

Translation and Validation of the Self-Assessment Leadership Instrument (SALI) for the Portuguese Cultural Context: A Methodological Study

Patrícia Costa ^{1,2}, Joana Pereira Sousa ^{1,3}, Bonnie Ketchum Smola⁴, Pilar Fuster-Linares ⁵, Paulo Cruchinho ^{1,2}, Elisabete Nunes ^{1,2}, Filomena Gaspar ^{1,2}, Pedro Lucas ^{1,2}

¹Nursing Research, Innovation and Development Centre of Lisbon (CIDNUR), Nursing School of Lisbon (ESEL), Lisbon, 1600-190, Portugal; ²Nursing Administration Department, Nursing School of Lisbon (ESEL), Lisbon, 1600-190, Portugal; ³Health Sciences Research Unit: Nursing, Nursing School of Coimbra, Coimbra, 3045-043, Portugal; ⁴Independent Researcher, Iowa, IA, USA; ⁵Department of Nursing, Faculty of Medicine and Health Sciences, Universitat Internacional de Catalunya, Cugat Del Vallès, Barcelona, Spain

Correspondence: Patrícia Costa, Email patriciacosta@esel.pt

Introduction: Leadership is a complex and multidimensional concept that has been widely studied in the field of nursing, given its proven influence on the nursing practice environment, and on the quality and safety of the care provided. Identifying which leadership skills are necessary for effective leadership, and understanding how they can be developed, is extremely important, as, without them, it is difficult for nursing leaders to maintain favourable nursing practice environments. In this context, we highlight the relevance of the Self-Assessment Leadership Instrument (SALI), which was developed by Bonnie Smola with the aim of specifically measuring leadership behaviours in nurses and nursing students. In this study, the SALI was translated, cross-culturally adapted, and validated for the Portuguese cultural context.

Purpose: This study aimed to (1) culturally and linguistically adapt the SALI to Portuguese and (2) validate its psychometric properties, resulting in a Portuguese version of the instrument.

Methods: A cross-sectional quantitative methodological study was carried out. The scale was translated and adapted transculturally through a rigorous process and applied to the target population of two nursing colleges, with a total of 1590 nursing students.

Results: The Portuguese version maintains the 40 items of the original scale. Internal consistency proved to be high, with a Cronbach's alpha coefficient of 0.95 for the total scale. Content validity was ensured during the initial stages of the translation and cross-cultural adaptation process. Construct validity was analysed using factor analysis, which identified the four leadership dimensions assessed, explaining 49.39% of the total variance: Critical and Strategic Thinking; Teamwork Skills; Emotional Intelligence; and Communication and Relational Influence. The final factor model achieved showed very good fit indices, which reinforced the underlying theoretical structure.

Conclusion: The PT-SALI proved to be a valid, reliable, and robust tool for assessing, monitoring, and promoting the development of leadership competences in the Portuguese cultural context, with applicability in undergraduate and postgraduate contexts.

Keywords: leadership, nursing education, scale, translation, validation studies, psychometrics

Introduction

Competent leadership is essential to ensure quality care.^{1,2}

In today's world, characterised by globalisation, technological advances, economic challenges, an ageing population, the emergence of new diseases and an increase in chronic illnesses, the complex nature of healthcare and the growing demand for its quality is increasingly evident.^{1,3-7} All of this, combined with the constant and necessary changes in healthcare systems and the uncertainties of organisational environments, highlights the importance of nurse leaders who, due to their training, skills, and holistic and insightful understanding of the people they care for, are excellently placed to contribute and lead.^{3,6,8} More nurse leaders are, therefore, needed, capable of dealing with the social and health demands that these changes entail.^{3,9}

The complexity inherent in the nursing profession is revealed in the multiplicity of roles that nurses fulfil in their professional practice, which often occur simultaneously.^{3,10} Some of these roles include providing healthcare, monitoring health conditions, communicating with families, and coordinating care,¹¹ in which nurses act as members of intraprofessional teams and as members of interprofessional teams.¹² Leadership emerges as a transversal competence, occurring from the direct provision of care to management, education, research, and the formulation and implementation of health policies.^{13,14} This was particularly evident during the COVID-19 pandemic, which demonstrated the ability of nurses to take on leadership roles at all levels and in all contexts.^{1,15}

Leadership in nursing has been defined in various ways. In the context of undergraduate education, the American Association of Colleges of Nursing defined leadership in nursing as taking responsibility for motivating others to do their best to achieve a defined goal.¹⁶ In relation to nurses, the American Nurses Association defined leadership as a multifaceted journey, marked by personal growth, understanding, and the relentless pursuit of excellence in patient care.¹⁷ Although these definitions do not specify any area of activity, historically, nursing leadership has been related to the management and organisation of care.¹⁸ Today, nursing leadership goes beyond this and includes, for example, the creation of knowledge through research and innovation; policy advocacy and development within governance contexts; executive leadership in executive teams and boards of directors; healthcare quality leadership in improvement initiatives; educational responsibilities as nurse educators and professors; and various other domains.¹⁹

The World Health Organization^{4,20} has defined promoting the development of leadership skills in nurses, both current and future, as a strategic priority for the progress of the nursing profession until 2030. This is also advocated by the European federation of Educators in Nursing Sciences,²¹ which reinforces the need for strong leadership skills in nurses, as they are the ones who often innovate, update, and improve the healthcare provided to populations. It is, therefore, imperative to promote their development,²² justifying the need to make the most of the years of undergraduate training.^{6,9}

