Article

Rasch Analysis of the Brazilian Version of the Spirit at Work Scale

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Theme: Promotion of health, well-being, and quality of life

Contributions to the field: Spirituality in the workplace can constitute a strategy for coping and maintaining the psychological well-being of healthcare professionals. The Spirit at Work Scale stands out as one of the most widely used instruments for assessing this concept in varying contexts. However, there are still no studies employing the Rasch analysis to research its internal structure. This gap highlights the originality and relevance of this study, which contributes to the analysis of precision evidence and the scale's applicability in workplace settings, expanding its use in promoting work-related mental health.

Abstract

Introduction: Spirituality in the workplace is a skill for coping with and maintaining psychological well-being that can be assessed using the Spirit at Work Scale (SAWS). Although this scale has previously been validated in various contexts, there is a lack of studies that employ Rasch analysis for its assessment. **Objective:** To evaluate the measurement properties of the version of the SAWS adapted for the Brazilian context (SAWS-Br), based on the Rasch model. **Materials and Methods:** This is a psychometric methodological study. Data were collected from April to October 2022, and the sample consisted of 3735 nursing professionals. The Andrich rating scale model was used, employing Winsteps software. The following were evaluated: The unidimensionality of the instrument via principal component analysis; the functionality of the response categories for the items; the polarity and differential functioning of the items; and the reliability, as well as the person and item separation indexes. **Results:** The analysis of the response probability curve indicated a threshold calibration fit, using only three response categories for the items. The unidimensionality of the instrument was confirmed after excluding misfitting items. The item fit analysis and differential item functioning analysis identified problems in items 1, 2, 6, 10, 12, and 15, which were excluded from the model. **Conclusion:** The SAWS-Br contributes to the nursing field by providing resources to understand how spirituality in the workplace influences the well-being of healthcare professionals, promoting mental health and resulting in safer, higher-quality patient care.

Keywords (Source: DeCS)
Nursing; occupational health; psychometrics; validation study; spirituality.

El análisis de Rasch sobre la versión brasileña de la Spirit at Work Scale

Resumen

Introducción: La espiritualidad en el trabajo es una habilidad para afrontar y mantener el bienestar psicológico que puede evaluarse mediante la Spirit at Work Scale (SAWS). Aunque esta escala ya ha sido validada en diferentes contextos, hay una falta de estudios que utilicen el análisis de Rasch para su evaluación. **Objetivo:** evaluar las propiedades de medición de la versión adaptada de la SAWS para el contexto brasileño (SAWS-Br), basada en el modelo Rasch. **Materiales y método:** Este es un estudio metodológico psicométrico. Se recogieron datos entre abril y octubre de 2022, y la muestra consistió en 3735 profesionales de enfermería. El modelo de escala de calificación de Andrich se utilizó utilizando el software Winsteps. La unidimensionalidad del instrumento se evaluó mediante análisis de componentes principales; la funcionalidad de la categoría de respuesta de los ítems; la polaridad y la función diferencial de los elementos; fiabilidad y la tasa de separación entre personas y objetos. **Resultados:** El análisis de la curva de probabilidad de respuesta indicó un ajuste de calibración umbral, utilizando solo tres categorías de respuesta a los ítems. La unidimensionalidad del instrumento se confirmó tras excluir los elementos mal ajustados. El análisis de polaridad y la función diferencial de los ítems mostraron desajustes significativos en los ítems 1, 2, 6, 10, 12 y 15, que se excluyeron para ajustarse al modelo. **Conclusión:** a SAWS-Br contribuye a la enfermería proporcionando subvenciones para entender cómo la espiritualidad en el trabajo influye en el bienestar de los profesionales, favoreciendo la salud mental y resultando en una atención más segura y de mayor calidad para los pacientes.

Palabras clave (Fuente: DeCS)
Enfermería; salud laboral; psicometría; estudio de validación; espiritualidad.

Análise de Rasch da versão brasileira da Spirit at Work Scale

Resumo

Introdução: A espiritualidade no trabalho é uma habilidade de enfrentamento e manutenção do bem-estar psicológico que pode ser avaliada pela Spirit at Work Scale (SAWS). Embora essa escala já tenha sido validada em diferentes contextos, observa-se a ausência de estudos que empreguem a análise de Rasch para sua avaliação. **Objetivo:** avaliar as propriedades de mensuração da versão adaptada da SAWS para o contexto brasileiro (SAWS-Br), com base no modelo de Rasch. **Materiais e método:** Trata-se de um estudo metodológico psicométrico. Os dados foram coletados de abril a outubro de 2022, e a amostra foi composta por 3735 profissionais de enfermagem. Utilizou-se o modelo de escala de classificação de Andrich, por meio do software Winsteps. Foram avaliadas a unidimensionalidade do instrumento, por meio da análise de componentes principais; a funcionalidade da categoria de resposta dos itens; a polaridade e o funcionamento diferencial dos itens; a confiabilidade e o índice de separação de pessoas e de itens. **Resultados:** A análise da curva de probabilidade de respostas indicou ajuste de calibração limiar, com a utilização de apenas três categorias de resposta aos itens. A unidimensionalidade do instrumento foi confirmada após a exclusão de itens desajustados. A análise de ajuste dos itens e de funcionamento diferencial dos itens identificaram problemas nos itens 1, 2, 6, 10, 12 e 15, os quais foram excluídos do modelo. **Conclusão:** A SAWS-Br contribui para a enfermagem ao fornecer subsídios para compreender de que forma a espiritualidade no trabalho influencia o bem-estar dos profissionais, favorecendo a saúde mental e resultando em uma assistência mais segura e de qualidade aos pacientes.

