designed by Wilson and Ciliska in 1984 in Canada to help physicians know their patients and their lifestyles (Añez et al., 2007). In 2014, the Fantastic Lifestyle Questionnaire was translated and adapted for Portuguese university students (Silva et al., 2014). Another instrument is the WHOQOL-100, created by the World Health Organization in 1994. Known in Brazil as *Instrumento de Avaliação da Qualidade de Vida*, this instrument measures quality of life from a cross-cultural perspective (Fleck, 2000). However, few instruments in Portuguese focus exclusively on the lifestyles of university students. The Fantastic Lifestyle Questionnaire (Añez et al., 2007; Silva et al., 2014) includes aspects such as family, friends, work, personality, and introspection, in addition to lifestyles.

Among the existing instruments, the Personal Lifestyle Questionnaire (PLQ) stands out. This questionnaire was developed by Brown et al. (1983) in the United States as a tool focused on lifestyles through relevant health behaviors. The PLQ assesses beneficial health practices and aims to measure individuals’ ability to adopt healthy behaviors (Mahon et al., 2002). Its initial psychometric validity was established for an adult population (Brown et al., 1983) and then for adolescents (Mahon et al., 2002, 2003). It was later translated, adapted, and validated for the Spanish university population by Domingues et al. (2022), resulting in the *Cuestionario de Estilos de Vida Personal* (PLQ-Jóvenes).

Given the relevance of this subject, it is imperative to enhance knowledge about the lifestyles associated with the health of university students (Luna-Bertos, 2015) using reliable and valid instruments. Therefore, this study aims to describe the validation of the PLQ-Jóvenes, which was named *Questionário de Estilos de Vida Pessoal em Estudantes Universitários* (PLQ-Universitários) in Brazil.

Methodology

Instrument validation study. After the translation, revision, and adaptation into Brazilian Portuguese (Chaparro et al., 2023), the instrument was validated with the population of Brazilian university students, over 18 years of age, attending undergraduate programs (three- or four-year undergraduate programs), regularly enrolled in public or private institutions in Brazil in 2022.

To ensure data reliability, the sample was calculated according to the criteria of Hill and Hill (2008). This rule allows the minimum sample size to be estimated so that specific statistical procedures can be carried out. In Brazil, according to the latest Higher Education Census of 2019, there are 8,603,824 undergraduate students (Ministério da Educação, 2020). The sample was initially estimated at 246 participants, with a sampling error of 5% and a 95% confidence interval. Taking into account potential losses (estimated at around 10% of participants who did not complete the questionnaire), the sample size was calculated at 270 undergraduate participants. Incomplete questionnaires were excluded.

In order to reach a diversity of participants from the five regions of Brazil, the invitation was widely disseminated to university participants via social networks (Facebook and Instagram) and the snowball sampling technique, in which key informants (or 'seeds') were contacted in order to identify people with the profile indicated for the questionnaire (Vinuto, 2014). In addition to dissemination on social media, the undergraduate committees of several Brazilian universities were contacted by email, asking them to disseminate the questionnaire and invite their students to participate. The initial invitation, which was widely publicized, provided information on the research objectives and the link to access the online questionnaire via Google Forms®. After clicking on the questionnaire link, participants had access to the Informed Consent Form (ICF) before answering the questions. After giving their consent to take part in the questionnaire, the participant was directed to the research questions. The *PLQ-Universitários* consists of two parts: the first part with nine questions on sociodemographic data and the second part with 28 questions specific to the *PLQ-Universitários*. This research was approved by the Research Ethics Committee of the Federal University of Rio Grande do Sul (CEP/UFRGS) under the informed opinion no. 58130522.0.0000.5347.

The PLQ was developed by Brown et al. in 1983 to establish an association between everyday health behaviors and health promotion. This questionnaire was built in English and consists of 24 questions divided into six sub-categories: nutrition, exercise, relaxation, safety, substance use, and health promotion. There is a specific question for women about gynecological exams.