Promoting the development of leadership skills in students will contribute to the creation of competent nursing professionals who are fully prepared to work effectively in today's complex, challenging, and chaotic healthcare environment, and to provide quality nursing care.^{9,23} Without adequate skills and knowledge, it becomes difficult for nurse leaders to maintain favourable nursing practice environments,^{24–26} which, in turn, are associated with higher quality and safety of nursing care, as well as better outcomes for the people being cared for.^{25–29} This demonstrates that leadership influences the nursing practice environment and is strongly associated with favourable nursing practice environments, constituting one of their structuring dimensions.^{24–26,28,30}

Within this context, nursing education assumes a position of opportunity and responsibility,¹⁵ where the development of leadership skills should be an essential component,²¹ as the future of the profession demands strong leaderships and governances.⁴

According to Scammell et al² and Jack et al³¹ studies carried out in the field of preparing students for leadership are still scarce. However, the available data show that students are not always prepared for the challenges of the complex clinical environment, and that they often struggle to demonstrate sufficient clinical leadership skills.⁹ All available opportunities to promote their development, both inside and outside the classroom, should, therefore, be supported, as should their assessment.^{9,23} However, for this development to be effectively demonstrated, it is essential that it is properly measured and evaluated.³² The use of measurement instruments for this purpose was identified as an effective strategy in the literature review we previously conducted, which highlighted the crucial role of such instruments in assessing the impact of the pedagogical strategies adopted, identifying areas for improvement, and supporting potential adjustments.³²

There are different instruments to measure a wide variety of leadership dimensions, usually associated with specific theories of leadership and/or professional development.^{14,23} However, particularly in Portugal, there is no validated instrument specifically aimed at nurses and nursing students. In this sense, the cross-cultural adaptation and validation of the *Self-Assessment Leadership Instrument* (SALI) for the Portuguese cultural context helps to close this gap, making it possible to assess and monitor the development of these competences throughout undergraduate and postgraduate training. The choice of the SALI is based on its wide international applicability and its specificity for measuring leadership behaviours in nurses and nursing students.³² The translation and validation of this instrument will not only contribute to the improvement of pedagogical strategies in nursing education in Portugal, but will also allow for international comparisons to be made and educational strategies to be adapted.

As the SALI is a self-assessment scale, its application will allow us to access the important contributions that result from this practice. Defined by Yan and Brown³³ as the “process during which students collect information about their own performance, evaluate and reflect on the quality of their learning process and outcomes” (p.1248), the practice of self-assessment will lead to the identification of strengths and weaknesses, as well as reflection on them, which, in turn, will enhance student involvement in future learning.³³ Its promotion is also advocated by the European Federation of Educators in Nursing Sciences,²¹ which considers this competence essential in nursing education.

Furthermore, it is widely recognised that, in order to exercise effective leadership, it is necessary for the leader to perceive themselves as such.^{6,15,34} Therefore, here, too, important contributions can be obtained from the self-assessment promoted by the SALI, since leadership development is integrally related to identity development, where self-knowledge plays a fundamental role.⁶

In this sense, and for all the reasons outlined above, the translation and validation of the SALI for the Portuguese cultural context is fully justified, especially given the current lack of validated instruments specifically designed to assess leadership behaviours in nurses and nursing students in Portugal. This will enable the reliable assessment of such behaviours and the implementation of sustained and effective training strategies to support their development. Furthermore, although the importance of cross-cultural adaptation is implicit, it is important to acknowledge that cultural differences may influence how leadership is perceived and expressed. These differences reinforce the need to ensure semantic, conceptual, and cultural equivalence in the adapted version.

The aim of the study was therefore to culturally and linguistically adapt and psychometrically validate the SALI, giving rise to its Portuguese version. Scientific integrity, fidelity to procedures, and ethical issues were carefully considered in this methodological study. This work benefited from the theoretical contributions of a literature review conducted by our research team (Costa et al³²), which mapped the scientific evidence on leadership development in undergraduate nursing students.

Materials and Methods

Design

A methodological study was designed, with a cross-sectional quantitative approach,^{35,36} in order to answer the research question: does the SALI have adequate psychometric characteristics for the Portuguese population?

The Guidelines for Reporting Reliability and Agreement Studies (GRRAS) were applied.^{37,38}

Target Population, Sample and Sampling Technique

The target population for this study included all students in the four years of undergraduate nursing program at two public nursing colleges in Portugal (known as School X and School Y), corresponding to a total of 1590 students. The inclusion criteria were: being 17 years old or older; being fluent in Portuguese; and attending undergraduate training.

The sample size was 656 students, selected using a non-probabilistic convenience sampling technique, with all students meeting the pre-defined inclusion criteria.

Data Collection Instrument

The SALI, developed in 1988 by Bonnie Smola^{39,40} was designed specifically to measure leadership behaviours in nurses and nursing students. Its conceptual foundations are based on the notion of transformational leadership, and it consists of a total of 40 response items on a five-point Likert scale (ranging from 0, usually not, to 4, almost always), which measure a broad domain of leadership rather than separate dimensions.^{23,39,40}

Its development was based on the Leadership Behavior Tool, developed by Yura,⁴¹ which, in turn, aimed to explore nursing teachers' perceptions of the potential for developing leadership behaviours in students.^{39,40} It is an instrument composed of a total of 70 items, organised into five categories: *Self*; *Critical Thinking and Decision Making*; *Interpersonal Relationships*; *Group Relations*; and *Job Relations*.^{39,40}

The SALI has already been translated, cross-culturally adapted, and validated for the Korean cultural context by Lee et al⁴² for the Latin American cultural context by Jiménez,⁴³ and for the Spanish cultural context by Fuster-Linares

et al.²³ It should also be noted that Baron et al.⁴⁴ translated the Spanish version (ES-SALI) of Fuster-Linares et al.²³ into English and Hebrew, adapting it to the cultural contexts of England and Israel, respectively. In this study, content validity was confirmed by experts and through comprehension tests (pre-tests) with students and nurses; however, neither criterion validity nor construct validity was assessed.

