Confirmatory factor analysis to validate the short version of the Ottawa mental skill for sports (OMSAT-3) in Portuguese athletes

Análisis factorial confirmatorio para validar la versión corta de la habilidad mental de Ottawa para deportes (OMSAT-3) en atletas portugueses

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Abstract

Introduction: The development of psychological skills plays an important role in improving performance and achieving excellent results in sports.
Objective: The aim of this study was to validate the Portuguese short version of the Ottawa Mental Skills Assessment Tool (OMSAT-3).
Methodology: By means of a confirmatory factor analysis (CFA), a total of 524 Portuguese athletes of both sexes aged between 12 and 42 (M = 19.21; SD = 5.46) were recruited for the present study.
Results: The results indicate that the reduced version of the OMSAT-3 (30 items) has adequate psychometric qualities, enabling an assessment of Foundation, Psychosomatic and Cognitive Skills (SRMR = 0.052; CFI = 0.983; TLI = 0.979; RMSEA = 0.031 CI 90% [0.026, 0.037]; χ^2/df = 1.52). There was high concurrent validity between the reduced version (30 items) and the full version (48 items).
Conclusions: The results suggest that the reduced OMSAT-3 can be used with confidence to assess psychological skills in a sports context.

Keywords

Cognitive skills; confirmatory factor analysis; foundation skills; OMSAT-3; psychosomatic skills; short version.

Resumen

Introducción: El desarrollo de habilidades psicológicas juega un papel importante en la mejora del rendimiento y en la obtención de excelentes resultados en los deportes.
Objetivo: El objetivo de este estudio fue validar la versión corta en portugués de la Herramienta de Evaluación de Habilidades Mentales de Ottawa (OMSAT-3).
Metodología: Mediante un análisis factorial confirmatorio (AFC), un total de 524 atletas portugueses de ambos sexos, con edades comprendidas entre 12 y 42 años (M = 19.21; DT = 5.46), fueron reclutados para el presente estudio.
Resultados: Los resultados indican que la versión reducida del OMSAT-3 (30 ítems) tiene cualidades psicométricas adecuadas, lo que permite una evaluación de las Habilidades Fundamentales, Psicosomáticas y Cognitivas (SRMR = 0.052; CFI = 0.983; TLI = 0.979; RMSEA = 0.031 CI 90% [0.026, 0.037]; χ^2/df = 1.52). Se encontró una alta validez concurrente entre la versión reducida (30 ítems) y la versión completa (48 ítems).
Conclusiones: Los resultados sugieren que el OMSAT-3 reducido se puede utilizar con confianza para evaluar habilidades psicológicas en un contexto deportivo.

Palabras clave

Análisis factorial confirmatorio; habilidades cognitivas; habilidades fundamentales; habilidades psicosomáticas; OMSAT-3; versión corta.

Introduction

Excellence in sports performance results from the complex interaction of physical, technical, tactical, and psychological factors. Research in sport psychology has consistently demonstrated that mental skills such as self-confidence, concentration, stress management, and emotional regulation are critical determinants of competitive success (Gould et al., 2002; Vealey, 2007). These abilities become particularly salient in high-pressure contexts, where the capacity to maintain emotional stability and cognitive clarity may represent the decisive factor between victory and defeat (Mahoney et al., 1987). Their importance extends beyond the competitive stage, influencing training adherence, recovery from injury, and long-term motivation (Bandura, 1977; Weinberg & Gould, 2019). Consequently, the assessment and development of such competencies constitute a strategic axis in athlete preparation.

Mental skills may be defined as a set of trainable psychological competencies that enable athletes to maximize their performance in both training and competition (Orlick, 1996). Among the most frequently studied are goal setting, imagery, arousal management, emotional self-regulation, and attentional focus (Nideffer, 2002; Simonsmeier et al., 2021). Far from being exclusively innate, these skills can be systematically developed and enhanced through psychological intervention programs implemented by coaches or sport psychologists (Hanin, 2007). Their rigorous monitoring requires psychometrically sound instruments that are culturally adapted and capable of capturing meaningful nuances across sports, competitive levels, and demographic groups.

