Psychological readiness in professional bullfighters: role, experience, and recent exposure

Preparación psicológica en toreros profesionales: función, experiencia y exposición reciente

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Abstract

Introduction. Professional bullfighting constitutes a performance context characterized by real risk, high uncertainty, and substantial psychophysiological demands, requiring specific psychological resources to ensure effective and safe performance.
Objective. The study aimed to characterize the psychological profile of professional bullfighters in the domains of basic, psychosomatic, and cognitive skills; to compare this profile across different professional roles; and to explore, in an integrated manner, the influence of role, accumulated experience, and recent practice volume on the global psychological index.
Methodology. A cross-sectional study was conducted with 51 Portuguese male professional bullfighters. Participants completed the Ottawa Mental Skills Assessment Tool (OMSAT-3). Descriptive analyses were performed, along with non-parametric tests for correlation and comparison across professional roles, and quantile regression was used for multivariate analysis.
Results. High levels were observed in foundational and cognitive competencies, with comparatively weaker psychosomatic competencies, especially in fear management and stress reactions, as well as differences between professional categories. Quantile regression indicated that the volume of recent practice was positively associated with several psychological domains, while accumulated experience was not predictive. Discussion. The findings were consistent with previous research in bullfighting and other high-risk sports, highlighting the importance of continued exposure for psychophysiological regulation and psychological preparation.
Conclusions. The psychological profile of professional bullfighters appears to be more closely associated with recent practice volume and the role performed.

Keywords

Bull; professional bullfighting; psychological skills; high-risk performance; performance.

Resumen

Introducción. El toreo profesional constituye un contexto de actuación marcado por riesgo real, elevada incertidumbre y altas exigencias psicofisiológicas, lo que exige recursos psicológicos específicos para un desempeño eficaz y seguro.
Objetivo. El estudio tuvo como objetivos caracterizar el perfil psicológico de toreros profesionales en los dominios de las competencias de base, psicossomáticas y cognitivas; comparar dicho perfil en función de las diferentes categorías profesionales; y explorar de forma integrada el papel de la categoría, la experiencia acumulada y el volumen de práctica reciente sobre el índice psicológico global.
Metodología. Se realizó un estudio transversal con 51 toreros profesionales masculinos portugueses. Los participantes completaron el Ottawa Mental Skills Assessment Tool (OMSAT-3). Se llevaron a cabo análisis descriptivos y pruebas no paramétricas de correlación y comparación entre categorías profesionales, así como regresión cuantílica para el análisis multivariado.
Resultados. Se observaron niveles elevados en las competencias de base y cognitivas, con mayor vulnerabilidad en las psicossomáticas, especialmente en el control del miedo y las reacciones al estrés, así como diferencias entre categorías profesionales. La regresión cuantílica indicó que el volumen de práctica reciente se asoció positivamente con varios dominios psicológicos, mientras que la experiencia acumulada no resultó predictiva.
Discusión. Los hallazgos fueron consistentes con investigaciones previas en el contexto tauromáquico y en modalidades de alto riesgo, que destacan la importancia de la exposición continuada para la regulación psicofisiológica y la preparación psicológica. Conclusiones. El perfil psicológico del torero profesional parece estar estrechamente relacionado con el volumen de práctica reciente y de la función desempeñada.

Palabras clave

Toro; torero; habilidades psicológicas; rendimiento en alto riesgo; rendimiento.

Introduction

Professional bullfighting constitutes a singular context of human performance in which technical, physical, strategic, and psychological demands converge under conditions of real life-threatening risk. Although it is not formally classified as a sport, the practice of *Toreo* involves high levels of physiological effort, substantial perceptual–decisional complexity, and constant exposure to threat-related stimuli, which functionally aligns it with other high-performance activities in extreme contexts (Reyes, 2004; Teba-del-Pino et al., 2025). Contemporary evidence indicates that professional bullfighters are exposed to psychophysiological demands comparable to those observed in high-intensity intermittent disciplines, compounded by the unpredictability of the fighting bull and the constant need for rapid decision-making under pressure (Teba-del-Pino et al., 2024a; Zafrilla et al., 2014).