Translation and Cross-Cultural Adaptation Process

This process followed a strict protocol, based on the recommendations of Beaton et al.,^{45,46} Cruchinho et al.⁴⁷ and Sousa and Rojjanasrirat,⁴⁸ with the aim of guaranteeing the validity, and semantic and conceptual equivalence, of the translated version compared to the original scale (Figure 1).

The first stage (direct translation) consisted of two independent translations from English into Portuguese from Portugal. At this stage, the 40 items of the scale were translated exclusively, without including the answer options or instructions for filling them in, as the aim was to create a precise focus on adapting the essential content of the scale – the items. The translations were carried out by two bilingual, bicultural translators, both native Portugal and speakers fluent in English and Portuguese, but with different profiles: one with a background in nursing, leadership, and management, and the other with a background outside nursing and health.

In the second stage (synthesising the direct translations), the previously obtained translations were synthesised. To this end, a meeting of experts was held, in which the discrepancies between the two versions realised in the first stage were compared and analysed in detail. Discrepancies and ambiguities were identified in items 6 and 39 that warranted further analysis, with resorting to a third translator and contacting the original author of the scale to clarify an idiomatic expression.

The third stage (back-translation) involved back-translating the consensus version into the original language of the instrument (English). Two independent, bilingual translators were selected, both fluent in English and Portuguese and with similar profiles to those of the translators in the first stage. It should be noted that none of the translators had access to the original scale at this stage.

In the fourth stage (harmonisation), the back-translated versions were compared with the original instrument in a meeting of experts. From this comparison, it was concluded that semantic and conceptual equivalence were preserved, and that there was consensus between the analysed versions, with the items maintaining their integrity.

In the fifth stage (pre-test), two pre-tests were carried out in order to assess the relevance and clarity of the items: (1) panel of experts, focused on relevance; and (2) application of the pre-final version to a sample of the target population (29 students), which resulted in 90% agreement (n=26).

The sixth stage (field test) consisted of applying the translated version to the target population, which allowed for effective data collection and, consequently, for the seventh and eighth stages to be carried out, relating to psychometric validation and the analysis of psychometric properties.⁴⁷

Data Collection

Data collection took place between 7 November 2024 and 1 January 2025, using an online questionnaire (Google Forms[®]), which was structured into two sections: (1) sociodemographic data (age, gender, year of study, clinical teaching experience, and school); (2) a translated version of the SALI.

To ensure broad participation in the study, various recruitment strategies were implemented, including the involvement of the coordinators of each curricular year, the coordinators of the study cycle, the lecturers of two curricular units, the student representatives of each year, and the student association. Three reminders were also sent via institutional Email to all students.

Data Analysis

For the statistical treatment of the data obtained and for the exploratory factor analysis, the IBM SPSS Statistical Package for the Social Science - IBM[®]-SPSS Statistics[®] version 29.0 software was used, and for the modelling of structural equations (confirmatory factor analysis) the IBM[®] SPSS[®] AMOS software (v.29, SPSS, Corporation, Armonk, NY, USA).