It was within this framework that researchers at the University of Ottawa developed the Ottawa Mental Skills Assessment Tool (OMSAT), originally based on a comprehensive review of existing tests and the identification of critical mental skills (Salmela, 1992). The structure subsequently evolved into the OMSAT-3 (Durand-Bush et al., 2001), consisting of 48 items organized into three main dimensions: Foundation Skills (e.g., self-confidence, goal setting, commitment), Psychosomatic Skills (e.g., stress reaction, relaxation, activation), and Cognitive Skills (e.g., concentration, attentional redirection, mental imagery). This organization ensures a comprehensive approach, integrating motivational, emotional, and cognitive aspects within a single measure.

The use of the OMSAT-3 has been documented across multiple sporting contexts, ranging from team sports such as football (Taher et al., 2013) and university hockey (Kruger, 2010) to individual disciplines such as taekwondo (Sotoodeh et al., 2012). Studies have examined variables such as gender, sport type, and competitive level, highlighting significant differences in mental skills profiles (Abdullah et al., 2016; Kuchar, 2005; Nicholls et al., 2008; Sukhodolsky et al., 2021; Znazen et al., 2017). For instance, Slimani et al. (2020) demonstrated that athletes in open-skill sports exhibit greater attentional flexibility, whereas closed-skill sports tend to favor arousal control competencies. Similarly, research by Jeong et al. (2023) and Lotfi et al. (2017) underscored gender-based differences, suggesting that specific psychological strategies may be more effective depending on athlete profiles. This diversity of applications reinforces the utility of the OMSAT-3 as both a diagnostic and intervention tool.

Although other instruments exist for assessing mental skills, such as the Psychological Skills Inventory for Sports (PSIS) and the Test of Performance Strategies (TOPS), the OMSAT-3 stands out for its comprehensiveness and cross-cultural validity (Durand-Bush et al., 2001). Among its advantages are high internal consistency, a solid theoretical foundation, and applicability across ages, competitive levels, and sports (Craciun et al., 2011). However, its length may represent a limitation in time-constrained contexts or in studies requiring repeated assessments (Silva et al., 2014), thereby opening the path for shorter versions that remain valid and reliable while being more practical.

The cross-cultural adaptation of the OMSAT-3 has been conducted in various countries, including Romania (Craciun et al., 2011), Tunisia (Noômen et al., 2015), and the Czech Republic (Znazen et al., 2017), all of which confirmed the 12-factor structure and satisfactory psychometric properties. In the portuguese context, Silva et al. (2024) validated the full version, analyzing factorial invariance across gender and confirming the instrument's cultural adequacy. This adaptation is particularly relevant given that psychological assessment instruments must be sensitive to linguistic and sociocultural specificities to ensure correct interpretation of results (Hambleton et al., 2005).

Beyond linguistic validation, cross-cultural research has shown that the interpretation of psychological constructs can vary across cultures, shaping how athletes perceive and report their mental skills (Van

de Vijver & Tanzer, 2004). Integrating evidence from diverse contexts—such as Sukhodolsky et al. (2021) in Russia or Slimani et al. (2020) in Europe—provides a useful comparative framework to understand global variations and trends. This perspective enhances the value of the portuguese validation, ensuring that future international comparisons are methodologically consistent.

The validation of reduced versions of the OMSAT-3, such as the one pursued in the present study, is justified for both practical and scientific reasons. Practically, shorter instruments improve athlete compliance and reduce data collection time, which is particularly advantageous in high-intensity training environments or in longitudinal research designs. Scientifically, an abbreviated version that retains the factorial validity and internal reliability of the full version represents a valuable tool for investigations that require measuring mental skills alongside other psychological and physiological indicators.

Accordingly, the aim of this study is to validate the reduced OMSAT-3 (30 items) for the portuguese population through Confirmatory Factor Analysis and by examining indicators of convergent, discriminant validity, and internal reliability. This research is relevant because it (1) offers a more efficient alternative to the full version, (2) strengthens the psychometric foundation of the instrument within the portuguese-speaking context, and (3) contributes to psychological intervention in sport by providing data to guide mental training programs tailored to specific sports, competitive levels, and athlete profiles.

Method

The research design was a cross-sectional correlational, as it aimed to analyze the relationship between the different dimensions assessed by the OMSAT-3 short version. This approach is based on the application of questionnaires and surveys to a sample of athletes, respecting the methodological recommendations of Montero and León (2007) for descriptive studies.

