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Translation, Cultural Psychometric and Adaptation Evaluation of a Professionalism Assessment Instrument for Pharmacists in Brazil

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Abstract

Professionalism encompasses the set of behaviors that inform and regulate the practice of health professionals. In the field of Pharmacy, professionalism can be examined through validated assessment instruments, such as the Modification of Hall's Professionalism Scale for Use with Pharmacists. This study aimed to translate the Modification of Hall's Professionalism Scale for Use with Pharmacists into Brazilian Portuguese and to assess its psychometric properties among pharmacists. The study followed a three-phase methodological approach. First, the original instrument was translated and cross-culturally adapted into Brazilian Portuguese. Second, content validity was established through expert consensus involving specialists from different geographic regions. Finally, the psychometric properties of the scale were evaluated using data collected from a convenience sample of 600 Brazilian pharmacists. Construct validity was examined through Exploratory Factor Analysis (EFA), and reliability was assessed using composite reliability estimates. The Brazilian Portuguese version of the instrument demonstrated satisfactory content validity, with coefficients exceeding the acceptable threshold of 0.80. Exploratory Factor Analysis supported a six-factor structure comprising 39 items. Additionally, the H index indicated high factor stability, and the scale exhibited adequate composite reliability. The adapted Brazilian Portuguese version of the instrument showed robust content validity and sound psychometric properties. This tool may serve as a valuable resource for future research on professionalism, particularly in relation to educational strategies and the evaluation of professionalism among pharmacists.

Keywords: Pharmacy, Professionalism, Instrument, Pharmacists, Cross-cultural adaptation, Validation

Introduction

Professionalism can be defined as the manifestation of behaviors and attitudes that orient professional practice, representing a social contract established between professionals and society [1-3]. Although there is no universally accepted definition, this concept has emerged in response to pragmatic transformations within health professions aimed at advancing patient-centered models of care. In recent years, these changes have contributed to growing scholarly interest in professionalism, whether considered as a broad construct or as an independent competency, particularly within the field of social pharmacy research [1, 3-7].

Within this framework, Pharmacy has undergone significant transitions driven by ethical considerations and concerns regarding professional autonomy, especially in relation to dilemmas associated with profit derived from the commercial distribution of medicines—an aspect often viewed as separate from patient-centered services [4, 5, 8, 9]. Consequently, there is a clear need to operationalize professionalism through the development of instruments that facilitate its comprehension among students and practicing pharmacists, support educational initiatives, and promote modifications in work processes that align with societal expectations [10-13].

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Professionalism is also regarded as a measurable construct that can be assessed using instruments designed to systematize perceptions related to behavioral and value-based transformations, such as altruism and autonomy. These attributes serve as indicators of the professional roles and responsibilities expected of pharmacists across diverse practice settings [1, 3, 14]. To strengthen the credibility of such assessments, the literature emphasizes the importance of ensuring evidence of validity and reliability, thereby enabling consistent interpretation of findings and reproducibility of results [3].

To facilitate the measurement of professionalism within Pharmacy, the literature describes the Modification of Hall's Professionalism Scale for Use with Pharmacists, developed by Schack and Hepler in 1979. This instrument conceptualizes professionalism as a multidimensional construct encompassing behaviors considered characteristic of professional practice, assessed through hypothetical situations and pharmacists' levels of agreement with each statement. This approach aligns with processes commonly identified in the literature as reflection and self-assessment [15].

Supported by evidence of reliability, this scale has been applied in several studies, predominantly within the United States [16, 17]. This highlights the necessity for research examining its applicability among pharmacists in different cultural contexts. Furthermore, in Brazil, recent advancements in patient-centered care models and increasing attention to professionalism within pharmacy practice underscore the relevance of such investigations [4, 9, 18-21]. Accordingly, the present study aimed to translate the Modification of Hall's Professionalism Scale for Use with Pharmacists into Brazilian Portuguese and to evaluate its psychometric properties among pharmacists.