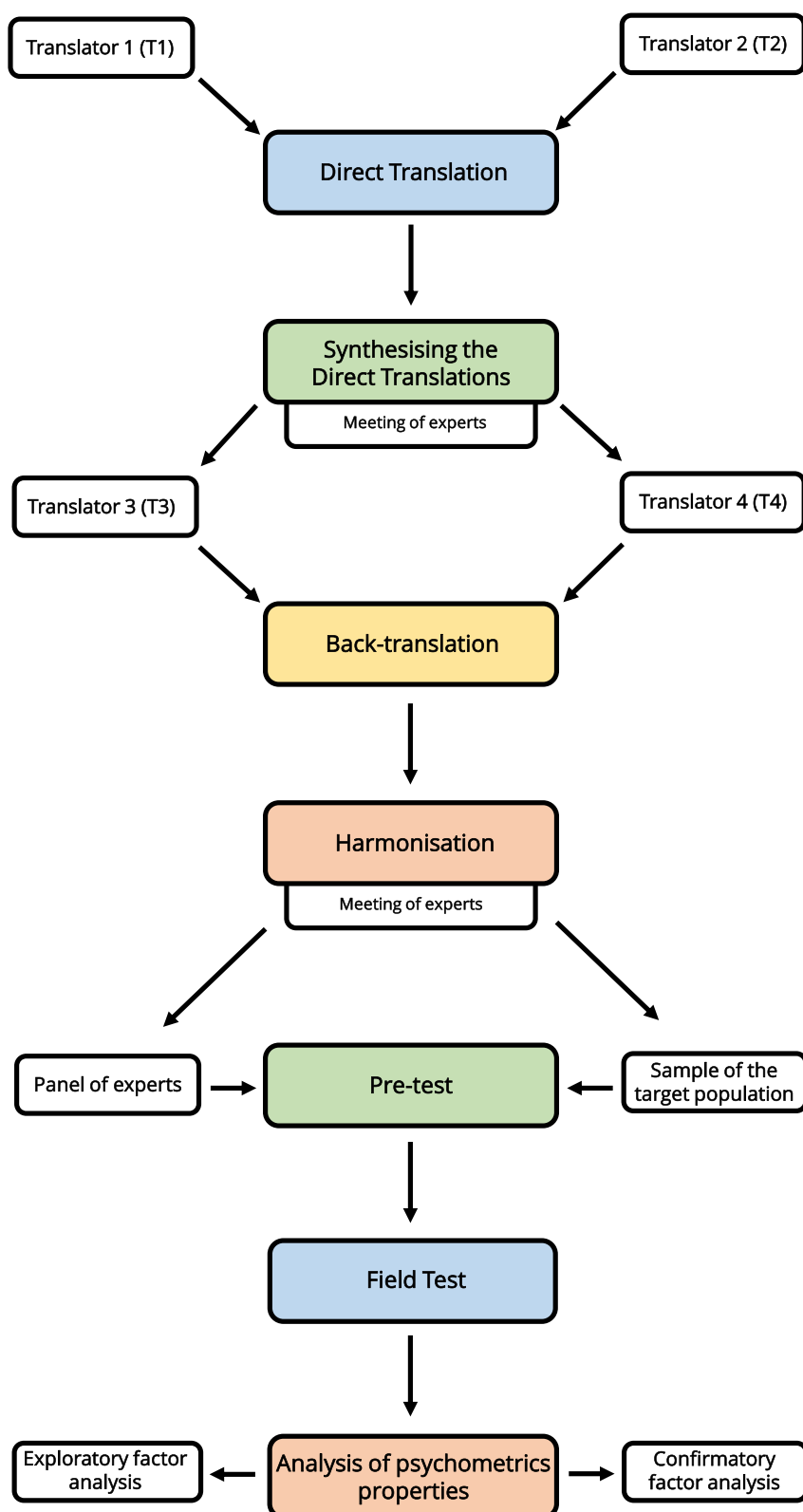


Figure 1 Flowchart illustrating the translation, cross-cultural adaptation, and psychometric validation of the SALI for the Portuguese cultural context. Adapted with permission from Dove Medical Press. Cruchinho P, López-Franco M, Capelas M et al. Translation, cross-cultural adaptation, and validation of measurement instruments: A practical guideline for novice researchers. *J Multidiscip Healthc.* 2024;17:2701–2728.⁴⁷

Ethical Considerations

Before starting the study, all the necessary ethical and legal authorisations were obtained. The first step consisted of making a formal request to Professor Bonnie Smola (author of the original SALI) in June 2024, asking for her authorisation to use the instrument in question, which was granted on the same day. This authorisation, in turn, made it possible to move on to the second step, which was to submit a request for the project to be assessed by the Ethics Council of one of the schools, which was done in July 2024 and approved in September 2024, without any reservations (case no 3808/2024).

All participants were duly informed about the purpose of the study, the methodology, the guarantee of anonymity of their responses (it was ensured that no emails or other personal information would be collected), the confidentiality of the information provided, their freedom of choice to participate, and their right to withdraw from the study at any time without any penalty. In addition, all participants signed the free and informed consent form, in its own format, online, requested before answering the questionnaire.

Results

Applying the translated version to the target population resulted in a sample of 656 students from the two nursing colleges, which corresponded to an overall response rate of 41.3%, considered very good and highly relevant. With this volume of participants, it was possible to guarantee the criterion of representativeness, far greater than that required to carry out robust psychometric analyses, since 16.4 responses were obtained for each item.⁴⁸

Sociodemographic Characterisation of the Sample

Of the sample of 656 students, 516 belonged to School X (78.7%), and 140 to School Y (21.3%).

The age of the sample ranged from 17 to 50, with an average of 20.6 years, and a median and mode both set at 19 years. The standard deviation was 4.34, suggesting that the ages of the sample were relatively concentrated around the average. The asymmetry, meanwhile, was positive (3.89), showing a distribution skewed to the right, with a higher concentration of students at younger ages (88.6% of students were up to and including 22 years old).

With regard to gender, there was a clear predominance of females ($n=557$; 84.9%), followed in second place by males ($n=95$; 14.5%), and in third place by non-binary ($n=4$; 0.6%).

The distribution by curricular year showed that 197 students were in the 1st year (30.0%), 259 in the 2nd year (39.5%), 95 in the 3rd year (14.5%), and 105 in the 4th year (16.0%).

Finally, with regard to clinical teaching experience, 252 of the students said they had already been in clinical teaching (38.4%), while 404 students said they had not yet had this experience (61.6%).

Analysis of Psychometric Properties

The psychometric properties of the version translated and adapted to the Portuguese cultural context were analysed using the reliability and validity study.⁴⁹

Reliability was analysed by assessing the internal consistency or homogeneity of the instrument, based on the 40 items of the original scale, by determining the Cronbach's alpha coefficient (α).^{50,51} This, in turn, resulted in a value of 0.95, which, according to Almeida,⁵¹ translates into very good internal consistency, which proves that the items are homogeneous and adequately measure the theoretical construct they are intended to measure.

The validity of the instrument was assessed through content validity and construct validity.

Content validity was ensured during the initial stages of the process of translating and cross-culturally adapting the scale for the Portuguese cultural context, as suggested by good methodological practices in this area.^{35,49}

The construct validity of the translated version was analysed using exploratory factor analysis and confirmatory factor analysis.

Criterion validity, on the other hand, was not assessed, due to the lack of previously validated scales in the Portuguese cultural context that assess leadership behaviours in nursing students. The lack of an equivalent instrument made it impossible to make a direct comparison and, consequently, to assess the sensitivity of the translated version in relation to a reference scale.