Participants

The study included 524 Portuguese athletes (88% men and 12% women) competing in different sports (football, handball, swimming, triathlon, basketball and volleyball), at national (77%) and regional (23%) level. Training experience ranged from 1 to 28 years (M = 8.61; SD = 5.49). Ages ranged from 12 to 42 years (M = 19.21; SD = 5.46), with 45% of the players in the senior ranks and 55% in the junior or younger ranks. The type of sampling adopted was purposive, selecting athletes who were available and agreed to take part, according to Montero and León (2007).

Procedure

The study was approved by the IPCB Ethics Commission under No. 107 CE-IPCB/2023. The application of the OMSAT-3 short-version questionnaire (30 items) and relevant socio-demographic questions (age, gender, sport, years of sporting experience) took approximately 10 minutes to complete, and all participants were informed of the purpose of the study and assured of the anonymity and confidentiality of their data.

Participation was voluntary and complied with ethical procedures in line with the guidelines of the *American Psychological Association* (APA).

In the case of athletes under the age of 18, informed consent was obtained from their parents or legal guardians. The questionnaires were administered during training sessions or competitions, after prior authorization from the coaches and team managers.

Instrument

OMSAT-3 Full Version (48 Items)

The original instrument in Portuguese (Silva et al., 2024) consists of 48 items divided into three main dimensions (Foundation, Psychosomatic and Cognitive Skills), each subdivided into specific variables. The answers are given on a seven-point Likert scale (from 'totally disagree' to 'totally agree').

- Foundation Skills: Goal Setting, Self-Confidence and Commitment (each with four items in the original version).

- Psychosomatic Skills: Stress Reaction, Fear Control, Relaxation and Activation (each with four items).
- Cognitive Skills: Focusing, Refocusing, Competition Planning, Mental Practice and Imagery (each with four items).

OMSAT-3 Short Version (30 Items)

The present research focused on validating a shorter version, with 30 items, which aimed to reduce the response effort for the participants and, at the same time, maintain the essential psychometric characteristics. The reduction from four to three items per factor is methodologically supported in the multivariate analysis literature, which establishes that a minimum of three indicators per construct is sufficient to ensure model identification and factorial validity, provided that the items preserve conceptual consistency and display adequate factor loadings (Hair, Anderson, Tatham, & Black, 1998). Subsequent studies further emphasize that parsimonious models, based on three items per factor, can maintain psychometric robustness and enhance the practical utility of instruments, as long as the selected indicators adequately represent the theoretical dimension under examination (Brown, 2015; Kline, 2023). Thus, each one of the 10 variables of the reduced version of the OMSAT was represented by three items:

- Foundation Skills: Goal Setting (3 items - e.g. "*I set difficult but achievable goals.");* Self-confidence (3 items- e.g. "*I believe I can succeed in my sport despite the obstacles I encounter.");* Commitment (3 items - e.g.: "*I am determined to be an outstanding athlete*").
- Psychosomatic Skills: Stress Reaction (3 items - e.g. "*I experience performance problems because I'm very nervous*."); Fear Control (3 items - e.g.: "*I find it difficult to train because of the fear involved in my sport*."); Relaxation (3 items - e.g.: "*I find it easy to relax.";* Activation (3 items 3.g.: "*I can easily activate myself to an optimum level for my performance to be at its best."*
- Cognitive Skills: Focusing (3 items - Aggregates the original Focus and Refocus items. E.g.: "*I mentally practice my sport every day*."); Imagery (3 items - e.g.: "*During important competitions I lose concentration*."); Mental Practice (3 items - Combines the original Competitive Planning and Mental Practice items. E.g.: "*I find it easy to modify the images in my mind*."

In both versions (full and short), the scores are calculated by averaging and adding up the items, making it possible to compare the level of each competency. In this study, we focused on analyzing the psychometric qualities of the reduced form (30 items), as well as its concurrent validity with the full version (48 items).

Data analysis

To test the 10-factor model (three foundation, four psychosomatic and three cognitive skills), a CFA was carried out using the *Lavaan* package of the JASP software (Rosseel, 2012). To respect the ordinal (Likert) nature of the items, the *Robust Diagonally Weighted Least Squares* (RDWLS) estimator, recommended for ordinal data, was used (DiStefano & Morgan, 2014; Li, 2016). For each latent factor, item loadings were restricted to 1. Standardized estimates were reported despite using unstandardized values in the model.