Professionals involved in bullfighting events —namely *matadores*, *novilleros*, *cavaleiros* (*rejoneo*), *picadores*, and *banderilleros* — perform distinct functions within the bullfight structure, which entails clear differences in technical demands, exposure to risk, and performance responsibilities. In the Portuguese context, the *forcado* must also be considered due to his central role in the final phase of the performance. This functional diversity highlights the internal heterogeneity of the bullfighting context and suggests that psychological demands may vary according to professional role (Teba-del-Pino et al., 2025).

The bullfighter's developmental pathway is prolonged and demanding, often beginning in childhood or adolescence and extending over many years until professional status is consolidated. Throughout this process, bullfighters develop specialized technical skills, strategies for interpreting animal behaviour, and mechanisms of emotional self-regulation that enable performance under conditions of uncertainty and risk. Recent evidence further indicates that professional bullfighters dedicate substantial time to physical and psychological preparation aimed at improving resistance to competitive stress and maintaining performance consistency (Zafrilla & González-Ravé, 2014; Teba-del-Pino et al., 2025).

From a psychophysiological perspective, both on-foot and mounted *Toreo* are characterized by high internal competitive loads, with heart-rate values frequently exceeding 85–90% of maximal heart rate during real bullfights (Teba-del-Pino et al., 2024a; Zafrilla et al., 2014). Importantly, these responses are not explained exclusively by mechanical effort, but also by psychological factors such as anxiety, threat anticipation, and decision-making under real danger (Teba-del-Pino et al., 2024a; Teba-del-Pino et al., 2025). In parallel, studies using validated psychological instruments have documented elevated levels of cognitive and somatic anxiety before official bullfights, as well as differences in self-confidence between simulated and real competitive contexts (Teba-del-Pino et al., 2024a).

Another distinctive feature of *tauromaquia* is the direct influence of the animal opponent's behaviour on performance. Variability in bull behaviour has been associated with substantial differences in physiological load and competitive demands within the same bullfight (Teba-del-Pino et al., 2024b). In addition, repeated exposure to the risk of severe injury or death places bullfighters in a context of extreme stress, reinforcing the importance of psychological regulation and emotional control in maintaining performance and safety (Byard, 2025).

Integrated approaches to psychological preparation in high-risk contexts highlight the relevance of three broad domains of psychological competence: basic skills (e.g., motivation, commitment, self-confidence), psychosomatic skills (e.g., stress regulation, fear control, activation), and cognitive skills (e.g., attentional control, imagery, decision-making under pressure) (Silva et al., 2024; Silva et al., 2025). These domains show strong parallels with psychological preparation models used in high-risk sports and support the relevance of structured mental training programs adapted to the *tauromaquia* context (Teba-del-Pino et al., 2024a; Teba-del-Pino et al., 2025).

Despite growing interest in the psychophysiological demands of bullfighting, scientific knowledge regarding the psychological profile of professional bullfighters remains limited. Existing studies are scarce, frequently based on small samples, and rarely compare different professional roles or simultaneously analyze the effects of accumulated experience and recent exposure to bullfighting activity (Teba-del-Pino et al., 2025). Accordingly, the objectives of the present study were to: (i) characterize the psychological profile of professional bullfighters in terms of basic, psychosomatic, and cognitive

skills; (ii) compare this profile across different professional roles involved in bullfighting; and (iii) explore, in an integrated manner, the role of professional role, accumulated experience, and recent exposure to *Toreo* activity on the global psychological profile.

Based on previous literature on high-risk performance and bullfighting contexts, it was hypothesized that: (i) psychological skills would differ according to professional role; (ii) recent exposure to bullfighting activity would be positively associated with psychological profile indices; and (iii) accumulated professional experience would show weaker associations with psychological profile than recent bullfighting activity.