Materials and Methods

The methodological procedures were conducted in three sequential phases: (1) translation and cross-cultural adaptation; (2) evaluation of content-related validity evidence; and (3) assessment of psychometric properties. The instrument Modification of Hall's Professionalism Scale for Use with Pharmacists was developed by Charles Hepler, a pharmacist recognized for his contributions to the philosophy and professional practice models in Pharmacy. This scale is grounded in Richard Hall's original framework for assessing professionalism among physicians, lawyers, nurses, and other autonomous professionals [22, 23].

The instrument consists of 40 statements rated on a five-point Likert scale, with response options ranging from "strongly disagree" to "strongly agree." These items are organized into six domains: autonomy, vocation, professional council (represented in Brazil by the Federal Council of Pharmacy), self-regulation, continuing education, and altruism. A translated version of this instrument is also available in Thai [17].

Translation and cross-cultural adaptation of the modification of hall's professionalism scale for use with pharmacists into brazilian portuguese

Authorization to translate and adapt the instrument into Brazilian Portuguese was obtained from the corresponding author. The adaptation process followed the methodological guidelines proposed by Borsa, Damásio, and Bandeira (2012) and was carried out in six stages: initial translation, synthesis of translations, expert committee review, evaluation by the target population, and back-translation [24, 25].

Two independent bilingual translators, both native speakers of Brazilian Portuguese with proficiency in English, conducted the initial translations [25]. One translator was familiar with the objectives and theoretical framework of the instrument, whereas the other translator had no prior knowledge of its purpose or conceptual background [26]. The two translated versions (T1 and T2) were reviewed and compared by the research team, with discrepancies resolved through consensus, resulting in a synthesized version (T12) [27].

An expert committee comprising an English language instructor, three specialists in instrument validation, and the study researchers evaluated the original version, the individual translations (T1 and T2), and the synthesized version (T12). This evaluation aimed to verify the preservation of the following equivalences [24, 26, 28]:

- *Semantic equivalence:* assessment of whether the translated terms retained their original meaning and were free of ambiguity or grammatical inconsistencies;
- *Idiomatic equivalence:* evaluation of the use of culturally appropriate expressions that accurately conveyed the intended meaning;

- *Experiential equivalence:* determination of the cultural relevance and applicability of the items, with modifications proposed when necessary;
- *Conceptual equivalence:* confirmation that the translated items consistently reflected the same underlying constructs across languages and cultural contexts.

Following revisions suggested by the expert panel, a preliminary adapted version (T3) was produced and subsequently evaluated by the target population. This group consisted of nine pharmacists from diverse geographic regions, who qualitatively assessed the clarity and comprehensibility of the items and reported any difficulties encountered during interpretation [28].

After incorporating feedback from the target population, the instrument proceeded to the back-translation phase. This step was performed independently by two translators who were native English speakers and fluent in Portuguese, neither of whom had prior exposure to the original instrument. This process resulted in two back-translated versions (RT1 and RT2) [27]. The research team compared these versions to confirm consistency with the original scale and ensure conceptual equivalence.

Content-based validity assessment

The Brazilian Portuguese version of the Modification of Hall's Professionalism Scale for Use with Pharmacists was evaluated for content-related validity using a structured Delphi methodology. The selection of specialists for the expert panel was based on an analysis of professional curricula retrieved from national databases. Experts were required to achieve a minimum score of five points according to the adapted Fehring's Criteria (1987) to qualify for participation [29, 30].

Pharmacists meeting these criteria were invited via e-mail to take part in the Delphi process. In addition, invited experts were permitted to recommend other qualified professionals to expand the panel. Consistent with methodological guidelines, at least six experts were required for each Delphi round. Although ten pharmacists were invited, six accepted and completed the evaluation [28-30].

The adapted instrument was administered electronically using the Google Forms platform (Google Inc., Mountain View, CA, USA). Upon accessing the form, participants were instructed to complete preliminary information and to review statements addressing data confidentiality and informed consent [29]. Each expert then independently and anonymously assessed the instrument items using a five-point Likert scale ranging from "strongly disagree" to "strongly agree." Evaluations were based on the following dimensions [28, 31]:

- *Language clarity:* adequacy and comprehensibility of wording for the intended population;
- *Practical applicability:* relevance of the item to professional pharmacy practice;
- *Conceptual adequacy:* alignment of the item with the theoretical construct underlying the scale.