Palavras-chave (Fonte: DeCS)
Enfermagem; saúde do trabalhador; psicometria; estudo de validação; espiritualidade.

Introduction

Spirituality constitutes a multidimensional construct that has been widely discussed in the health field. Conceptually, its definitions can be explored from two theoretical streams: (i) the traditional approach, in which spirituality is strongly linked to religions or beliefs, whether traditional or non-traditional; and (ii) the comprehensive approach, which defines it based on humanistic values (1, 2).

In the traditional theoretical stream, spirituality refers to the realm of the spirit, the non-material or extra-physical dimension of existence, and is connected to the supernatural, the mystical, and religion (3, 4). In the broader theoretical stream, however, researchers define it as the connection between people and the self, art, and nature, encompassing the search for purpose and meaning in life, as well as the interconnection with a higher or transcendent power. It can also be understood as the energy or life force that drives these connections (5-8).

Meanwhile, spirituality in the workplace is shaped by the interaction of personality traits, individual behaviors, and organizational factors, given that there is no clear separation between personal life and the workplace (8).

Evidence suggests that spirituality is a coping skill that helps healthcare professionals maintain their psychological well-being, given its capacity to minimize stress, enhance resilience, and reduce burnout (9, 10). This is due to the fact that spirituality is recognized as a coping strategy and a resource that helps people find meaning in their lives and safely overcome difficult situations (9, 11).

With the aim of assessing spirituality at work, several instruments have been proposed in recent decades. Among these instruments, the Spirit at Work Scale (SAWS) stands out; it was developed to assess individuals' experiences of spirituality at work (12). The SAWS consists of 18 items, divided into four factors: Engaging work, sense of community, spiritual connection, and mystical experience. Engaging work represents a deep sense of well-being and the belief that work is meaningful and has a greater purpose; sense of community characterizes a feeling of connection and shared purpose among individuals; spiritual connection represents the individual's connection to something greater than the "self;" and mystical experience characterizes a positive state of energy, vitality, experiences of happiness, and a sense of transcendence (12, 13). The SAWS has already been validated in a variety of contexts and populations (14–22). In Brazil, the adapted version (SAWS-Br) underwent an initial validation process (22), but it still lacks evidence based on probabilistic models, such as the Rasch model. This model allows for assessing the quality of the measurement by verifying unidimensionality, the response categories operation, and the precision of items on a latent ability continuum.

In light of the above, this study aims to evaluate the psychometric properties of the Brazilian version of the SAWS in a national sample

of nursing professionals using the criteria of the Rasch model. The Rasch analysis offers a robust approach for assessing the adequacy of items, unidimensionality, and the functionality of response categories, allowing for a thorough examination of the quality of the measurements. Contrary to classical methods based on factor analysis, the Rasch model evaluates item behavior on a measurement continuum, detecting deviations and differential functioning among subgroups (23). The lack of validation studies of the SAWS using this methodology highlights the originality and relevance of this study, which aims to provide additional evidence of validity and precision for the scale's use in workplace contexts in Brazil.

Materials and Methods

Study Type and Sampling Design

This is a psychometric methodological study with non-probability sampling. The population consisted of nurses, nursing technicians, and nursing assistants registered with the Federal Nursing Council (Cofen for its initials in Portuguese). To calculate the minimum sample size required for statistical analyses, a requirement of 10 to 20 respondents per parameter of the model to be estimated was employed (24). Considering the 46 parameters of the SAWS (eighteen items, eighteen errors, four factors, and six correlations between factors), the minimum sample size was estimated to be between 460 and 920 participants. The sample consisted of 3735 nursing personnel.

The inclusion criteria were to be a nurse, nursing technician, or nursing assistant currently registered with the Cofen/Regional Nursing Councils; to have at least one year of professional experience in the nursing field; and to be actively practicing during the data collection period. The exclusion criterion was an incomplete data collection form.

Data collection

The data were collected remotely using an electronic form created on the Research Electronic Data Capture (REDCap) platform (25) between April and July 2022. Emails were sent to nurses, nursing technicians, and nursing assistants registered with Cofen; the communication contained a link to the form and the informed consent form, which was signed by all participants.

Data Collection Instruments

A questionnaire was administered to assess the sociodemographic and occupational characteristics of the participants, including information on age, sex, marital status, occupational category, years of experience in the profession, and weekly workload.

The SAWS (12) was originally developed in English and consists of eighteen items and four factors: Engaging work (items 1, 4, 7, 9, 11, 14, and 18); mystical experience (items 2, 5, 8, 12, and 16); spiritual connection (items 6, 10, and 15); and sense of community (items 3, 13, and 17). The items use a six-point Likert-type response scale, ranging from 1—Completely disagree to 6—Completely agree. It should be noted that the scale underwent a process of cultural adaptation and validation for the Brazilian context (22).

Data analysis

The psychometric properties of the SAWS-Br were evaluated via Rasch analysis, using the Andrich model (Rating Scale Model), which presumes that the response scale functions uniformly across all items in the instrument. The analyses were conducted using the Winstep software, version 5.7.2.0.