Method

This study employed a cross-sectional correlational design aimed at assessing the status of a population at a specific point in time through the use of questionnaires (Montero & Leon, 2007). In terms of direct intervention manipulation concerning the subject of the study, it is classified as an observational study with a descriptive nature. This is because there was no manipulation of the independent variables (Montero & Leon, 2007), variables were analyzed as they naturally occurred, without interference from the researchers.

Participants

The sample comprised 51 participants, all male, distributed by professional role in Toreo as follows: banderillero, n = 34 (66.7%); novillero, n = 8 (15.7%) and cavaleiro, n = 9 (17.6%). We emphasize that, although the sample is not large, each professional category includes between 70% and 90% of the personnel currently active in Portugal.

Regarding the educational level, among the 49 participants with valid data for this variable (2 missing values; 3,92% of the total), the distribution was as follows: primary education, n = 2 (3.8% of the total); lower secondary education (third cycle), n = 14 (26.4% of the total); upper secondary education, n = 20 (37.7% of the total); bachelor's degree, n = 12 (22.6% of the total); and master's degree, n = 1 (1.9% of the total).

With respect to professional experience, the sample showed a mean of 12.58 ± 9.49 years of practice, with values ranging from 1 to 34 years. The total number of bullfighting events performed by the participants in 2024 and 2025 averaged 47.36 ± 27.29, ranging from 8 to 101 events, including bullfights, novilladas, and festivals.

Procedure

The study received approval from the Department of Sport and Well-Being of the Polytechnic Institute of Castelo Branco (Portugal), in accordance with the guidelines of the Declaration of Helsinki. All participants were treated in compliance with the ethical standards of the American Psychological Association regarding informed consent, confidentiality, and participant anonymity. Written informed consent was obtained from all participants.

Subsequently, a questionnaire booklet was prepared for administration. In addition to the main instrument, sociodemographic data were collected, including sex, academic education, professional role (banderillero, novillero or cavaleiro), years of experience as a bullfighter, and the number of official bullfighting events performed in 2024 and 2025. These events included bullfights (events with adult bulls – 4 or 5 years), novilladas (events with young bulls – 2 or 3 years), and festivals (bullfighting events with cattle of different ages). Questionnaire administration was conducted in paper format and face-to-face by the principal investigator. The approximate completion time was fifteen minutes.

Instrument

The instrument used was the Ottawa Mental Skills for Sports (OMSAT-3) (Durand-Bush, et al., 2001) consists of 48 items on a seven-level Likert scale, ranging from totally disagree to totally agree. The Portuguese European version was adapted and validated by Silva et al. (2024). The main results show that the psychometric qualities of the 48-item OMSAT-3 are adequate and that it has acceptable validity, allowing it to assess Foundation Skills (*SRMR* = 0.042, *CFI* = 0.999, *TLI* = 0.998, *RMSEA* = 0.008 and $\chi 2$

/df = 1.46), Psychosomatic Skills (*SRMR* = 0.056, *CFI* = 0.979, *TLI* = 0.975, *RMSEA* = 0.042 and *χ2 /df* = 1.93) and Cognitive Skills (*SRMR* = 0.058, *CFI* = 0.973, *TLI* = 0.968, *RMSEA* = 0.044 and *χ2 /df* =1.99).

These items are grouped into factors of psychological skills, namely Foundation Skills, Psychosomatic Skills, and Cognitive Skills:

-The Foundation Skills are grouped into the following variables: Goal Setting, 4 items (e.g. *"I set difficult but achievable goals");* Self-Confidence, 4 items (e.g. "*I am confident in most aspects of my performance*"); Commitment, 4 items (e.g. "*I am determined not to give up bullfighting.* ").

-Psychosomatic Skills are grouped into: Stress Reactions, 4 items (e.g. *"I experience performance problems because I'm very nervous");* Fear Control, 4 items (e.g. "I'm afraid of losing"); Relaxation, 4 items (e.g. "I find it easy to relax"); and Activation, 4 items (e.g. "I can easily activate myself to an optimum level so that my performance is at its best").