Exploratory Factor Analysis

An exploratory factor analysis was carried out to explore the underlying structure of the translated version. This was done using the Kaiser-Meyer-Olkin criterion, which is an indicator of the consistency of variables that assesses the relationship between direct correlations and the partial correlations observed between them.⁵⁰ In this analysis, a Kaiser-Meyer-Olkin of 0.96 was obtained, which, according to Almeida,⁵¹ corresponds to an excellent recommendation to proceed with exploratory factor analysis. Factorability was confirmed for all 40 items using Bartlett's test of sphericity. Varimax orthogonal rotation was applied, and factors with an eigenvalue greater than 1 were retained, in line with the scree plot.^{50,52} The final solution revealed that a matrix of four factors explained 49.39% of the total variance (with a minimum eigenvalue of 1.285), with all factors showing α values greater than 0.70 (Table 1). As a result of this exploratory factor analysis, it was concluded that the translated version had a structure comprising four dimensions, derived from the four factors resulting from the factor extraction and rotation process.

The next step was to name the dimensions identified. To do this, the theoretical contributions of the development of the original scale^{39,40} were taken into account, namely the contributions of Yura's work,⁴¹ and the foundations of transformational leadership by Burns⁵³ and Bass.⁵⁴ To complement this, we also took into account the more recent contributions of Fuster-Linares et al²³ who, in his translation and cross-cultural adaptation of the SALI for the Spanish cultural context, also identified four dimensions.

Based on this empirical analysis, the following naming of the dimensions was established: *Critical and Strategic Thinking*; *Teamwork Skills*; *Emotional Intelligence*; and *Communication and Relational Influence*.

Table 1 Final Factor Structure of the PT-SALI: Distribution of Items per Factor, Factor Loadings and, Cronbach's Alpha Coefficients

Total items	Items	Critical and Strategic Thinking	Teamwork Skills	Emotional Intelligence	Communication and Relational Influence
16	1	0.471			
	2	0.527			
	5	0.556			
	11	0.574			
	12	0.629			
	13	0.460			
	15	0.474			
	20	0.611			
	21	0.587			
	22	0.505			
	24	0.434			
	25	0.616			
	26	0.569			
	29	0.556			
	32	0.448			
	33	0.589			

(Continued)

Table 1 (Continued).

Total items	Items	Critical and Strategic Thinking	Teamwork Skills	Emotional Intelligence	Communication and Relational Influence
8	4		0.407		
	14		0.525		
	23		0.565		
	27		0.761		
	28		0.601		
	30		0.628		
	38		0.563		
	39		0.549		
10	16			0.549	
	17			0.735	
	18			0.671	
	19			0.574	
	31			0.587	
	34			0.704	
	35			0.478	
	36			0.479	
	37			0.445	
	40			0.643	
6	3				0.449
	6				0.623
	7				0.405
	8				0.600
	9				0.685
	10				0.418
	Cronbach's alpha	0.91	0.85	0.87	0.76
		0.95			

In order to reinforce methodological rigour and guarantee the validity of the names given, they were shared with Professor Bonnie Smola in an effort to ensure conceptual coherence with the assumptions of the original instrument, who expressed total agreement with the proposal, validating its suitability for the instrument.

Once this process was completed, the final structure of the translated version was defined, which was designated the Portuguese version of the *Self-Assessment Leadership Instrument* (PT-SALI).

Confirmatory Factor Analysis

A confirmatory factor analysis was then carried out, as described in Marôco,⁵⁵ to analyse the validity of the factor structure obtained in the exploratory factor analysis. The quality of the overall fit of the factor model was assessed using the fit indices referenced by Marôco,⁵⁵ and the model was adjusted using the modification indices produced by the programme and based on theoretical considerations. In total, 79 covariance corrections were made, resulting in a significant improvement in the model's overall fit indices, which, in turn, showed a very good quality of fit: Chi-Square Minimum Discrepancy/Degrees of Freedom (CMIN/DF)=2.79 (≤ 3); Root Mean Square Residual (RMR)=0.04 (≤ 0.05); Goodness of Fit Index (GFI)=0.88 (≥ 0.90); Adjusted Goodness of Fit (AGFI)=0.84 (≥ 0.90); Comparative Fit Index (CFI)=0.90 (≥ 0.90); Root Mean Square Error of Approximation (RMSEA)=0.05 (≤ 0.05); Modified Expected Cross-Validation Index (MECVI)=3.33 (< 5); *Delta*2=0.90 (≥ 0.90); Standardized Root Mean Square Residual (SRMR)=0.054 (≤ 0.08).

Figure 2 presents the model's local fit values, highlighting the standardised factor weights and the individual reliability of each item. All the items had higher standardised factor loadings, equal to or very close to 0.5, as did the individual reliabilities, whose values were also higher, equal to or very close to 0.25, as recommended by Marôco⁵⁵ and Hair et al.⁵²

The composite reliability was adequate for all the factors, with values above 0.7,^{50,52} which reinforces the internal consistency of the variables in the model.⁵⁵

The average variance extracted – a statistical indicator widely used to assess the convergent validity of factors in factor analysis models⁵⁵ –, presented values of 0.4 for the four PT-SALI factors. Although these values fall below the ideal threshold of 0.5 recommended by Marôco⁵⁵ and Hair et al.⁵² it is important to emphasise that this outcome can be attributed to the heterogeneity in the factor loadings of the items comprising each factor. This variety reflects the differences in the individual contributions of each item to the explanation of the respective latent factor, which is an expected characteristic in models of a complex nature.⁵⁵ Nevertheless, the interpretative context of these results should also be broadened. Hair et al.⁵² emphasise that in confirmatory factor analysis, the priority is not exclusively to achieve high average variance extracted values, but also to achieve substantial factor loadings on the items and adequate overall fit indices, criteria that were met in the proposed PT-SALI model. The items exhibited robust factor loadings, and the model demonstrated an overall fit considered very good. This is further corroborated by Waltz et al.⁵⁶ who argue that factor loadings equal to or above 0.3 may be deemed acceptable and sufficiently representative.