Experts were also encouraged to provide written feedback, including critiques and suggestions for item improvement. In accordance with established recommendations, items were considered valid when at least 80% agreement among experts was achieved, as determined by the Content Validity Coefficient (CVC). Items failing to meet this criterion were revised and reassessed in a subsequent Delphi round [30].

Psychometric evaluation

The psychometric performance of the instrument was examined through a nationwide online survey administered to pharmacists practicing in Brazil. Eligible participants included professionals working in hospital pharmacies, community pharmacies, public pharmaceutical services, or pharmaceutical offices. Data collection was conducted between March and August 2022, with recruitment facilitated through e-mail invitations and dissemination on social media platforms.

Sample size determination followed psychometric recommendations suggesting a minimum ratio of four to ten respondents per item. Given the 40-item structure of the adapted scale, a minimum of 400 participants was required. Additionally, considering the total population of 234,301 pharmacists registered with the Brazilian Federal Council of Pharmacy, a sample size of 384 respondents was deemed sufficient to ensure statistical representativeness, assuming a 95% confidence level and a 5% margin of error [32, 33].

Before completing the questionnaire, participants reviewed and consented to the informed consent statement. Sociodemographic variables were collected, including sex, age, region of residence, employment sector (public or private), and current area of professional practice. Data were compiled using Microsoft Excel software and subsequently analyzed to obtain evidence

of validity based on the internal structure of the instrument through exploratory factor analysis.

Internal structure validity analysis

This study represents the first effort to adapt the Modification of Hall's Professionalism Scale for Use with Pharmacists for use in Brazilian Portuguese, hereafter referred to as the Brazilian version of the scale. It also constitutes the first psychometric investigation of this instrument within the Brazilian pharmacy context. Given the absence of prior evidence regarding its dimensional configuration in this population, Exploratory Factor Analysis (EFA) was selected to examine the latent structure of the measure.

All analyses were conducted using the Factor software package (version 10.9.02). A correlation matrix served as the basis for the analysis, and factor extraction was performed using the Robust Diagonally Weighted Least Squares (RDWLS) estimator [34]. Before proceeding with factor extraction, data adequacy was evaluated. Sampling suitability was assessed using the Kaiser–Meyer–Olkin (KMO) statistic, with values above 0.80 indicating excellent adequacy, while Bartlett's test of sphericity was applied to confirm the presence of sufficient inter-item correlations; statistical significance ($p < 0.05$) was required to reject the null hypothesis of an identity matrix [35].

The determination of the appropriate number of factors relied on Parallel Analysis with random permutation of the observed data, followed by factor rotation using the Robust Promin method [28, 36]. Model residuals were examined using the Weighted Root Mean Square Residual (WRMR), with values below 1.0 interpreted as indicative of satisfactory model fit. Overall model performance was additionally assessed using the chi-square to degrees of freedom ratio (χ^2/df), with acceptable fit defined as values below 3. Complementary fit indices were also considered, including the Comparative Fit Index (CFI ≥ 0.95) [37], Goodness of Fit Index (GFI ≥ 0.95), Non-Normed Fit Index (NNFI ≥ 0.95), Root Mean Square Error of Approximation (RMSEA ≤ 0.08, with $p > 0.05$), and Root Mean Square of Residuals (≤ 0.8) [28, 38].

The robustness of the factorial solution was examined through the factor determinacy coefficient, with values greater than 0.90 indicating reliable estimation of factor scores, as well as the expected percentage of true score variance, with thresholds above 90% considered acceptable [34]. Factor stability was further evaluated using the H index, a statistic ranging from 0 to 1 that reflects the degree to which a set of items coherently represents a latent construct [34, 39, 40]. H index values exceeding 0.80 were interpreted as evidence of adequate factor stability. For items exhibiting meaningful loadings on more than one factor, allocation decisions were guided by Pratt's index in conjunction with theoretical considerations derived from the professionalism literature. Items with factor loadings below 0.30 were excluded from the final model [41-44].