Steps in Confirmatory Factorial Analysis

1. Data Preparation and Cleaning
   - Checking for missing data and univariate and multivariate outliers.
   - Univariate and multivariate normality analyses (Skewness, Kurtosis, Mardia's test), although CFA with RDWLS is less sensitive to normality violations (Kline, 2011).
2. Model Specification
   - Definition of 10 latent factors (Goal Setting, Self-Confidence, Commitment, Stress Reaction, Fear Control, Relaxation, Activation, Focusing, Imagery and Mental Practice).
   - Each factor had 3 items, with the factor loadings of an item fixed at 1 to allow the model to be identified (Kline, 2023; Schumacker & Lomax, 2010).
3. Model Estimation

- Use of the RDWLS method to estimate the parameters.
- Standardized factor loadings, standard errors and residual variances were calculated.

4. Model Evaluation

- Recommended value $\chi^2/df \leq 5$ for acceptable adjustment (Schumacker & Lomax, 2010).
- *Comparative Fit Index* (CFI) and *Tucker-Lewis Index* (TLI) with values above 0.90 (preferably ≥ 0.95) suggest a good fit (Brown, 2015).
- *Root Mean Square Error of Approximation* (RMSEA) with values below 0.08 are considered an acceptable fit; below 0.05, a very good fit (Browne & Cudeck, 1992).
- *Standardized Root Mean Square Residual* (SRMR) with values below 0.08 are acceptable; below 0.05 indicate good fit (Hu & Bentler, 1999; Brown, 2015).

5. Analyzing Reliability

- Descriptive, Asymmetry and Kurtosis analyses were carried out, as well as reliability analyses using McDonald's Omega Coefficient (ω) (McDonald, 1999) for each of the factors. According to Revelle and Zinbarg (2009), values closer to 1 indicate greater internal consistency. Also, values of 0.70 or higher are indicative of good reliability.
- *Composite Reliability* (CR) and *Average Variance Extracted* (AVE) (Bagozzi & Yi, 1988). CR values above 0.60 are considered acceptable, and AVE values above 0.40 also suggest satisfactory convergence.

6. Concurrent Validity

- Comparison between the scores obtained on the dimensions of the OMSAT-3 short version and their corresponding scores on the full 48-item version, using Pearson's correlation. Strong correlations (above 0.70) indicate good concurrent validity (Kline, 2023).

All complementary statistical procedures (statistical descriptions, normality, correlations) were carried out in the SPSS 21.0 and JASP software's. In addition, the decision criteria for each adjustment index were based on recommendations in the literature (Brown, 2015; Hu & Bentler, 1999; Schermelleh-Engel et al., 2003; Schumacker & Lomax, 2010).

Results

Confirmatory Factor Analysis

According to the quality of fit indexes, the ten-factor model tested (Figure 1) obtained SRMR = 0.052, CFI = 0.983, TLI = 0.979, RMSEA = 0.031 CI 90% [0.026, 0.037] and $\chi^2/df = 1.52$, indicating a very good fit. These values meet the recommendations of the literature, demonstrating that the ten-factor structure is appropriate for assessing mental skills (three foundation, four psychosomatic and three cognitive skills) using 30 items.

By comparison, the 48-item version, due to its greater number of latent variables, was analyzed in three subsets (Foundation, Psychosomatic and Cognitive Skills). In each of the subsets, there were also acceptable to excellent adjustment indices (SRMR between 0.042 and 0.058; CFI between 0.973 and 0.999; TLI between 0.968 and 0.998; RMSEA between 0.008 and 0.044), which corroborates the good structure of the instrument in its complete form.

Figure 1. Schematic example of the ten-factor model in the short version of the OMSAT-3 (30 items).