-Cognitive Skills are grouped into Focusing, 4 items (e.g. "During important *bullfights* I often lose concentration"); Refocusing, 4 items (e.g. "I find it difficult to regain control after being disturbed during a performance"); Mental Visualization or Imagery, 4 items (e.g. "I can create very clear mental images"); Mental Practice, 4 items (e.g. "I mentally practice *bullfighting* every day"); and Competition Planning, 4 items (e.g. "I define a set of things to do before each *bullfight*).

Negatively worded dimensions (stress reactions, fear control, focusing, and refocusing) were reverse-scored according to the OMSAT-3 technical manual prior to score computation and statistical analysis. Accordingly, lower scores in these dimensions reflect comparatively weaker psychological regulation competencies and a greater need for psychological intervention.

In some items, a cultural adaptation was made to the Toreo context so that participants would interpret the questions as part of the tauromaquia context in which they were involved, rather than as referring to sport.

Data analysis

Statistical analyses were performed using IBM SPSS Statistics (version 29). A two-tailed significance level of $p < 0.05$ was adopted for all inferential procedures. Prior to inferential analyses, data screening and preprocessing checks and transformations were conducted as described below.

Internal consistency analysis. The reliability of the subscales was estimated using McDonald's omega (Ω), as this estimator is more appropriate than Cronbach's alpha for multidimensional instruments (McDonald, 1999; Dunn, Baguley, & Brunsden, 2014). Based on the items showing the best internal consistency, the different dimensions composing the OMSAT-3 were calculated (Silva et al., 2024).

Assessment of distribution normality. Normality was evaluated using the Kolmogorov–Smirnov test and through graphical inspection (histograms and Q–Q plots). As most variables and indices deviated from normality, non-parametric procedures and robust methods were selected for subsequent inferential analyses (Field, 2018).

Descriptive and correlational analyses. For all variables and indices, means, standard deviations, minimum and maximum values were reported. Bivariate associations were quantified using Spearman's correlation coefficient (ρ), given the non-normal distribution of the data.

Comparisons between professional roles. Group comparisons (banderillero, Novillero and cavaleiro) were conducted using the non-parametric Kruskal–Wallis test. When significant effects were detected, post hoc pairwise comparisons were performed using Dunn's procedure with Bonferroni adjustment. Effect sizes (η^2) were reported to complement statistical significance and facilitate interpretation of practical relevance (Field, 2018).

Collinearity between predictors. Collinearity between continuous predictors (years of practice vs. number of bullfighting events in the previous two years) was assessed using Spearman's correlation, with values of $\rho < .60$ considered acceptable for simultaneous inclusion in regression models (Field, 2018). Variance inflation factors were additionally inspected when applicable in complementary analyses.

Index construction. The dimensions of the Ottawa Mental Skills Assessment Tool (OMSAT-3) were standardized using z-scores (z = [X − M] / SD) to allow aggregation into composite indices. Three domain-specific indices were calculated as the mean of the corresponding subscale z-scores: Basic Skills Index (goal setting, self-confidence, commitment); Psychosomatic Skills Index (stress reactions, fear control, relaxation, activation); and Cognitive Skills Index (focusing, refocusing, imagery, mental practice, performance planning). A Global Psychological Index was subsequently computed as the arithmetic mean of the three domain indices, following recommended methodological practices for index construction (Tabachnick & Fidell, 2019).

Multivariate modelling. Given the non-normality of the data, interindividual heterogeneity, and imbalance in group sizes, quantile regression at the median (q = 0.50) was selected as the primary multivariate analytical approach. Quantile regression is less sensitive to outliers and heteroscedasticity and provides robust estimates of relationships between predictors and conditional quantiles of the dependent variable (Koenker, 2005; Tabachnick & Fidell, 2019). The estimated models included professional role (categorical variable dummy-coded and entered as a control factor), years of professional practice (continuous covariate), and number of bullfighting events in the previous two years (continuous covariate). Quantile regressions were performed in SPSS using the QUANTREG extension and parameterized with the simplex algorithm. For each model, predictor coefficients, 95% confidence intervals, p-values, and model quality indicators (pseudo R^2 and mean absolute error) were reported.