Reliability assessment

The internal consistency of the adapted scale was estimated using composite reliability, a measure that incorporates the standardized factor loadings of individual items rather than assuming equal contribution across items [28, 45]. Composite reliability coefficients were interpreted according to established benchmarks, with values of ≥ 0.70 indicating acceptable reliability, ≥ 0.80 reflecting good reliability, and ≥ 0.90 denoting excellent internal consistency [46]. An overview of the methodological stages of the study is presented in **Figure 1.**

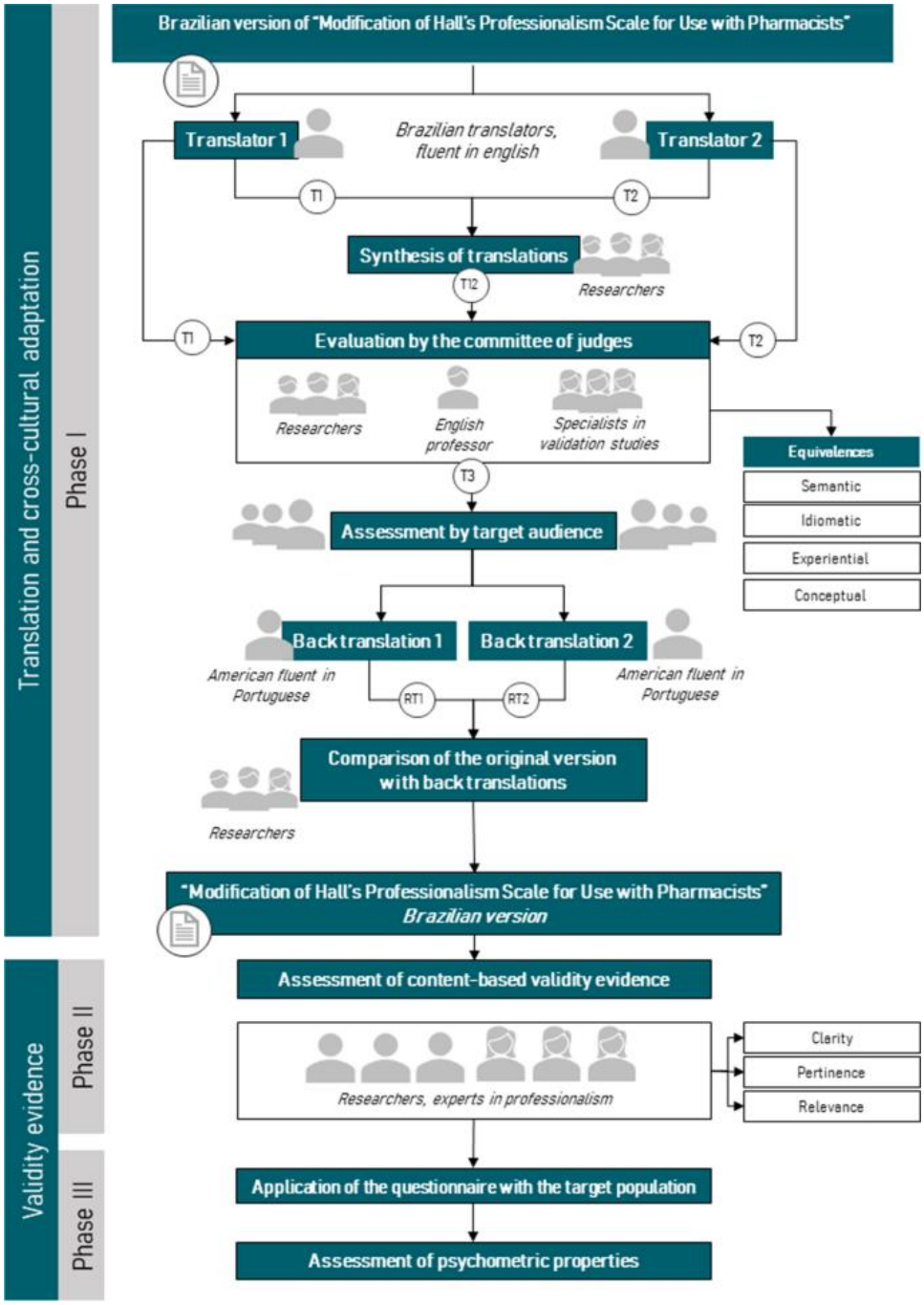

Figure 1. Overview of the methodological phases of the investigation. Source: authors' own elaboration.

Ethical aspects

All procedures followed the ethical standards established by Resolution No. 466/2012 of the Brazilian National Health Council. Approval to conduct the study was obtained from the Research Ethics Committee of the Federal University of Sergipe for the project entitled Evaluation of Professionalism in the Pharmacy Area (Ethical Approval Opinion No. 4169752).

Results and Discussion

Evidence of content validity

The content validation stage involved six pharmacists originating from different regions of Brazil. All participants satisfied the eligibility requirements defined by Fehring's criteria for the selection of expert judges

and formally agreed to take part in the study. A minimum score of five points was required for inclusion in the panel. The professional and demographic characteristics of the experts who participated in the content validation process are presented in **Table 1.**

Table 1. Sociodemographic and professional profile of the judges participating in the content validation committee.

Sex	Age	Professional experience	Academic degree	Score
Female	47 years	16 years	PhD	7 points
Female	52 years	26 years	PhD	7 points
Female	52 years	21 years	PhD	7 points
Female	63 years	37 years	PhD	7 points
Male	50 years	20 years	PhD	7points
Female	35 years	9 years	PhD	7 points