In order to apply this questionnaire to the young Spanish university population, the PLQ was translated, adapted, and validated into Spanish by Domingues et al. (2022). After the necessary cultural adaptation, the *PLQ-Jóvenes* consisted of 28 questions and, as in the original version, included one question exclusively for women.

In order to apply the *PLQ-Jóvenes* to the Brazilian university population, this questionnaire was translated and adapted by experts into Brazilian Portuguese (Chaparro et al., 2023). In Brazil, it was called *PLQ-Universitários*. The *PLQ-Universitários*, like the *PLQ-Jóvenes*, is divided into five categories: a) healthy behaviors related to physical activity (questions 10, 11, 18, 24); b) behaviors related to alcohol intake and safety (questions 7r, 8, 12, 16r, 17r, 20r, 25); c) healthy behaviors related to rest and well-being (questions 9, 15, 19); d) other prevention and health promotion behaviors (questions 1, 2, 3, 4, 5, 6, 14r, 22, 23, 26, 27); and e) behaviors related to the use of other substances (questions 13r, 21r, 28r). The questions are answered on a Likert scale: 1 (*never*), 2 (*sometimes*), 3 (*always*), and 4 (*never*). The maximum scores for women and men are 112 and 108, respectively. The scores for eight items (7r, 13r, 14r, 16r, 17r, 20r, 21r, 28r) should be reversed to calculate the total score. To obtain the results, the total score and the score for each category were summed (the score was reversed in questions with behaviors that tend to be harmful to health). The higher the score, the better the lifestyles or positive health behaviors.

The PLQ showed an acceptable internal consistency in its English version for adolescents, with Cronbach's alpha coefficients between 0.72 and 0.80 (Mahon et al., 2002, 2003), and in the Spanish university population, with Cronbach's alpha of 0.691 for men and 0.606 for women (Domingues et al., 2022).

The *PLQ-Universitários* was applied in a pilot test to 10 students selected for convenience (eight female and two male students) to assess their understanding of the questions and the time needed to answer them. The questionnaire was applied after the research had been approved by the CEP/UFRGS and following the same procedures described in the methodology. Data were collected between July and September 2022, and 286 responses were obtained. The validation and data analysis processes of the *PLQ-Universitários* followed the steps described below.

Quantitative variables were analyzed descriptively using measures of central tendency and dispersion. Qualitative variables were analyzed by calculating frequencies and percentages. One-way ANOVA was used to assess the differences between female and male participants. The items were analyzed using Pearson's correlation coefficient, based on the correlation between the statements and between each statement and the total. Internal consistency was calculated using Cronbach's alpha coefficients for the total scale and for each category, following the guidelines of Maroco and García-Marqués (2013), who state that an internal consistency with an α of 0.60 is considered acceptable as long as the results obtained are interpreted with caution and analyzed in context. Stability was calculated using test-retest validity and measured using the intraclass correlation coefficient (ICC). The pilot test was applied to 10 students, selected for convenience, and was applied again 15 days later to the same students. Both the questionnaire and the informed consent form were provided on paper. Finally, IBM SPSS Statistics software,

version 23.0, was used to analyze the answers.

Results

The total sample consisted of 286 students. Of these, 218 (76.2%) were female, 64 (22.4%) were male, and 4 (1.4%) answered “other or prefer not to answer.” The mean age was 27 years (standard deviation: 9.24). The mean age of the participants was 21, the lowest 18 ($n = 13$) and the highest 65 ($n = 2$). Participants came from seven states: Federal District (0.35%), Minas Gerais (1.75%), Rio de Janeiro (1.05%), Rio Grande do Norte (7.34%), Rio Grande do Sul (88.46%), Santa Catarina (0.70%), and São Paulo (0.35%). The majority of the sample ($n = 174$; 60.85%) lived with their families.

Most parents had completed secondary or higher education: 105 students (36.7%) reported that their fathers

had completed secondary education, followed by 92 (32.2%) who reported that they had completed higher education; 111 students (38.8%) reported that their mothers had completed higher education, followed by 108 (37.8%) who reported that they had completed secondary education.