Justification of analytical choices and validity criteria. The use of quantile regression and composite indices was based on the theoretical framework of the OMSAT-3 and the empirical characteristics of the data, namely non-normality and marked interindividual variability. Collinearity between continuous predictors was assessed prior to model inclusion, supporting their simultaneous entry. Interpretation of quantile regression coefficients focused on the conditional median of the dependent variable rather than the mean, in accordance with methodological recommendations (Tabachnick & Fidell, 2019).

Results

Table 1 presents the descriptive analysis of the psychological profile variables assessed using the Ottawa Mental Skills Assessment Tool – OMSAT-3 (Silva et al., 2024), as well as the internal consistency indices estimated through McDonald's omega (Ω) and the results of the Kolmogorov–Smirnov (KS) normality test.

Overall, the results show high mean values for psychological skills related to goal setting (M = 6.58 ± 0.53), self-confidence (M = 6.26 ± 0.99), and relaxation (M = 5.67 ± 1.08), suggesting globally elevated levels of these competencies in the analyzed sample. Skills associated with imagery (M = 5.53 ± 1.52), activation (M = 5.04 ± 1.07), and mental practice (M = 4.80 ± 1.39) also presented moderate to high mean values, reflecting a consistent use of psychological preparation and self-regulation strategies.

Conversely, lower mean values were observed in dimensions related to fear control (M = 2.80 ± 1.06), stress reactions (M = 2.50 ± 1.23), and attentional focusing (M = 1.81 ± 0.74), indicating comparatively lower psychological regulation scores in these specific domains. Attentional refocusing showed an intermediate mean value (M = 3.64 ± 1.18), suggesting some capacity to recover attention following disruptions, albeit with high interindividual variability. Performance planning also displayed moderate values (M = 4.03 ± 1.47).

Regarding the data dispersion, a considerable range was observed across several variables, as evidenced by the minimum and maximum values, particularly in the dimensions of commitment, imagery, mental practice, and performance planning. This pattern indicates heterogeneity in individual psychological profiles within the sample.

With respect to internal consistency, McDonald's omega values ranged from .62 to .89. Overall, most subscales showed Ω values equal to or above .64, which are considered acceptable to good for research in sport sciences. Particularly high values were observed for relaxation (Ω = .89), imagery (Ω = .82), and mental practice (Ω = .77), indicating good internal reliability. The remaining subscales presented moderate internal consistency values, compatible with multidimensional instruments applied in complex performance contexts.

Normality analysis assessed using the Kolmogorov–Smirnov test, indicated that most variables did not follow a normal distribution ($p < .05$). Exceptions were found for attentional refocusing ($p = .16$) and performance planning ($p = .20$), which showed values consistent with normality. These results support the adoption of non-parametric statistical procedures or, alternatively, the use of robust methods in subsequent inferential analyses.

Table 1. Descriptive analysis of psychological profile variables, McDonald's omega, and Kolmogorov–Smirnov normality test

OMSAT-3	M ± SD	Min	Max	Ω	KS
Goal-setting	6.58 ± 0.53	5.33	7.00	0.75	0.01
Self-confidence	6.26 ± 0.99	2.33	7.00	0.64	0.01
Commitment	5.41 ± 1.49	2.67	7.00	0.68	0.01
Stress Reactions	2.50 ± 1.23	1.00	5.33	0.67	0.01
Fear Control	2.80 ± 1.06	1.00	5.00	0.64	0.02
Relaxation	5.67 ± 1.08	3.33	7.00	0.89	0.01
Activation	5.04 ± 1.07	2.67	7.00	0.66	0.01
Focusing	1.81 ± 0.74	1.00	3.00	0.62	0.01
Refocusing	3.64 ± 1.18	1.00	6.00	0.64	0.16
Imagery	5.53 ± 1.52	1.67	7.00	0.82	0.01
Mental Practice	4.80 ± 1.39	1.00	7.00	0.77	0.01
Performance Planning	4.03 ± 1.47	1.00	6.67	0.65	0.20

Note: M ± SD: Mean ± Standard Deviation; Min – Minimum; Max – Maximum; Ω – McDonald's Omega; KS – Kolmogorov Smirnov

Table 2 presents Spearman's correlation coefficients (ρ) between years of professional practice in Toreo and the different psychological profile variables assessed by the OMSAT-3, as well as the inter-correlations among these variables.