During the initial Delphi round assessing content-related validity, the Content Validity Coefficient (CVC) values varied from 0.67 to 0.97. Four items (1, 11, 18, and 23) failed to meet the minimum threshold of 0.80 recommended in the literature, primarily due to limitations in statement clarity. Item 1 additionally did not achieve the required coefficient for practical relevance or theoretical alignment. Based on the qualitative feedback provided by the expert judges, these items were revised, and the instrument was subsequently submitted to a second evaluation round. In this phase, all revised items demonstrated CVC values ranging between 0.88 and 0.92, indicating satisfactory validation.

Psychometric properties

A total of 600 pharmacists completed the questionnaire. The sample was predominantly composed of women (n = 415; 69.16%). Most participants resided in the Northeast region of Brazil (n = 228; 38%) and were employed in private-sector institutions (n = 335; 55.7%). Community pharmacy represented the most frequently reported area of professional practice (n = 299; 49.8%). Participant ages ranged from 21 to 72 years, with a mean age of 34 years.

Internal structure validity

Evidence supporting the suitability of the data for factor analysis was provided by Bartlett's test of sphericity (χ^2 = 6737.0) and a Kaiser–Meyer–Olkin index of 0.81, both indicating adequate inter-item correlations (Table 2). Parallel analysis supported the extraction of six latent factors, consistent with the dimensional structure of the original instrument. Factor stability was confirmed by H index values, which indicated strong robustness across all factors. Additional fit indices demonstrated satisfactory model performance, with no requirement for further model refinement. Notably, the Non-Normed Fit Index (NNFI) indicated a 98% improvement in model fit, corroborating the adequacy of the proposed factorial solution. Detailed results related to internal structure validity are presented in **Table 2.**

Table 2. Evidence of validity based on the internal structure of the scale.