With regard to family income, 114 students (39.9%) had a monthly income of between 2 and 5 minimum wages, followed by 53 students (18.5%) with an income of between 2 and 10 minimum wages, and 52 students (18.2%) with an income of between 1 and 2 minimum wages. The questionnaire lasted, on average, 10 minutes to complete. The mean score for women was 82.94 (range: 67 - 102), with a standard deviation of 7.48. The mean score for men was 78.66 (range: 59 - 98), with a standard deviation of 7.87. The differences were statistically significant ($p = 0.000$) for the total *PLQ-Universitários* score and categories 4 and 5 (Table 1).

Table 1

Gender differences in the scores of the PLQ-Universitários

Category	Men $n = 64$	Women $n = 218$	<i>p</i> -value
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Total <i>PLQ-Universitários</i>	78.66 (7.876)	82.94 (7.488)	0.000
1 – Healthy behaviors related to physical activity	9.91 (3.131)	9.64 (2.953)	0.281
2 – Behaviors related to alcohol intake and safety	21.19 (3.356)	21.84 (2.981)	0.208
3 - Healthy behaviors related to rest and well-being	8.22 (2.207)	7.9 (1.955)	0.189
4 – Other prevention and health promotion behaviors	28.02 (3.606)	32.05 (3.847)	0.000
5 - Behaviors related to the use of other substances	11.33 (1.222)	11.51 (1.017)	0.000

Note. *M* = Mean; *SD* = Standard deviation.

In terms of categories, the maximum score is 16 for category 1 (healthy behaviors related to physical activity), 28 for category 2 (behaviors related to alcohol intake and safety), 12 for category 3 (healthy behaviors related to rest and well-being), 38 for men and 40 for women in category 4 (other prevention and health promotion behaviors) and 12 for category 5 (behaviors related to the use of other

substances), 38 for males and 40 for females in category 4 (other prevention and health promotion behaviors) and 12 for category 5 (behaviors related to the use of other substances). The mean scores for males and females were, respectively, 9.91 and 9.64, 21.19 and 21.84, 8.22 and 7.9, 28.02 and 32.05, and 11.33 and 11.51. The male population scored slightly higher in categories 1 and 3 (Table 2).

Table 2*Alpha scores by category*

	Name	α		Items of the <i>PLQ-Universitários</i>	α <i>PLQ-Jóvenes</i>
		Men	Women		
Category 1	Healthy behaviors related to physical activity	0.739	0.662	10. 11. 18. 24	0.7
Category 2	Behaviors related to alcohol intake and safety	0.591	0.466	7r. 8. 12. 16r. 17r. 20r. 25	0.49
Category 3	Healthy behaviors related to rest and well-being	0.769	0.630	9. 15. 19	0.55
Category 4	Other prevention and health promotion behaviors	0.449	0.475	1. 2. 3. 4. 5. 6. 14r. 22. 23. 26. 27	0.48
Category 5	Behaviors related to the use of other substances	0.486	0.385	13r. 21r. 28r	0.52
<i>Total PLQ-Universitários</i>		0.686	0.647		0.691 male and 0.606 female

Note. α = Cronbach's alpha.

The correlations between each item of the *PLQ-Universitários* and the total score for women were significant in all items, with the highest correlation being 0.541 and the lowest 0.114. For men, the correlations between the different items and the total score were significant in 17 of the 27 items, with the highest correlation being 0.571 and the lowest 0.039.

Internal consistency. Cronbach's alpha was 0.647 for females and 0.686 for males. Table 2 shows the Cronbach's alpha values for each category of the *PLQ-Universitários*. Stability: The intraclass correlation coefficient (ICC) for test-retest reliability was 0.683 (95% CI; 0.385; 0.879). According to Fleiss's parameters (1999), an ICC between 0.41 and 0.75 indicates good consistency.

Discussion

This study aimed to describe the process of validating the Personal Lifestyle Questionnaire (*PLQ-Universitários*) in university students, given the importance of this stage of life. Based on this knowledge, it aimed to analyze any weaknesses on which to intervene through actions or programs for improving lifestyle behaviors. Dividing the *PLQ-Universitários* into five categories (healthy behaviors related to physical activity, behaviors related to alcohol intake and safety, healthy behaviors related to rest and well-being, other prevention and health promotion behaviors, and behaviors related to the use of other substances) allows understanding which area of lifestyles is most in need of intervention.