Initially, the functionality of the response categories for the items was assessed according to the guidelines proposed by Linacre (26) and Wright and Linacre (27), considering a minimum of 10 observations per category; the monotonic increase in mean measures as the number of response categories increased; and an examination of the values of the Unweighted Mean Square (Outfit) index for the categories (with values between 0.5 and 2.0 considered adequate).

The unidimensionality of the scale was assessed via principal component analysis of residuals, a procedure recommended in the Rasch model to identify the presence of possible secondary dimensions. Unidimensionality was considered evident when the eigenvalue of the first residual contrast was lower than or equal to 2.0 (28). In cases where this value was higher, the unweighted correlation between the participants' scores derived from the items loaded on the first contrast and those derived from the remaining items was examined. An unweighted correlation of 0.70 or higher was interpreted as evidence that both measures share substantial variance and, therefore, predominantly assess the same construct (29).

In the Rasch model, the principle of unidimensionality is a necessary statistical premise for the continuity of the analyses, as it allows for verification of whether the items in the instrument truly converge on the construct they are intended to assess (30). This step also included an analysis of the correlation matrix among item residuals, with correlations equal to or greater than 0.70, considered indicative of significant local dependence (29).

The polarity of the items was analyzed based on bivariate correlations to ensure that all items were oriented in the same direction as the latent trait. In addition, the mean square (MnSq) values of the Information-Weighted Mean Square (Infit) and Unweighted Mean Square (Outfit) indexes of the items were examined, with values between 0.5 and 1.5 considered adequate (27, 28).

An analysis of person reliability, item reliability, and person and item separation indexes was also conducted. Person reliability indicates the instrument's reproducibility, and item reliability assesses the replicability of item positioning along a latent trait continuum; for both, values ≥ 0.80 are considered adequate (28, 31). The person separation index identifies the number of distinct groups of latent trait levels that the instrument can distinguish, which is considered useful if ≥ 2 (32). The item separation index (recommended if ≥ 3), on the other hand, indicates how many levels of item difficulty the instrument can discriminate.

Differential Item Functioning (DIF) was analyzed to assess the invariance of the measure across individual and occupational variables (sex, age, participation in complementary integrative activities, religious beliefs, and occupational category). This analysis is based on the premise that these variables may influence the respondent's perception of spirituality. Values greater than 0.5, with statistical significance ($p \leq 0.05$) in the Rasch-Welch test, indicate the presence of DIF (33).

The item-person map was also evaluated, allowing for an overview of the distribution of items and respondents' abilities along a continuum. This analysis provides an assessment of how the instrument's items are distributed in relation to respondents' abilities, facilitating an understanding of the instrument's effectiveness in measuring the proposed latent trait (34).

Finally, items that failed to meet the criteria for fit to the Rasch model or that presented significant DIF were sequentially removed. After each removal, a new analysis was conducted to reassess the psychometric properties of the instrument using the remaining items. This process was repeated until a set of items with a satisfactory fit to the model was obtained.

Ethical aspects

The study was approved by the Research Ethics Committee of the School of Nursing of Ribeirão Preto/University of São Paulo, in compliance with the Report No. 4,912.327, following the guidelines of Resolution 466/2012 of the National Health Council (35), the General Data Protection Law (36), and Circular Letter 2/2021 of the National Research Ethics Commission (37) for research procedures conducted in virtual environments.

Results

Charasteristics of the Participants

The sociodemographic and occupational characteristics of the participants are presented in Table 1.

Table 1. Sociodemographic and Occupational Data of the Participants. Brazil, 2022 (n = 3735)

Variables	n	%
Age		
≤ 39 years	2560	68.54
≥ 40 years	1154	30.90
Missing	21	0.56
Sex		
Male	504	13.49
Female	3207	85.86
Missing	24	0.64
Marital status		
Single	1428	38.23
Married/in a long-term relationship	1883	50.41
Separated/divorced/widowed	415	11.11
Missing	9	0.24
Professional category		
Nurse	1781	47.68
Nursing technician/assistant	1942	51.99
Missing	12	0.32
Do you use any integrative or complementary health practices to maintain your well-being?		
Yes	679	18.18
No	3048	81.61
Missing	8	0.21
How important do you consider spirituality to be in your life?		
It is irrelevant.	90	2.41
It is not very relevant.	166	4.44
I am indifferent.	197	5.27
It is relevant.	1178	31.54
It is very relevant.	2102	56.28
Missing	2	0.05
Do you have any religious beliefs?		
Yes	3425	91.70
No	294	7.87
Missing	16	0.43
Does your religious or spiritual belief help you cope with difficulties in the workplace?		
It does not help.	169	4.52
It helps a little.	621	16.63
It is indifferent.	237	6.35
It helps a lot.	1640	43.91
It totally helps.	1054	28.22
Missing	14	0.37

Source: Prepared by the authors.

It was found that the sample was predominantly female (85.86%), with a mean age of 35.41 years (SD = 8.87), consisting mainly of nursing technicians and assistants (51.99%); 91.70% of the participants reported having some religious belief; 87.82% considered spirituality to be a relevant or very relevant aspect of their lives; 72.13% reported that religious or spiritual beliefs helped them a lot or totally in coping with difficulties in the workplace.

Rasch Analysis

The analysis of the functionality of the response categories for the items before and after adjustment is presented in Table 2.