Exploratory Factor Analysis	Adequacy of the correction matrix	Bartlett	6737.0 (df = 741)[a]
		Kaiser–Meyer–Olkin (KMO)	0.81
	Factors		6
	Explained variance		53.7%
	Waste distribution	Weighted Root Mean Square Residual (WRSR)	0.0356
	Chi-square ratio for degree of freedom (X2/df)		757.625
	Non-Normed Fit Index (NNFI)		0.98
	Comparative Fit Index (CFI)		0.98
	Goodness of Fit Index (GFI)		1.0
	Root Mean Square Error of Approximation (RMSEA)		0.027
	Root Mean Squared Residual (RSMR)		0.0437
[a]p < 0,001; [b]p = ,99			
Replicability adjusted by H index			
Factor Index Confidence Interval	Factor Index Confidence Interval	Factor Index Confidence Interval	
Autonomy	0.962	0.945 – 0.980	
Vocation	0.935	0.919 – 0.945	

Self-regulation	0.838	0.795 – 0.858
Altruism	0.828	0.779 – 0.845
Professional Council	0.878	0.799 – 0.915
Continuing Education	0.867	0.810 – 0.887

Quality and effectiveness of factor score estimates

Index	Factor					
	Autonomy	Vocation	Professional Council	Self-regulation	Continuing Education	Altruism
Expected percentage of true differences	96.2%	94.4%	91.5%	90%	91%	89.6%
Factor Determinacy Index	0.981	0.967	0.937	0.916	0.931	0.910

Table 3 displays the pattern of item–factor relationships identified in the exploratory analysis. During model estimation, item 18 exhibited a negligible loading (−0.095), indicating inadequate contribution to any latent construct. Consequently, this item was removed, and the factor analysis was re-estimated to obtain updated fit indices.

Additional inspection revealed that item 18 showed weak cross-loadings on the autonomy (0.26) and self-regulation (0.21) factors. However, theoretical examination based on existing professionalism literature did not support an association between this item and either dimension. Although item 18 was originally assigned to the continuing education domain in the original scale, its empirical performance and conceptual misalignment in the Brazilian adaptation justified its exclusion from the final instrument.

The finalized Exploratory Factor Analysis results, including the retained items and their standardized factor loadings for the Brazilian adaptation of the Modification of Hall's Professionalism Scale for Use with Pharmacists, are presented in **Table 3.**

Table 3. Exploratory factor analysis: retained items and corresponding factor loadings.

ITEM	FACTOR					
	Autonomy	Vocation	Professional Council	Self-regulation	Continuing education	Altruism
5	0.381					
11	0.580					
15	0.438					
17	0.713					
23	**-0.370**					
29	0.681					
35	0.339					
37	-0.365					
4		-0.961				
10		0.888				
16		0.644				
22		0.995				
28		0.589				
36		0.450				
1			0.793			
7			-0.847			
13			-0.855			
19			0.819			
25			0.618			
33			0.830			
3				0.462		
9				0.591		
21				0.727		
27				0.716		
21				0.328		
40				0.577		
6					0.568	
12					-0.856	
24					**0.568**	
32					0.744	
38					-0.592	
2						0.615
8						-0.483
14						0.586
20						0.686
26						-0.315
30						**-0.486**
34						0.760
39						0.644

Reliability

The consistency of the measurement model was assessed by estimating composite reliability indices. Across all latent constructs, coefficients exceeded the minimum acceptable level of 0.7, supporting the stability of the scale scores. Factor-specific reliability results for the Brazilian adaptation are provided in Table 4.

Table 4. Internal consistency indicators for the Brazilian Portuguese scale.

Metric	Vocational Commitment	Autonomy	Self-Governance	Professional Council Involvement	Altruistic Orientation	Continuing Professional Development
Composite reliability coefficient	0.898	0.715	0.745	0.912	0.800	0.803

This study resulted in the development of a Brazilian Portuguese version of the "Modification of Hall's Professionalism Scale for Use with Pharmacists" through a systematic translation and cultural adaptation process. In addition to following internationally accepted methodological guidelines, specialists from different regions contributed to content refinement, ensuring contextual adequacy. These steps initially produced a 40-item instrument. Subsequent psychometric testing—including exploratory factor analysis and assessments of reliability and replicability—supported a refined version with 39 items and evidence of validity related to content and internal structure.