After the statistical tests, the *PLQ-Universitários* showed good consistency (Cronbach's alpha of 0.647 for women and 0.686 for men), according to the parameters of Maroco and García-Marqués (2013), and reliability for both men and women. The correlations were not significant for the population who identified themselves as "other or prefer not to answer" due to the small number of participants who ticked this option ($n = 4$), requiring a

larger number of participants for validation among this population. For this reason, we decided not to validate the questionnaire for the population who identified their gender as "other or prefer not to answer".

The average total score was higher for women (82.94) than for men (78.66), with statistical significance, which may suggest that women adopt healthier behaviors than men. Correlations were significant in all items among women and in most items among men. Category 4 - Other prevention and health promotion behaviors and category 5 - Behaviors related to the use of other substances showed statistically significant differences ($p = 0.000$) in relation to gender. Domingues et al. (2022) found that women scored slightly higher on average than men, with statistically significant differences, which may indicate gender variations in lifestyles among young people in Spain.

In contrast, Silva et al. (2014) found that the overall mean score 'Very Good' and none of the respondents scored below 46 points, indicating a generally positive pattern of lifestyles among university students. However, it should be noted that making direct comparisons between studies can be challenging, given the potential differences in the methods and criteria used in each study. Both studies highlight the importance of understanding young people's lifestyles and the factors that can influence them, corroborating the findings of our research.

No other PLQ validation studies were found, apart from those already mentioned: the questionnaire validated for adolescents (in English) and the questionnaire validated for the Spanish youth population. With regard to these studies, the Cronbach's alpha values (0.647 for women and 0.686 for men) are close to the *PLQ-Jóvenes* values (0.691 for men and 0.606 for women), although slightly higher for men in both studies. When compared to the Cronbach's alpha of the questionnaire validated with adolescents, the values were lower, between 0.72 and 0.80 (Mahon et al., 2002, 2003). In comparison with another validation study, the values are close to the validation of

the Fantastic Lifestyle Questionnaire, with a Cronbach's alpha of 0.69 (Añez et al., 2007), and the validation in Portugal, with an alpha of 0.71 (Silva et al., 2014). Although not identical, the alpha values of the compared studies are close to that of the *PLQ-Universitários*, indicating that the results of the *PLQ-Universitários* support the scientific evidence available to date.

The weaknesses refer to the question about the participants' gender in the sociodemographic data section since it was not clear whether the question referred to biological sex or gender identity and question 27 of the *PLQ-Universitários* "Do you use condoms during sexual intercourse?" because the way it was worded did not include people who do not have sexual intercourse.

With regard to its advantages, answering the *PLQ-Universitários* prompted reflection on the lifestyles that the respondents have been adopting. Another advantage is associated with how the questionnaire is administered, since the use of Google Forms® enables simultaneous access by many students and offers greater confidentiality to the respondent in terms of anonymity.

Given the geographical vastness and cultural variety of Brazil, the *PLQ-Universitários* has limitations, as it does not incorporate the cultural specificities of each region of the country. In order to be validated in populations that do not identify themselves as male or female, the questionnaire needs a new validation process, which was not carried out in this study.

Conclusion

The *PLQ-Universitários* proved that it is easy to answer and obtain information about the behaviors adopted by male and female higher education students in Brazil. It can be used in different universities or regions of the country to assess the need for interventions to improve lifestyles. This study concluded that the *PLQ-Universitários* is intuitive and quick to apply. With solid metric characteristics, this instrument not only helps to identify the health behaviors of Brazilian university students, but also determines a score related to the level of healthy lifestyle, enabling health professionals to quickly identify university students' health practices and behaviors and adjust interventions to their needs. Furthermore, by assessing the level of healthy lifestyles, professionals can set more specific goals and objectives, thus improving outcomes and promoting healthy lifestyles.

Author contributions

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