Table 2. Functionality of the Response Category for Items in the SAWS-Br. Brazil, 2022 (n = 3735)

Indexes of the original response categories					
Category Label	**Observed Counting**	**Mean Measure**	**Infit MnSq**	**Outfit MnSq**	**Threshold Calibration**
1	11142	-0.64	1.18	1.33	None
2	7451	-0.39	0.90	0.89	-0.16
3	8506	-0.13	0.81	0.80	-0.36
4	15798	0.12	0.88	0.86	-0.59
5	11501	0.44	0.92	0.98	0.61
6	12832	0.83	1.05	1.17	0.50
Indexes after adjustment of response categories					
Category Label	**Observed Counting**	**Mean Measure**	**Infit MnSq**	**Outfit MnSq**	**Threshold Calibration**
0	18593	-0.96	1.06	1.10	None
1	24304	0.10	0.85	0.80	-0.71
2	24333	1.25	1.02	1.14	0.71

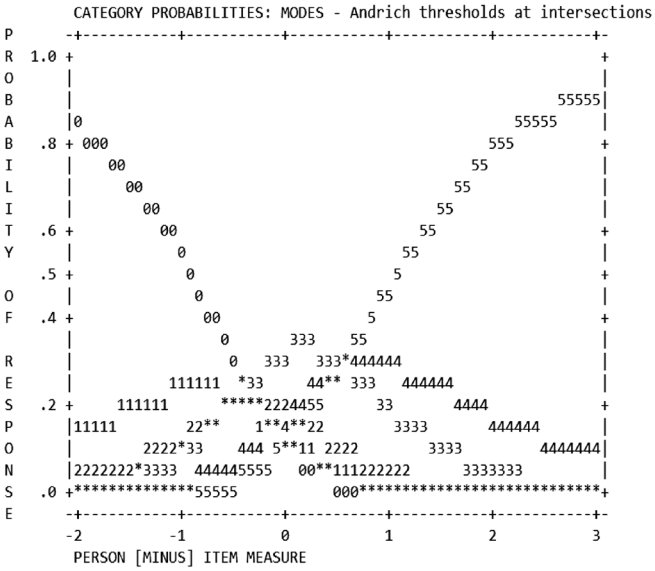
Source: Prepared by the authors.

It was found that the frequency of responses met the established criteria and that there was a continuous increase in the observed means, based on the rise in response scores; the Infit and Outfit values did not indicate a misfit. However, the threshold calibration values did not show monotonic growth, and it was proposed to redistribute the response scale of the items into three points by merging categories 1 and 2 to form category 0; categories 3 and 4 to create category 1; and categories 5 and 6, which resulted in category 2. After the adjustment, it was found that all statistical premises were met, including the monotonic increase in the threshold calibration values, which showed a 1.4 logit distance between categories, which is considered an adequate value.

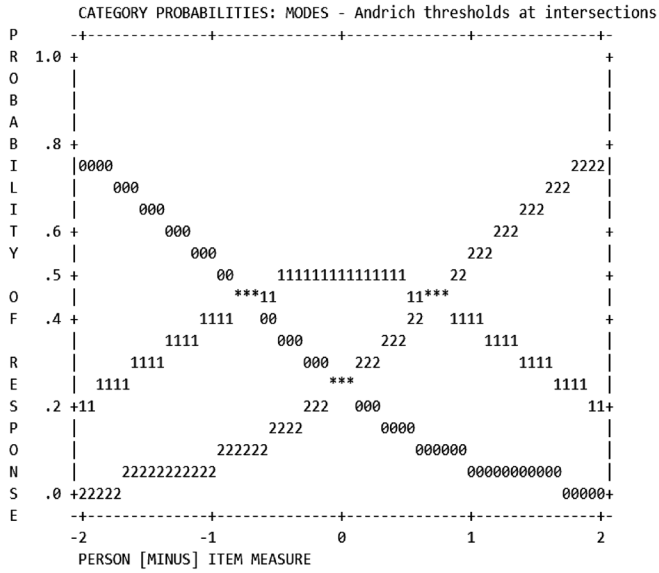
The fit of the three-point scale to the data can also be seen in Figure 1, which illustrates the response probability curve for the original scale and the adjusted SAWS-Br scale.

Figure 1. SAWS-Br Response Probability Curves (n = 3735)

a)



b)



Source: Prepared by the authors.

Note: a) The instrument's original response scale (6 points); b) The adjusted response scale (3 points).

Regarding dimensionality, the principal component analysis of residuals for the original 18-item model yielded an eigenvalue of 2.29 in the first contrast, suggesting the possible presence of a secondary dimension. However, the unweighted correlation between the individual scores estimated from the items in clusters 1-2 and 2-3 was 0.82, which reinforces the unidimensionality of the SAWS-Br. Furthermore, the correlation matrix among the residuals showed values below 0.32, indicating the absence of local dependence.

In Table 3, the polarity and fit indexes of the 18 items in the instrument are presented, sorted in descending order by Infit and Outfit values.