Unlike earlier investigations, all items were examined during factor analysis. In the original study by Schack and Hepler (1979) and in the confirmatory analysis conducted by Rupp and Segal (1989), items 30, 31, 39, and 40 were not included in the analytical procedures. In the present evaluation, item 18—previously associated with the "continuing competence" domain—failed to demonstrate a meaningful association with any factor due to insufficient loading and was therefore removed. The final scale comprises 39 statements organized into six domains, assessed using a five-point Likert response format ranging from "totally disagree" to "totally agree." The results of the exploratory factor analysis revealed a six-dimensional structure. This configuration was supported by indicators such as the factor determinacy index and the expected proportion of true score variance, suggesting that professionalism among pharmacists is a multidimensional construct. A comparable factorial arrangement was identified in the original model proposed by Schack and Hepler (1979) and later confirmed by Rupp and Segal (1989), whose studies included large pharmacist samples. In those analyses, the "autonomy" and "self-regulation" domains demonstrated adequate model fit, although these factors initially showed weaker loadings in the present dataset.

In the current model, acceptable factor loadings were ultimately achieved for both "autonomy" and "self-regulation." However, theoretical considerations and Pratt's correlation coefficients were required to guide the allocation of items 24, 30, 31, and 37 to the domains of "continuing education," "altruism," "self-regulation," and "autonomy," respectively. Previous research examining professionalism among pharmacists, pharmacy students, and other health professionals—such as physicians—has also described factor structures consisting of five or six domains [1, 13]. These dimensions frequently align with concepts such as professional responsibility [1, 22, 47], reinforcing the view that professional autonomy and self-governance should be safeguarded from non-professional interference.

High levels of reliability, replicability, and factorial stability were observed for the adapted instrument. These findings are consistent with those reported by Schack and Hepler (1979), who employed Cronbach's alpha to assess internal consistency. Similarly, a Thai adaptation of the same scale demonstrated satisfactory reliability, indicating that the instrument maintains its psychometric robustness across languages and cultural contexts beyond the United States. Typically, inadequate values for these indicators would suggest poor measurement stability and limited reproducibility [28, 34].

Beyond its psychometric contribution, this study sought to advance dialogue on professionalism in settings where this concept remains insufficiently emphasized, such as Brazil, in contrast to its more established role in European countries and the United States. The professional role of pharmacists in Brazil has been

evolving, particularly in response to efforts aimed at overcoming the historical perception of pharmacy as a profession distanced from patient care [1, 4, 48-51]. Within this context, the adapted scale may support pharmacists in reflecting on their professional attitudes during ongoing transformations in practice models and professional philosophy. Additionally, it may serve as an evaluative tool for educational interventions targeting professionalism or professional identity, as well as for professional selection processes.

This investigation presents notable strengths. It represents the first instrument adapted for Brazilian Portuguese that assesses pharmaceutical professionalism with evidence of validity based on content and internal structure. The use of a well-established theoretical framework from the social sciences and a rigorous cross-cultural adaptation methodology further strengthens its contribution. Moreover, the factor analytic procedures both replicated the original conceptual structure and incorporated items that had previously been excluded. Nonetheless, certain limitations must be acknowledged. The length of the scale may increase the likelihood of respondent fatigue or incomplete participation. Furthermore, the concentration of participants from specific geographic regions during the exploratory phase may have introduced sampling bias, a challenge inherent to research conducted in a country characterized by vast territorial extension and cultural diversity. Future studies may consider item reduction strategies, although such modifications may affect internal consistency.

Conclusion

The present study describes the translation, cultural adaptation, and psychometric evaluation of an instrument designed to measure pharmaceutical professionalism in Brazil. The findings support a six-factor structure that adequately represents professionalism among pharmacists working in diverse practice settings, including community pharmacies, hospitals, pharmaceutical clinics, public pharmacies, and pharmaceutical offices. By enabling the systematic assessment of professionalism in contexts where the construct is not yet well established, this instrument may contribute to future research and educational initiatives. Furthermore, it offers a means of longitudinally monitoring professionalism within sustainable and reproducible educational strategies.

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Conflict of Interest: None

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Ethics Statement: None

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