Regarding the relationship between years of professional practice and psychological skills, a moderate and statistically significant negative correlation was observed with attentional focusing ($\rho = -0.50$, $p < 0.01$), indicating that a greater number of years of professional practice was associated with lower values in this specific dimension. The remaining correlations between years of practice and the psychological variables did not reach statistical significance ($p > 0.05$), although associations of small to moderate magnitude were observed in both positive and negative directions, suggesting a non-linear relationship between professional experience and psychological profile.

With respect to intercorrelations among psychological profile variables, multiple statistically significant associations were identified, with magnitudes ranging from moderate to strong. Self-confidence showed significant positive correlations with commitment ($\rho = 0.51$, $p < 0.01$), relaxation ($\rho = 0.36$, $p < 0.01$), and activation ($\rho = 0.59$, $p < 0.01$), as well as a significant negative correlation with stress reactions ($\rho = -0.42$, $p < 0.01$). These findings suggest that higher levels of self-confidence are associated with greater engagement, better psychophysiological self-regulation, and lower stress reactivity.

Commitment exhibited a strong negative correlation with stress reactions ($\rho = -0.61$, $p < 0.01$) and a positive correlation with mental practice ($\rho = 0.55$, $p < 0.01$), indicating that more committed bullfighters tend to show lower vulnerability to stress and greater use of structured psychological strategies.

Stress reactions correlated positively with fear control ($\rho = 0.50$, $p < 0.01$) and performance planning ($\rho = 0.42$, $p < 0.01$), and negatively with activation ($\rho = -0.57$, $p < 0.01$). These results point to a complex relationship between perceived stress, emotional control demands, and the mobilization of cognitive and planning strategies.

Fear control showed significant positive correlations with refocusing ($\rho = 0.52$, $p < 0.01$), imagery ($\rho = 0.37$, $p < 0.01$), mental practice ($\rho = 0.39$, $p < 0.01$), and performance planning ($\rho = 0.52$, $p < 0.01$), indicating that this competence is strongly associated with cognitive strategies related to preparation and attentional recovery.

Attentional focusing revealed significant negative correlations with imagery ($\rho = -0.37$, $p < 0.01$), mental practice ($\rho = -0.48$, $p < 0.01$), and performance planning ($\rho = -0.51$, $p < 0.01$), suggesting that higher values in this dimension are associated with lower use of these specific psychological strategies.

In turn, attentional refocusing showed a strong positive correlation with performance planning ($\rho = 0.54$, $p < 0.01$), indicating that the ability to recover attention following disruptions is closely associated

with processes of organization and performance anticipation. Imagery correlated positively with mental practice ($\rho = 0.44$, $p < 0.01$) and performance planning ($\rho = 0.31$, $p < 0.05$), reinforcing the interdependence among cognitive psychological preparation strategies.

Overall, these results indicate a consistent relational structure among psychological competencies, characterized by significant associations across cognitive, psychosomatic, and emotional variables. In contrast, professional experience, expressed as years of practice, showed a limited and specific relationship with the psychological profile, with the most salient finding being its negative association with attentional focusing.