Table 3. Polarity and Fit Indexes of SAWS-Br Items. Brazil, 2022 (n = 3735)

Item	Model		Infit	Outfit	Point-Biserial Correlations
	Measure	Standard Error	MnSq	MnSq	
2. At times, I experience a "high" at work.	0.71	0.03	1.66	2.17	0.30
12. I have moments at work in which I have no sense of time or space.	0.45	0.03	1.66	1.95	0.38
1. I experience a match between the requirements of my work and my values, beliefs, and behaviors.	0.17	0.03	1.52	1.79	0.40

Item	Model		Infit	Outfit	Point-Biserial Correlations
	Measure	Standard Error	MnSq	MnSq	
10. My spiritual beliefs play an important role in everyday decisions that I make at work.	-0.50	0.03	1.17	1.21	0.57
3. I experience a real sense of trust and personal connection with my coworkers.	0.17	0.03	1.08	1.16	0.55
15. I receive inspiration or guidance from a Higher Power about my work.	0.29	0.03	1.07	1.03	0.62
18. At the moment, I am right where I want to be at work.	0.44	0.03	1.06	1.03	0.62
11. I have a sense of personal mission in life, which my work helps me to fulfill.	-0.54	0.03	0.88	0.81	0.67
4. I am able to find meaning or purpose at work.	-0.51	0.03	0.83	0.82	0.66
17. I feel like I am part of "a community" at work.	0.45	0.03	0.83	0.82	0.67
7. I am passionate about my work.	-0.82	0.03	0.82	0.73	0.69
16. I experience moments at work where everything is blissful.	0.62	0.03	0.81	0.77	0.67
9. I am fulfilling my calling through my work.	-0.37	0.03	0.79	0.75	0.70
5. At moments, I experience complete joy and ecstasy at work.	0.16	0.03	0.78	0.76	0.68
6. I experience a connection with a greater source that has a positive effect on my work.	-0.22	0.03	0.78	0.73	0.70
13. I share a strong sense of purpose and meaning with my coworkers about our work.	0.38	0.03	0.75	0.76	0.68
8. At times, I experience an energy or vitality at work that is difficult to describe.	0.14	0.03	0.73	0.69	0.72
14. I feel grateful to be involved in work like mine.	-1.02	0.03	0.72	0.64	0.71

Source: Prepared by the authors.

It was established that all items presented positive polarity, with point-biserial correlations ranging from 0.30 to 0.71. The analyses revealed poor fit for items 1, 2, and 12, with Infit and Outfit values greater than 1.5.

The Rasch reliability coefficient for the 18-item instrument was 0.86, with a person separation of 2.52; the item reliability value was 1.0, with an item separation of 17.16.

The analysis of DIF by age indicated that item 2, "At times, I experience a 'high' at my work", was more readily endorsed by people aged 39 or younger (item difficulty: 0.51 logit) compared to those aged 40 or older (item difficulty: 1.15 logit; DIF contrast = -0.65 logit, p = 0.00). In the DIF analysis by religious belief, it was found that item 10, "My spiritual beliefs play an important role in everyday decisions that I make at work", was more readily endorsed by people with religious beliefs (item difficulty: 0.62 logit) compared to those without beliefs (item difficulty: 0.83 logit; DIF contrast = -1.45 logit, p = 0.00). Similarly, item 6, "I experience a connection with a greater source that has a positive effect on my work", was more readily endorsed by people with religious beliefs (item difficulty: -0.22 logit) compared to those without beliefs (item difficulty: 0.32 logit; DIF contrast = -0.54 logit, p = 0.00). Item 15, "I receive inspiration or guidance from a Higher Power about my work", was also more readily endorsed by people with religious beliefs (item difficulty: 0.25 logit) compared to those without beliefs (item difficulty: 0.83 logit; DIF contrast = -0.58 logit, p = 0.00). In contrast, item 12, "I have moments at work in which I have no sense of time or space", was more readily endorsed by people without religious beliefs (item difficulty: 0.49 logit) compared to those with religious beliefs (item difficulty: -0.02 logit; DIF contrast = 0.51 logit, p = 0.00). No significant DIF was found by sex, professional category, or complementary practice.

After evaluating the psychometric properties of the original SAWS instrument, items that showed poor fit and significant DIF were excluded in the following order: 2, 10, 12, 1, 6, and 15. As a result, 12 items remained, which, collectively, showed adequate fit (Table 4). It should be noted that, although item 3 yielded an Outfit MnSq value of 1.60, its inclusion in the instrument did not compromise the respondents' measurements. Therefore, it was decided to retain it in the analysis.

Table 4. Fit Indexes for the 12-Item SAWS-Br. Brazil, 2022 (n = 3735)

Item	Model		Infit	Outfit	Point-Biserial Correlations
	Measure	Standard Error	MnSq	MnSq	
3. I experience a real sense of trust and personal connection with my coworkers.	0.31	0.03	1.36	1.60	0.59
18. At the moment, I am right where I want to be at work.	0.66	0.03	1.22	1.21	0.68
11. I have a sense of personal mission in life, which my work helps me to fulfill.	-0.59	0.03	1.15	1.17	0.67
4. I am able to find meaning or purpose at work.	-0.56	0.03	0.99	1.01	0.70

Item	Model		Infit	Outfit	Point-Biserial Correlations
	Measure	Standard Error	MnSq	MnSq	
16. I experience moments at work where everything is blissful.	0.88	0.03	0.97	0.93	0.71
5. At moments, I experience complete joy and ecstasy at work.	0.30	0.03	0.95	0.96	0.71
9. I am fulfilling my calling through my work.	-0.38	0.03	0.96	0.95	0.72
13. I share a strong sense of purpose and meaning with my coworkers about our work.	0.58	0.03	0.92	0.96	0.72
17. I feel like I am part of "a community" at work.	0.68	0.03	0.96	0.95	0.72
7. I am passionate about my work.	-0.94	0.03	0.88	0.78	0.73
8. At times, I experience an energy or vitality at work that is difficult to describe.	0.27	0.03	0.83	0.81	0.75
14. I feel grateful to be involved in work like mine.	-1.20	0.03	0.81	0.71	0.74