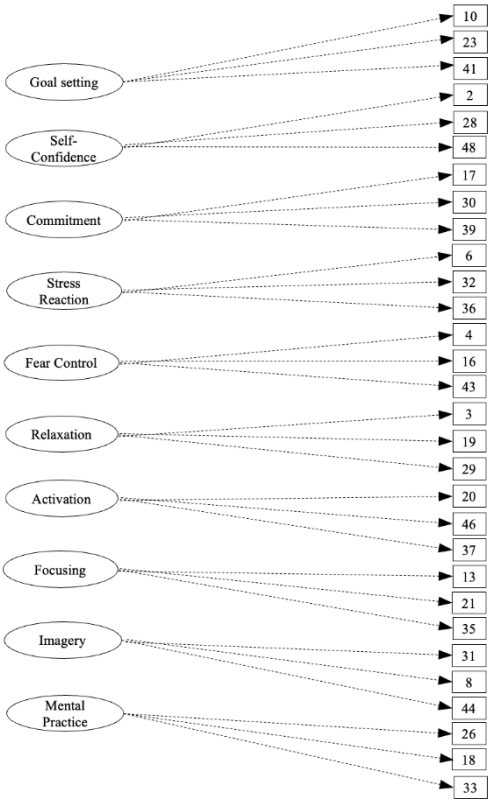

Table 1 shows the covariance values between each of the latent variables (ranging from -0.25 to 0.98), the normalized factor loadings (between 0.38 and 0.85) and their respective residual variances.

Table 1. Estimated parameters of the items in the 30-item OMSAT-3 structural model

Covariance between variables					item	SFL	SVR
Goal setting	↔	Self-confidence	0.851	Goal setting	it10	0.618	0.617
	↔	Commitment	0.829		it23	0.718	0.484
	↔	Stress Reaction	-0.008		it41	0.675	0.544
	↔	Fear control	0.006				
	↔	Relaxation	0.295				
	↔	Activation	0.718				
	↔	Mental Practice	0.821				
	↔	Focusing	0.019				
	↔	Imagery	0.421				
Self-confidence	↔	Commitment	0.749	Self-confidence	it2	0.735	0.459
	↔	Stress Reaction	-0.025		it28	0.683	0.533
	↔	Fear Control	0.034		it48	0.694	0.519
	↔	Relaxation	0.415				
	↔	Activation	0.777				
	↔	Mental Practice	0.670				
	↔	Focusing	0.032				
	↔	Imagery	0.350				
Commitment	↔	Stress Reaction	-0.065	Commitment	it17	0.850	0.278
	↔	Fear Control	0.006		it30	0.693	0.519
	↔	Relaxation	0.261		it39	0.530	0.719
	↔	Activation	0.606				
	↔	Mental Practice	0.625				
	↔	Focusing	0.001				
	↔	Imagery	0.306				
Stress Reaction	↔	Fear Control	0.988	Stress Reaction	it6	0.793	0.371
	↔	Relaxation	-0.250		it32	0.806	0.351
	↔	Activation	-0.200		it36	0.379	0.856
	↔	Mental Practice	-0.090				
	↔	Focusing	0.917				

	↔	Imagery	-0.280				
Fear Control	↔	Relaxation	-0.201	Fear Control	it4	0.449	0.799
	↔	Activation	-0.155		it16	0.837	0.299
	↔	Mental Practice	-0.064		it43	0.764	0.417
	↔	Focusing	0.931				
	↔	Imagery	-0.240				
Relaxation	↔	Activation	0.693	Relaxation	it3	0.401	0.839
	↔	Mental Practice	0.491		it19	0.807	0.349
	↔	Focusing	-0.186		it29	0.548	0.700
	↔	Imagery	0.443				
Activation	↔	Mental Practice	0.861	Activation	it20	0.421	0.823
	↔	Focusing	-0.151		it46	0.462	0.787
	↔	Imagery	0.553		it37	0.649	0.579
Mental Practice	↔	Focusing	-0.025	Mental Practice	it13	0.589	0.653
	↔	Imagery	0.724		it21	0.681	0.536
					it35	0.610	0.628
Focusing	↔	Imagery	-0.151	Focusing	it31	0.585	0.657
					it8	0.850	0.278
					it44	0.050	0.998
Imagery				Imagery	it26	0.686	0.530
					it18	0.637	0.594
					it33	0.738	0.456

Note: SFL - Standardized Factor Loadings; SVR - Standardized Residual Variances

Descriptive Statistics, Normality and Reliability

Table 2 shows the descriptive statistics (mean and standard deviation), as well as the Skewness and Kurtosis values for each dimension of the reduced version of the OMSAT-3. The Skewness values were below 2 and the Kurtosis values below 7, meeting the recommended criteria for univariate normality (Curran et al., 1996). Multivariate normality was also assessed using Mardia's test (Mardia, 1970), considering both skewness and kurtosis statistics. The results indicated a violation of the assumptions, with *p*-values below 0.05 for both multivariate skewness and kurtosis across the latent variables. These findings suggest that the data do not follow a multivariate normal distribution, thereby justifying the use of the RDWLS method in subsequent analyses, as it is less sensitive to deviations from normality (Kline, 2023).