In this sense, it may be concluded that, although the average variance extracted values fall slightly below the theoretical ideal, the presence of adequate factor loadings – combined with consistent overall fit indices – supports the validity of the PT-SALI model and indicates that the items contribute meaningfully to the explanation of the assessed dimensions.

Discussion

The SALI was translated using a rigorous process that included the methodological steps recommended by Beaton et al,^{45,46} Cruchinho et al⁴⁷ and Sousa and Rojjanasirirat⁴⁸ for translation and cross-cultural adaptation studies.

The adaptation to the Portuguese cultural context was carried out to ensure that the items were understandable and relevant to the target population – the students.^{45–48} This process was based on a detailed analysis of cultural differences, with particular attention paid to idioms and underlying cultural values in order to preserve the content validity of the SALI.^{45–48} The changes in this area were all introduced during the translation synthesis stage, in order to optimise the clarity and precision of the items.

Regarding the validation of the psychometric properties of the PT-SALI, the results provided empirical evidence of good psychometric performance.²⁵

The analysis of the psychometric properties began with an assessment of internal consistency, through the calculation of the α coefficient. The value obtained for the total scale (which retained the 40 items from the original version) was 0.95, reflecting very good internal consistency according to Almeida.⁵¹ This value was higher than that reported by Fuster-Linares et al²³ who conducted an equivalent study for the Spanish cultural context ($\alpha=0.87$), higher than that of Lee et al⁴² who translated and validated the SALI for the Korean cultural context ($\alpha=0.94$), and also higher than that of Jiménez⁴³ for the Mexican/Latin American cultural context ($\alpha=0.89$ for the student sample). In the study by Baron et al⁴⁴ in which the translation and adaptation to the cultural contexts of England and Israel were carried out, and the reliability

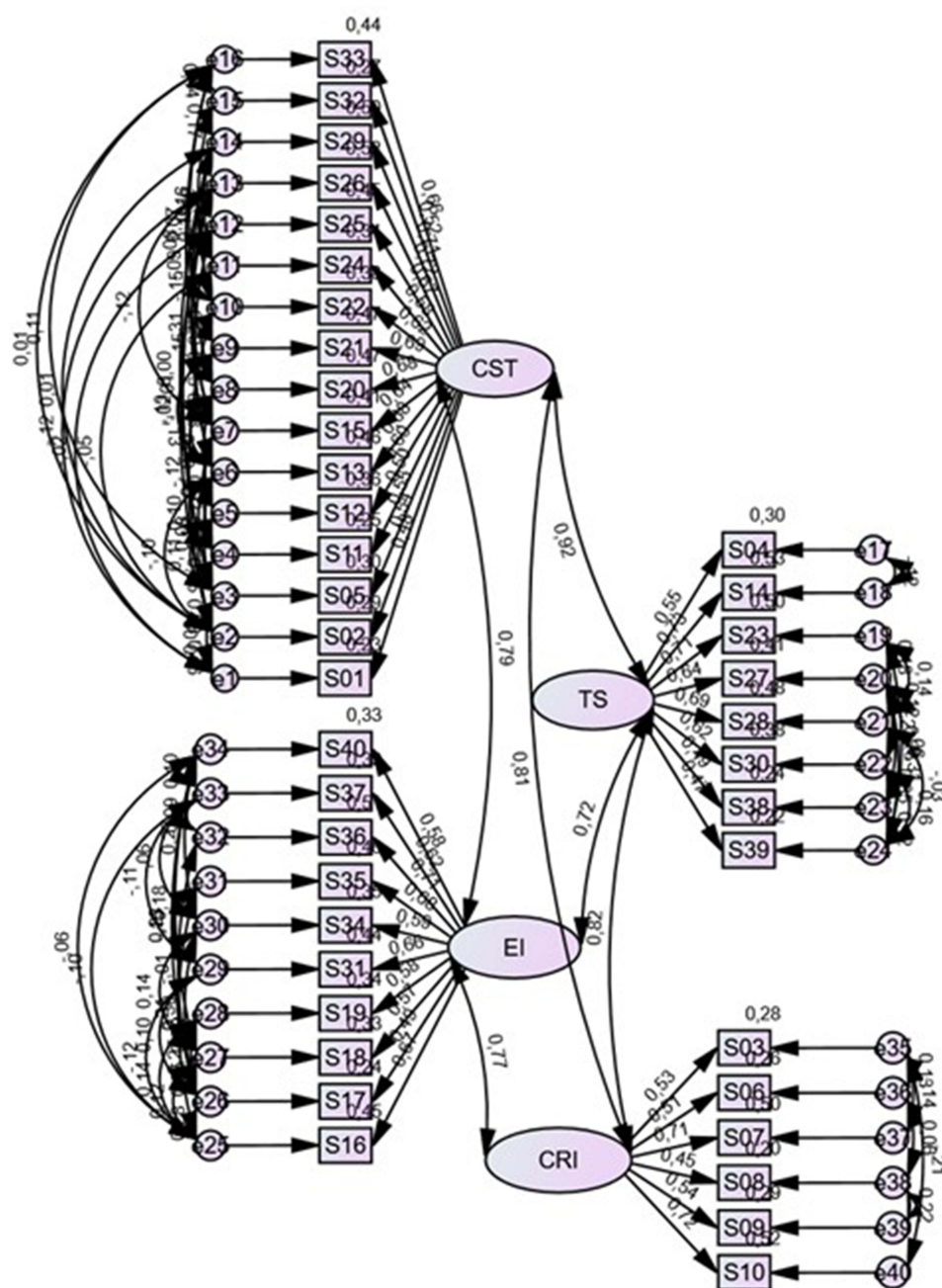


Figure 2 PT-SALI tetrafactorial model.

and content validity were assessed (without assessing criterion validity and construct validity), a value of $\alpha=0.95$ was obtained for the English cultural context (comparable to that of the PT-SALI), and 0.93 for the Hebrew cultural context (slightly lower than that obtained in the PT-SALI).