Table 2. Spearman correlation analysis between psychological profile variables and years of professional practice in toreo

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Years of practice	-	-0.24	0.20	-0.18	-0.15	0.10	0.21	0.24	-0.50**	-0.10	0.14	0.16	0.07
2. Goal-setting		-	0.26	0.24	-0.11	0.16	0.42**	0.12	0.14	0.25	0.59**	0.08	0.18
3. Self-confidence			-	0.51**	-0.42**	0.04	0.36**	0.59**	-0.29*	0.01	0.25	0.30*	0.11
4. Commitment				-	-0.61**	-0.17	-0.22	0.34*	0.02	-0.20	0.14	0.55**	-0.16
5. Stress Reactions					-	0.50**	-0.02	-0.57**	-0.03	0.32*	-0.14	0.07	0.42**
6. Fear Control						-	0.09	-0.15	-0.06	0.52**	0.37**	0.39**	0.52**
7. Relaxation							-	0.20	-0.28*	-0.02	0.18	-0.04	0.36**
8. Activation								-	0.06	0.03	0.04	0.01	-0.14
9. Focusing									-	0.18	-0.37**	-0.48**	-0.51**
10. Refocusing										-	0.15	-0.09	0.54**
11. Imagery											-	0.44**	0.31*
12. Mental Practice												-	0.34*
13. Performance Planning													-

Note: *p < 0.05; **p < 0.01

Table 3 presents comparisons of psychological profile variables according to professional role in Toreo (banderillero, novillero and cavaleiro), highlighting statistically significant differences across several OMSAT-3 dimensions, as well as the corresponding effect sizes (η^2).

With regard to goal setting, significant differences were observed between roles ($p = 0.015$; $\eta^2 = 0.13$). Novilleros showed the highest mean values ($M = 7.00 \pm 0.02$), differing significantly from banderilleros, whereas cavaleiros presented intermediate values. The effect size indicates a moderate effect of professional role on this skill.

For self-confidence, no statistically significant differences were found between roles ($p = .428$; $\eta^2 = 0.01$), suggesting similar levels of this psychological skill regardless of the role performed in the bullfight.

Commitment showed statistically significant differences between groups ($p = 0.002$; $\eta^2 = 0.21$), with a moderate-to-large effect size. Novilleros displayed higher mean values, whereas cavaleiros showed significantly lower values than the other groups, indicating relevant differences in psychological involvement and dedication according to professional role.

Regarding the stress reactions, significant differences were observed between roles ($p = 0.035$; $\eta^2 = 0.10$). Cavaleiros showed the highest mean values, whereas novilleros displayed the lowest values, suggesting lower stress reactivity in this specific group.

Significant differences were also observed in fear control ($p = 0.020$; $\eta^2 = 0.12$). Cavaleiros showed higher mean values than the other groups, whereas banderilleros and novilleros presented lower values, indicating distinct fear-management profiles according to the role performed.

The relaxation dimension revealed highly significant differences between roles ($p = 0.001$; $\eta^2 = 0.43$), corresponding to a large effect size. Cavaleiros showed the highest values, clearly differing from novilleros and banderilleros, which suggests a greater capacity for psychophysiological self-regulation in this professional group.

For activation, no statistically significant differences were observed between roles ($p = 0.311$; $\eta^2 = 0.01$), indicating similar levels of psychophysiological mobilization across the different professional roles.

Attentional focusing showed statistically significant differences (p = 0.008; η^2 = 0.16). Novilleros displayed higher mean values than the other groups, whereas cavaleiros showed the lowest values, suggesting distinct attentional patterns associated with the specific demands of each role.

For refocusing, no statistically significant differences were observed between roles (p = 0.454; η^2 = 0.01), indicating similar levels of this skill among banderilleros, novilleros, and cavaleiros.

In the imagery dimension, statistically significant differences were found between roles (p = 0.015; η^2 = 0.13). Novilleros showed the highest values, whereas banderilleros presented lower values, suggesting differences in the use of mental imagery strategies.

Regarding the mental practice, no statistically significant differences were observed between roles (p = 0.184; η^2 = 0.03), indicating similar levels in the use of this psychological strategy across the different groups.

Finally, performance planning showed highly significant differences between roles (p = 0.001; η^2 = 0.23), corresponding to a moderate-to-large effect. Cavaleiros showed the highest mean values, followed by banderilleros, whereas novilleros presented lower values, highlighting differentiated cognitive planning profiles according to professional role.