The internal reliability, assessed by the Omega Coefficient (ω), showed values between 0.61 and 0.76 in the different dimensions, being higher than 0.70 in most of the subscales (Gignac & Kretzschmar, 2017). In the Activation and Focusing subscales, although the values were slightly lower than desired (0.60-0.65), it was considered acceptable given the small number of items (Hair et al., 1998). The analyses of CR and AVE also suggested adequate values (CR > 0.60; AVE > 0.40), indicating satisfactory convergence (Bagozzi & Yi, 1988).

Table 2. Descriptive statistics, asymmetry, kurtosis and reliability analysis of the 30-item OMSAT-3 variables

OMSAT-3	item	SFL	CF	M	SD	Skew	Kurt	ω	AVE	CR
Goal setting	10	0.775	.765**	5.69	.97	-.86	1.04	.71	.50	.75
	23	0.926	.814**							
	41	0.736	.814**							
Self-confidence	2	0.825	.802**	5.89	.92	-.96	1.03	.75	.48	.73
	28	0.746	.825**							
	48	0.824	.815**							
Commitment	17	0,952	.777**	5.22	1.29	-.69	.10	.73	.67	.86
	30	0,945	.838**							
	39	0.936	.804**							
Stress Reactions	6	0,954	.831**	4.40	1.60	-.25	-.99	.76	.55	.78
	32	0,961	.875**							
	36	0.612	.643**							
Fear Control	4	0.926	.691**	3.99	1.78	-.18	-1.11	.76	.69	.87
	16	0,989	.874**							
	43	0,958	.782**							
Relaxation	3	0.600	.782**	4.79	1.09	-.52	.35	.68	.46	.72
	19	0,930	.683**							

	29	0.795	.825**							
	20	0.608	.743**							
Activation	46	0.676	.739**	4.81	.98	-.06	-.18	.61	.40	.62
	37	0.770	.665**							
	13	0.908	.404*							
Focusing	21	0.924	.340*	4.05	1.34	-.19	-.47	.65	.64	.84
	35	0,928	.436*							
	31	0,924	.293*							
Imagery	8	0,983	.336*	4.73	1.21	-.28	.12	.74	.49	.72
	44	0.502	.381*							
	26	0,927	.498**							
Mental Practice	18	0.953	.486**	4.89	1.19	-.45	-.06	.67	.66	.85
	33	0,938	.518**							

Note: SFL – Standardized Factor Loading: Correlation between item and factor; CF – Factor loading of the item in the factor; *p < 0,05, **p < 0,01; M – Mean; SD – Standard Deviation; Skew – Skewness; Kurt – Kurtosis; ω – McDonald's Omega; AVE – Average Variance Extracted; CR – Composite Reliability. * p < 0.01.

Concurrent Validity

Table 3 shows the Pearson correlations between the dimensions of the 30-item OMSAT-3 and the similar dimensions in the 48-item version. The correlation values were strong (between 0.81 and 0.97), showing that the reduced instrument assesses the same skills as the full version, reinforcing its concurrent validity.

Table 3. Concurrent validity between the 48-item OMSAT-3 and the 30-item OMSAT-3

OMSAT 30	GS	SF	Com	SR	FC	Rlx	Atv	Foc	Ima	MP
OMSAT 48	.96**	.96**	.96**	.97**	.96**	.96**	.93**	.81**	.96*	.96**

Note: *p < .05; **p < .01; GS - Goal Setting; SC - Self-confidence; Com - Commitment; SR – Stress Reaction; FC – Fear Control; Rlx – Relaxation; Atv – Activation; Foc – Focusing; Ima – Imagery; MP – Mental Practice.

Discussion

This study set out to evaluate the psychometric properties of the 30-item short version of the Ottawa Mental Skills Assessment Tool (OMSAT-3) in a sample of portuguese athletes, extending previous validation work by adapting and confirming the model's adequacy in this cultural context. As emphasized in the introduction, mental skills are central to athletic performance across sports, influencing factors such as self-confidence, attention control, emotional regulation, and coping under pressure. However, as noted in earlier research, the availability of brief, valid, and culturally adapted instruments for portuguese-speaking athletes has been limited, restricting large-scale monitoring and applied interventions in competitive settings.