Content validity was guaranteed in the initial stages of the translation and cross-cultural adaptation process. Construct validity was analysed using exploratory factor analysis and confirmatory factor analysis. This resulted in the validation of a four-factor model, which is considered to be conceptually consistent and aligned with the author of the original scale – Smola.^{39,40} However, the items that make up each factor differ from those in the study by Fuster-Linares et al²³ which may be explained by cultural differences. In this context, it is worth noting that, although Lee et al.⁴² Jiménez,⁴³ and Baron et al⁴⁴ translated, adapted, and validated the SALI for their respective cultural contexts (Korean, Mexican/Latin

American and English and Hebrew, respectively), they did not provide details on the performance of factor analyses in their studies – a feature reported only in the study by Fuster-Linares et al.²³

The exploratory factor analysis revealed that the four PT-SALI factors explained 49.4% of the total variance, which is close to the value recommended by Marôco,⁵⁵ who considers values equal to or greater than 50% as a reference.

The identification of these four factors determined the four dimensions of the PT-SALI, named *Critical and Strategic Thinking*, *Teamwork Skills*, *Emotional Intelligence*, and *Communication and Relational Influence*. This designation was based on both the theoretical contributions of Smola's original work^{39,40} and the work on which she based her development of the SALI, namely the work of Yura,⁴¹ as well as the foundations of transformational leadership by Burns⁵³ and Bass.⁵⁴ In addition, the contributions of Fuster-Linares et al²³ were also taken into account, and it was decided not to fully maintain the nomenclature attributed by them to the dimensions, as there are differences in the distribution of the items across the factors. It should also be noted that the naming of the dimensions was shared with the author of the original scale, Professor Bonnie Smola, who expressed her full agreement, validating their suitability for the instrument.

Critical and Strategic Thinking, *Teamwork Skills*, *Emotional Intelligence*, and *Communication and Relational Influence* constitute a set of skills regarded as fundamental to effective leadership in nursing. They fall within the domains of cognitive, social, emotional, and persuasive skills, which, in turn, complement each other,^{57–61} in line with the principles of transformational leadership,^{53,54} shared leadership,⁶² authentic leadership,⁶³ and integral leadership.²² Recent studies, such as Aydogdu,¹ Jack et al³¹ and Brown et al⁶⁴ support this perspective, demonstrating that the joint development of these competences is directly associated with the improvement of nursing practice environments and the quality and safety of the care provided.

Critical and Strategic Thinking – the first dimension – is an essential skill for nurses, as it enables them to simultaneously analyse their own individual skills and the specific demands of a given situation, making it easier to choose the best course of action.²³ The studies by Sritoomma and Wongkhomthong⁶⁵ and, Lee and Kang⁶⁶ reinforce the importance of this dimension and show that leaders who are able to think critically and strategically act in a more reflective and reasoned manner, being more proactive and innovative, understanding and dealing positively with change.

Teamwork Skills and *Emotional Intelligence* – the second and third dimensions – are also crucial for effective leadership. Effective teamwork contributes to the creation of cohesive, resilient teams oriented towards common goals.⁶⁷ The study by Beiboer et al⁶⁸ corroborates these findings and adds that a leader who possesses teamwork skills instils collective responsibility, facilitates the integration of new members, and promotes greater acceptance of change within teams. Regarding emotional intelligence, studies indicate that it correlates positively with leadership,^{13,69} and the study by Benson et al⁷⁰ identified this same correlation using the SALI as a measuring instrument. It is thus understood that the ability to recognise and manage one's own emotions, as well as those of others, enables nursing leaders to effectively address situations of stress and conflict, and maintain team cohesion and high morale.^{70–74}

Communication and Relational Influence – the fourth dimension – are also structuring factors, as it is through these skills that the leader motivates, inspires, guides, resolves conflicts, promotes team cohesion, and facilitates processes of change. This fact is emphasised in the study by Heidari et al⁷⁵ which demonstrated strong positive correlation between communication skills and leadership effectiveness, through which the leader also exerts their impact and influence.

A comparison with the version by Fuster-Linares et al²³ confirms that both the names and the distribution of the items differ. In the study by Fuster-Linares et al²³ the dimensions were identified as: *Strategic Thinking*; *Emotional Intelligence*; *Impact and Influence*; and *Teamwork Skills*.

The main differences identified between the two versions are:

- The *Critical and Strategic Thinking* dimension of PT-SALI includes most of the items from the *Strategic Thinking* dimension of Fuster-Linares et al²³ and also items from the *Teamwork Skills* (items 11, 15 and 33), *Impact and Influence* (items 1, 21, 22 and 26) and *Emotional Intelligence* (item 13) dimensions;
- The *Teamwork Skills* dimension in PT-SALI was reduced to 8 items, compared to the 14 items of the *Teamwork Skills* dimension of Fuster-Linares et al²³ also incorporating items from dimension *Impact and Influence* (items 4 and 14);
- The *Emotional Intelligence* dimension of PT-SALI includes more items than in Fuster-Linares et al²³ and incorporates items from the *Strategic Thinking* (18 and 36) and *Teamwork Skills* (items 35, 37 and 40) dimensions;

- And the *Communication and Relational Influence* dimension groups together items that in the version by Fuster-Linares et al²³ are dispersed in the *Strategic Thinking* (item 8), *Emotional Intelligence* (items 6 and 9), *Impact and Influence* (item 3) and *Teamwork Skills* (items 7 and 10) dimensions.