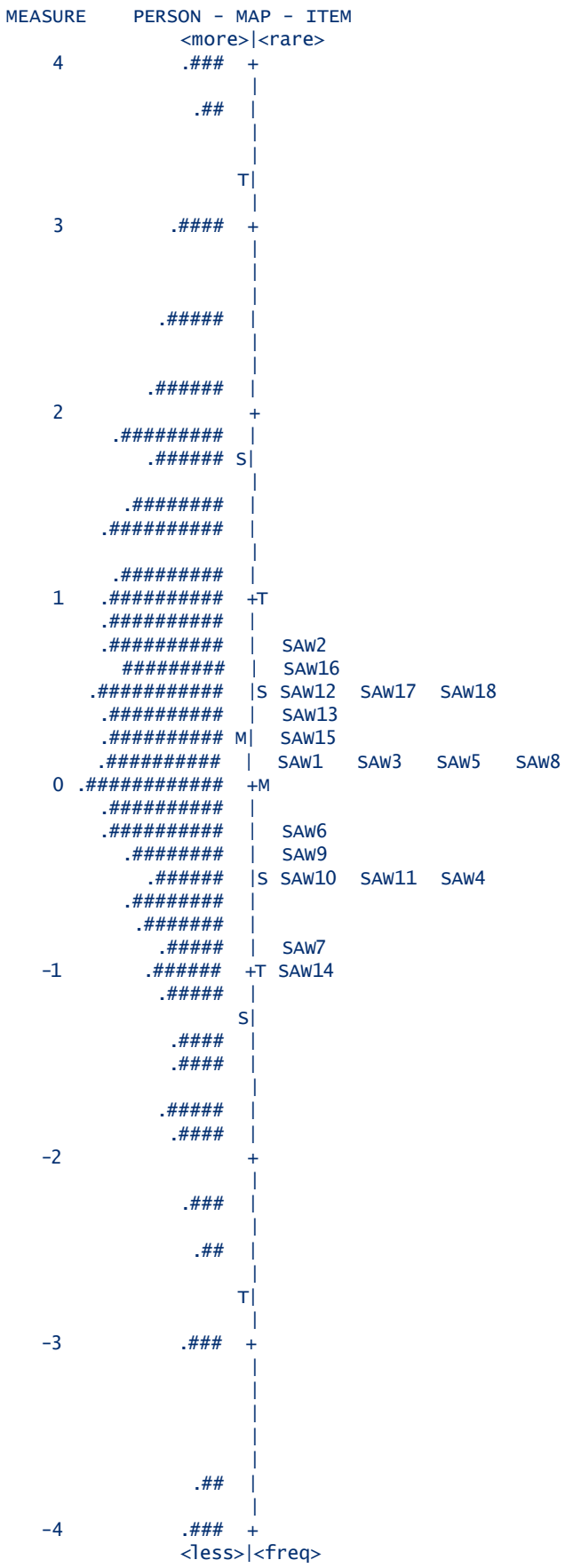
Source: Prepared by the authors.

For the 12-item version, the principal component analysis revealed an eigenvalue of 1.85 for the first contrast. Additionally, analysis of the residual correlation matrix showed values below 0.28, indicating the absence of local dependence. The reliability of the respondents was 0.85, with a discrimination index of 2.40. As for the items, reliability reached 1.0, and the discrimination index was 20.79.

The item-person distribution map for the complete instrument is shown in Figure 2. The difficulty estimates for the SAWS-Br items ranged from -1.02 to 0.71 logit, with item 2 being the most difficult and item 14 the easiest. Regarding the individuals, their ability level ranged from -4.93 to 4.91. The mean score for the individuals was 0.22 logit, and the mean score for the items was 0.0 logit.

In Figure 3, the instrument map consisting of 12 items is presented. The difficulty estimates for the SAWS items ranged from -1.20 to 0.88 logit, with item 16 being the most difficult and item 14 the easiest to answer.