Our results show that the 10-factor structure of the shortened version demonstrated an excellent fit to the data (χ^2/df = 1.52; CFI = 0.983; TLI = 0.979; RMSEA = 0.031; SRMR = 0.052), aligning with earlier validations in other cultural contexts (Craciun et al., 2011; Durand-Bush et al., 2001; Noômen et al., 2015). This consistency reinforces the theoretical robustness of the OMSAT framework, even when reduced to three items per factor, and demonstrates that its multidimensional conceptualization—covering Foundation, Psychosomatic, and Cognitive Skills—remains intact. By confirming these results in a Portuguese sample, this research not only replicates but also extends the cross-cultural generalizability of the OMSAT-3.

The internal consistency indices were also satisfactory, with most factors exceeding the 0.70 threshold for Omega coefficients. Although Activation and Focusing presented slightly lower values (0.60), such results are expected in short-form scales, given the limited number of items per factor (Hair et al., 1998). Composite reliability (CR) and average variance extracted (AVE) supported the internal coherence of all dimensions. These findings highlight that the abbreviated instrument retains adequate psychometric quality while minimizing respondent burden—a crucial consideration in high-performance contexts, where assessment time is often constrained.

In terms of concurrent validity, high correlations (0.81–0.97) between the shortened and full versions confirm conceptual equivalence. This supports the practical utility of the 30-item version for both research and applied sport psychology, enabling accurate and multidimensional assessment without

sacrificing the theoretical richness of the original instrument. In line with the points raised in the introduction, this efficiency makes the short version particularly valuable for coaches, sports psychologists, and federations seeking to integrate psychological skills monitoring into broader performance evaluation systems.

From a cross-cultural perspective, the present study advances the adaptation work initiated by Silva et al. (2024), who validated the portuguese full version of the OMSAT-3. By developing and validating a short version, our research bridges the gap between theoretical robustness and field applicability, adding a tool that can be integrated into longitudinal designs, large-scale talent development programs, or comparative studies between countries. The increasing number of adaptations in different cultures (e.g., Czech, Iranian, Canadian contexts) reinforces the OMSAT's status as a versatile, globally applicable measure, and the current study ensures that portuguese-speaking athletes can benefit from the same standard of assessment.

The novelty of this research lies in three main contributions. First, it confirms that the psychometric integrity of the OMSAT-3 can be preserved in a substantially shorter format. Second, it extends the cultural validation of mental skills measurement into the portuguese sports context, an area that has received limited attention despite the country's competitive achievements in multiple sports disciplines. Third, it provides empirical support for an assessment tool that balances theoretical comprehensiveness with applied feasibility, a need repeatedly highlighted in sport psychology literature.

Practical implications include the potential for the short version to be used in pre-competition screenings, psychological skills training programs, and research examining the relationship between mental skills and other performance-related variables, such as self-determined motivation (Ryan & Deci, 2020), leadership styles (Leo et al., 2023), resilience, and group cohesion. Moreover, the multidimensional nature of the tool allows practitioners to identify specific areas for development, enabling more targeted interventions.

Nonetheless, the study has limitations. The absence of multi-group invariance testing means that equivalence across gender, sport type, and competition level remains to be verified. Future research should address these aspects to reinforce the scale's robustness. Additionally, integrating the OMSAT-3 short version into predictive models of performance outcomes could clarify how different mental skills contribute to success across various sports disciplines.

In conclusion, this research not only meets the aims outlined in the introduction but also delivers a culturally adapted, psychometrically validated, and time-efficient tool for assessing athletes' mental skills in Portugal. By doing so, it strengthens the theoretical foundation of mental skills assessment and enhances its practical application in competitive sport.

Conclusions

This study confirms that the short version of the OMSAT-3 (30 items), adapted for the Portuguese context, has good psychometric properties, particularly in terms of factorial validity, internal reliability and concurrent validity.

The results show the feasibility of a shorter instrument, which could facilitate application in a training or competition context, as well as in research studies, given the need for practicality and a shorter time frame.

The availability of a shorter version of the OMSAT-3 is a valuable tool for coaches, trainers, psychologists and researchers, enabling a reliable assessment of athletes' mental skills.

However, it is recommended that further studies be carried out to explore the invariance of the model in different sports and age groups, contributing to the continuous improvement of this instrument in the sports psychology panorama.

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