We emphasise that these differences can be explained by cultural adaptation to the Portuguese context, reflecting cultural specificities and associated practices.

Regarding the reliability of the dimensions, assessed by the Cronbach's alpha coefficient, the values obtained in the PT-SALI ranged from 0.76 to 0.91, with the highest value found in the *Critical and Strategic Thinking* dimension.

These results suggest that the PT-SALI has a robust and reliable structure, reflecting a strong alignment with the characteristics of the Portuguese sample.

The results of the confirmatory factor analysis conducted showed that the four-dimensional model of the PT-SALI is stable and fits the studied sample very well. The obtained coefficients were acceptable and support the four-dimensional factor structure. The composite reliability further reinforced the internal consistency of the variables, indicating a robust and high-quality model.⁵⁵ Additionally, although the average variance extracted was slightly below the ideal value,⁵⁵ it demonstrated that the items in the model contribute significantly to explaining the dimensions, thereby reinforcing the convergent validity of the scale.

Analysis of the standardised factor loadings and the individual reliabilities of the items revealed that nearly all of them exhibited satisfactory values, indicating that the variables of each factor are well represented by the items. These results, along with the composite reliability, corroborate the robustness of the model and the consistency of the included variables.

In summary, the PT-SALI proved to be a valid and reliable tool for assessing the four proposed dimensions, with strong psychometric properties and potential for application in research, professional practice, and training contexts, both undergraduate and postgraduate.

Implications for Practice

The results of this study have relevant implications for the fields of nursing education, management, and research.

In the fields of nursing education and management, the availability of the PT-SALI represents a significant advancement, as it provides a valid, reliable, and scientifically supported tool for assessing, monitoring, and promoting the development of leadership in training contexts. Given the structuring role of leadership in the management of health services, the application of this scale could contribute to the design and reformulation of curricular programmes, as well as to the adaptation and refinement of teaching-learning dynamics and strategies. These changes would facilitate the development of leadership skills and promote the training of competent nurse leaders, capable of acting and leading in today's complex and demanding health contexts.

In terms of scientific research, this study represents a significant and innovative contribution to the production of knowledge and scientific dissemination on leadership and management in nursing in the Portuguese context. It will provide new research possibilities, not only at a national level, but also at an international level, since the scale has already been translated and validated in different cultural contexts. Moreover, these results are considered to have the potential to inform and influence future research into leadership in nursing, encouraging the exploration of new dimensions and approaches within this field. As leadership is regarded by many authors as one of the dimensions of nursing practice environment, investing in this area will foster the development of favourable nursing practice environments, and, consequently, improve the quality and safety of the care provided.

Limitations

A significant limitation identified in this study was the lack of a previously validated reference instrument that would allow for direct comparison of the results obtained with the PT-SALI.

For future research, in addition to attempting to include a reference scale, it would also be advisable to carry out longitudinal studies that would enable a more comprehensive assessment of the PT-SALI's temporal stability. Such studies would allow for the verification of the PT-SALI's ability to capture significant variations over time, as well as its applicability in different nurse training cycles. Another recommendation would be to apply the scale to all nursing

colleges in the country, in order to analyse the phenomenon at a national level. We also suggest that future applications of the PT-SALI within the Portuguese cultural context consider the use of additional data sources—such as peer evaluation or observational methods—in order to deepen the understanding of leadership behaviours and mitigate the limitations associated with exclusive reliance on self-report measures.

Conclusion

A rigorous process of translation, cross-cultural adaptation, and validation was conducted in accordance with established guidelines from the scientific literature. This procedure ensured semantic and conceptual equivalence, confirmed cultural appropriateness for the Portuguese context, and validated the instrument's psychometric properties, resulting in the Portuguese version of the SALI, designated PT-SALI. Analysis of its psychometric characteristics indicated that they are appropriate for the Portuguese population, demonstrating very good reliability and validity indices. The factor model obtained – comprising the dimensions of *Critical and Strategic Thinking*, *Teamwork Skills*, *Emotional Intelligence*, and *Communication and Relational Influence* – also exhibited excellent fit indices, reinforcing the theoretical structure underlying the scale. These findings therefore support the suitability of the PT-SALI, and substantiate its validity, reliability, and robustness as a tool for assessing leadership behaviours and their development within the Portuguese context. Furthermore, it is considered appropriate for use in both undergraduate and postgraduate training settings.

Abbreviations

SALI, Self-Assessment Leadership Instrument; PT-SALI, the Portuguese version of the Self-Assessment Leadership Instrument; GRRAS, Guidelines for Reporting Reliability and Agreement Studies; CST, Critical and Strategic Thinking; TS, Teamwork Skills; EI, Emotional Intelligence; CRI, Communication and Relational Influence.

Data Sharing Statement

Due to ethical considerations, the research data is not publicly available.

Ethics Approval and Informed Consent

This study was conducted in accordance with the principles established by the Declaration of Helsinki and the Oviedo Convention. Ethical approval was granted by the Ethics Committee of the Nursing School of Lisbon (ESEL) (case no. 3808/2024), and informed consent was duly obtained from all participants involved in the research.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

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