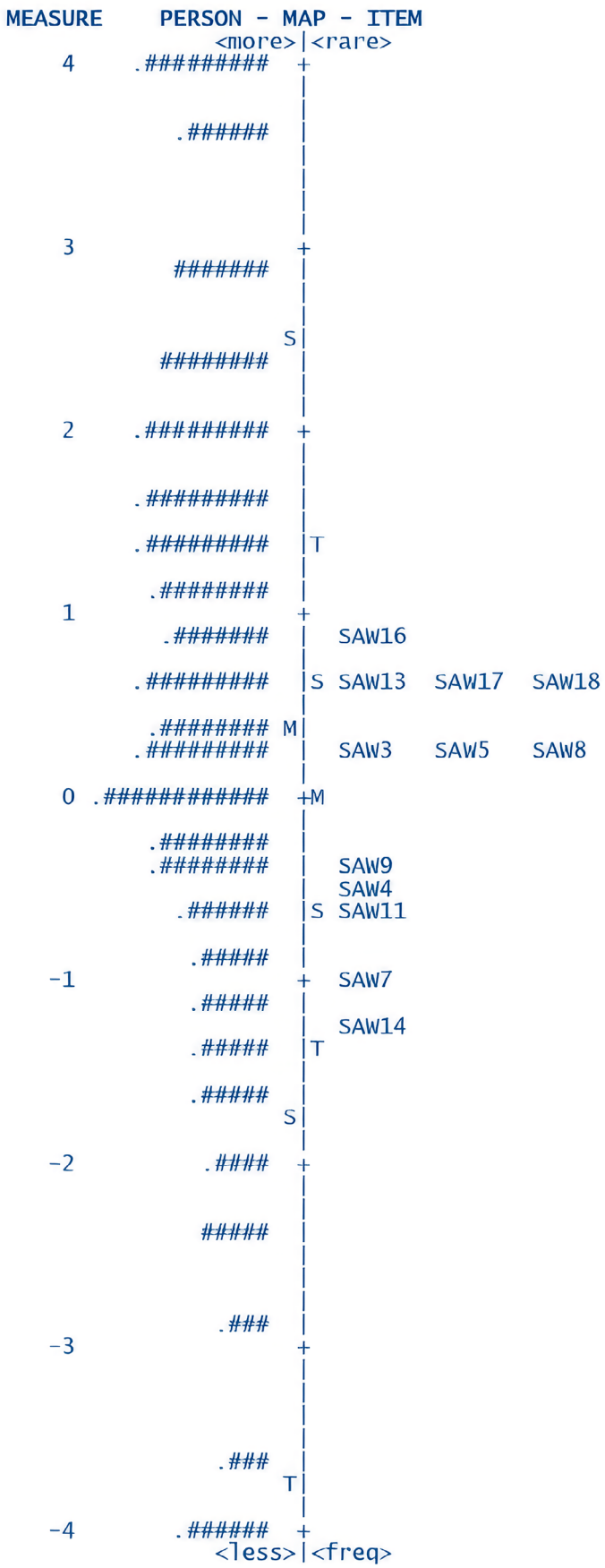
Figure 2. Item-Person Distribution Map for the Eighteen Items of the SAWS



Source: Prepared by the authors.

Note: The sample mean (M) and standard deviation (S) are presented relative to the mean of the items (set by default to 50). Each "#" represents 14 people; "." represents 13 people; and each "T" represents two standard deviations.

Figure 3. Item-person distribution map for the 12-item SAWS



Source: Prepared by the authors.

Note: The sample mean (M) and standard deviation (S) are presented relative to the mean of the items (set by default to 50). Each "#" represents 20 people; "." represents 19 people; and each "T" represents two standard deviations.

Discussion

The primary objective of this study was to evaluate the psychometric properties of the Brazilian version of the SAWS, based on the premises of the Rasch model. This is the first study to employ Rasch analysis to examine the internal structure of the SAWS among Brazilian nursing professionals, representing a significant contribution to the literature. The application of this model allowed for a detailed and rigorous evaluation of the functionality of the response categories, the unidimensionality of the instrument, and the fit of the items to the construct of spirituality at work, pointing to the need for adjustments to the original theoretical model.

The data referring to the functionality of the response categories for the items revealed a mismatch in the calibration of the thresholds, suggesting problems with the instrument's response scale. This indicates that participants were unable to distinguish between the six response options originally proposed by the authors of the SAWS (1 — completely disagree; 2 — mostly disagree; 3 — somewhat disagree; 4 — somewhat agree; 5 — mostly agree; and 6 — completely agree) and, for this reason, this does not represent the most adequate response categorization for the sample. In this context, the analysis of the response probability curve confirmed better psychometric performance with three response categories.

It should be noted that, to date, no studies have been found that used Rasch analysis to assess the internal structure of the SAWS, which precludes comparison of evidence related to the categorization of responses to the instrument's items. Furthermore, it is also worth noting that the three-category response structure is specific to the characteristics of the sample studied and should not be regarded as a standard for use in future studies. Similar studies conducted in different cultural contexts and with different populations may confirm the instrument's original response categorization structure.

The principal component analysis and the correlation matrix between item residuals revealed the unidimensionality of the full version of the SAWS-Br (18 items). However, items with statistical misfit to the model were identified, which required adjustments to the item set. After excluding the misfitting items, a 12-item model showed a better fit to the data, reinforcing the unidimensionality regarding the construct of spirituality at work. In addition, the DIF analysis indicated significant misfits in the Infit and Outfit values for items 1 ("I experience a match between the requirements of my work and my values, beliefs, and behaviours"), 2 ("At times, I experience a 'high' at my work"), and 12 ("I have moments at work in which I have no sense of time or space").

These results reinforce the evidence from SAWS validation studies conducted in different contexts that used exploratory and confirmatory factor analysis of the data and indicated the need to exclude

items to adjust the instrument's theoretical model. In this sense, a study conducted with workers at a hospital in Vietnam (14) confirmed the need to exclude item 2 from the SAWS. A previous study that performed the cultural adaptation and validation of the SAWS for the Brazilian context (22) confirmed the exclusion of items 1, 2, and 12 for nursing professionals. A study conducted with a sample of academics from a university in Turkey (38) indicated the reclassification of item 7 from the "engaging work" factor to the "sense of community" factor. Furthermore, results from the exploratory factor analysis of a study conducted in Turkey with industrial zone workers (19) indicated the fit of a three-factor model that led to the creation of the "spiritual and social connection" factor (combining the sense of community and spiritual connection factors), without excluding any items from the instrument; a study on the cultural adaptation and validation of the SAWS in Germany (16) confirmed the fit of a one-factor model with all items in the instrument.

Thus, to date, various adjustments to the original SAWS theoretical model have been identified in the contexts studied. Despite the scarcity of psychometric studies that have used robust methodologies to analyze data collected via the SAWS, the findings of this study reinforce the hypothesis that the concept of spirituality at work can be interpreted in specific ways by each group or population, in the same way that the experience of spirituality depends on cultural aspects inherent to each studied context.

Based on these considerations, it can be inferred that the non-adjustment of SAWS-Br items may be attributed to aspects of Brazilian culture related to the concept of spirituality and religiosity, which differ from the cultural context in which the instrument was originally developed (Canada).

The cultural divergences related to aspects of spirituality/religiosity in the German context also required semantic adaptations to terms originally used in the SAWS for the validation of the instrument (16). In that study, expressions with religious connotations were replaced by broader terms that did not refer directly to a higher power. Other potential reasons for the misfits include ambiguities in the items, interpretive difficulties, and the prevailing pandemic context during data collection.

Specifically, it is considered that item 1, "I experience a match between the requirements of my work and my values, beliefs, and behaviors", presents ambiguity related to the simultaneous inquiry into three aspects (values, beliefs, and behaviors), leading to confusion and difficulty in understanding among respondents. The same ambiguity may be observed in item 12, "I have moments at work in which I have no sense of time or space", making it difficult for the participant to define exactly what is being asked of them.

In item 2, "At times, I experience a 'high' at my work", the word "high" is associated with feelings of euphoria in Brazilian culture. However, during the data collection period, the world was undergoing the health crisis caused by the COVID-19 pandemic, which caused immense physical and mental suffering for healthcare and nursing professionals and may have influenced participants' responses, leading them to question whether it was possible to feel excitement at work during the pandemic.

Added to the suffering caused by the pandemic, it is important to consider aspects related to nursing practice that may exacerbate significant differences in participants' responses to the SAWS-Br items. Immersed in the management of human suffering, nursing professionals face challenging and stressful conditions on a daily basis imposed by the demands of the healthcare system, the work environment, and workplace relationships, including professional devaluation, low wages, job instability, and lack of access to support services; factors that may trigger various forms of suffering and physical and mental illnesses related to work in the healthcare field (39, 40). This work context differs considerably from that experienced by participants in the initial studies that led to the development and validation of the SAWS theoretical model (workers from various professional fields at a Canadian university) (12).

Regarding the DIF analysis between different groups, it was noted that several items on the instrument did not function equivalently when the sample was stratified by age (item 2) and religious belief (items 6, 10, 12, and 15). The fact that individuals under 39 years of age more readily endorsed item 2, "At times, I experience a 'high' at my work", may be indirectly related to their shorter tenure in the profession, leading these younger professionals to experience greater happiness at work than older individuals with longer experience in the nursing field. Corroborating these results, evidence has demonstrated a direct relationship between the development of spirituality and an individual's advancing age (40, 41). In turn, younger groups frequently consider the purpose and meaning of work to be more important aspects (16, 42).

Regarding items 6 ("I experience a connection with a greater source that has a positive effect on my work"), 10 ("My spiritual beliefs play an important role in everyday decisions that I make at work"), and 15 ("I receive inspiration or guidance from a Higher Power about my work"), it is acknowledged that the wording of these items contains terms, expressions, or words whose meaning is closely related to spiritual and religious aspects, which explains why they were more readily endorsed by people who reported having religious beliefs. Item 12, "I have moments at work in which I have no sense of time or space", on the other hand, having no spiritual connotations, was easier for participants without religious beliefs to endorse.

Rasch reliability analyses of the original version of the instrument (18 items) and the sample-adjusted version (12 items) were found

to be adequate, with no significant differences between them. However, the person separation suggests that the instrument has difficulty identifying individuals at extreme levels of the latent trait (high and low levels). This weakness was confirmed by the item-person map analysis, which demonstrated an imbalance in the distribution of items along the continuum when compared to participants' latent trait scores, in addition to highlighting the high concentration of items within a narrow logit range and the absence of items capable of assessing the extremes of latent traits.

As limitations of the study, the scarcity of evidence using robust methods to analyze the internal validity of the SAWS and the absence of studies based on a Rasch analysis of the instrument are noted, which hindered the comparison of results and an in-depth analysis of aspects related to the construct of spirituality at work.

Conclusion

The analysis of the data obtained using the version of the SAWS adapted for the Brazilian context, based on the premises of the Rasch method, did not fully confirm the original theoretical structure proposed by the scale's authors.

In the sample of Brazilian nursing personnel, the unidimensionality of the instrument was confirmed after excluding misfit items, resulting in a 12-item model that more accurately represented the construct of spirituality at work. Analysis of the response probability curve indicated the need to adjust the calibration of the thresholds, suggesting the use of only three response categories. Items 2, 6, 10, 12, and 15 exhibited DIF in the responses of distinct groups, based on age and religious belief, suggesting potential biases in the measurement of the latent trait across subgroups. In addition, the person separation indexes and the item-person map revealed low sensitivity of the scale in distinguishing individuals at extreme levels of the latent variable, indicating a need to include items that are more representative of these segments.

In general, it can be concluded that the use of the SAWS-Br can contribute to nursing practice by providing insight into how spirituality in the workplace influences professionals' motivation and well-being, thereby enabling the implementation of strategies that promote mental health and result in safer, higher-quality patient care.

Therefore, it is considered essential to conduct further validation studies of the SAWS-Br using robust psychometric models, such as the Rasch model, which allow for a more precise assessment of the construct of spirituality at work and the invariance of the measure.

Conflict of interest

he authors declare that they have no conflicts of interest.

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