Table 3. Comparisons of psychological profile variables according to professional category in toreo

	Banderillero [a]	Novillero [b]	Cavaleiro [c]	Sig.	η^2
Goal-setting	6.48 ± 0.54[b,c]	7.00 ± 0.02[a]	6.81 ± 0.56[a]	0.015*	0.13
Self-confidence	6.25 ± 1.17	6.17 ± 0.18	6.22 ± 0.75	0.428	0.01
Commitment	5.54 ± 1.37[c]	6.67 ± 0.00[c]	4.11 ± 1.51[a,b]	0.002**	0.21
Stress Reactions	2.59 ± 1.09[b]	1.67 ± 0.36[a,c]	3.22 ± 1.72[b]	0.035*	0.10
Fear Control	2.71 ± 1.00[c]	2.67 ± 0.01[c]	3.67 ± 1.20[a,b]	0.020*	0.12
Relaxation	5.65 ± 1.00[b,c]	4.50 ± 0.89[a,c]	6.78 ± 0.24[a,b]	0.001**	0.43
Activation	5.24 ± 0.88	4.67 ± 0.71	4.41 ± 1.68	0.311	0.01
Focusing	1.75 ± 0.77[b]	2.33 ± 0.02[a,c]	1.30 ± 0.35[b]	0.008**	0.16
Refocusing	3.67 ± 1.11	3.83 ± 0.89	3.96 ± 1.16	0.454	0.01
Imagery	5.39 ± 1.42[b,c]	6.67 ± 0.01[a]	6.11 ± 1.70[a]	0.015*	0.13
Mental Practice	5.04 ± 1.37[b]	4.83 ± 0.18[a]	4.78 ± 0.94	0.184	0.03
Performance Planning	4.08 ± 1.16	3.17 ± 0.89[c]	5.30 ± 1.69[b]	0.001*	0.23

Note: *p < .05; **p < .01; η^2 - Eta squared; [a,b,c] Different superscript letters indicate significant post hoc differences.

Table 4 presents the descriptive analysis of the composite psychological indices—Basic Skills Index (IB), Psychosomatic Skills Index (IP), Cognitive Skills Index (IC), and Global Psychological Index (IPG) computed from the standardized values (z-scores) of the OMSAT-3 subscales.

Overall, the mean values of the four indices were close to zero, as expected given the standardization procedure used in their construction. The Basic Skills Index showed a slightly negative mean (M = −0.05 ± 0.80), with a considerable range between the minimum (Min = −2.22) and maximum (Max = 0.87) values, indicating high interindividual variability in basic psychological skills.

The Psychosomatic Index showed a slightly positive mean close to zero (M = 0.02 ± 0.49), reflecting an overall balance in psychophysiological self-regulation skills within the sample, with moderate variation (Min = −0.67; Max = 0.87). Similarly, the Cognitive Index showed a mean close to zero (M = 0.07 ± 0.48), revealing relevant interindividual variability (Min = −1.86; Max = 0.72) in the cognitive skills associated with performance preparation and management.

In turn, the Global Psychological Index showed a slightly positive mean close to zero (M = 0.02 ± 0.47), with minimum and maximum values ranging from −1.32 to 0.73, respectively, suggesting a relatively balanced distribution of overall psychological resources in the analyzed sample.

Table 4. Descriptive analysis of BSI, PSI, CSI, and GPI variables calculated based on OMSAT-3 z-scores

OMSAT-3	M ± SD	Min	Max
Basic Skills Index (BSI)	-0.05 ± 0.80	-2.22	0.87
Psychosomatic Skills Index (PSI)	0.02 ± 0.49	-0.67	0.87

Cognitive Skills Index (CSI)	0.07 ± 0.48	-1.86	0.72
Global Psychological Index (GPI)	0.02 ± 0.47	-1.32	0.73

Note: M ± SD: Mean ± Standard Deviation; Min – Minimum; Max – Maximum

Taken together, these results demonstrate marked interindividual heterogeneity across the different domains of the bullfighters' psychological profile, despite mean values being close to the sample average. This pattern supports the relevance of multivariate analyses for understanding the factors associated with the observed differences in psychological resources.

Given the Spearman coefficients obtained (ρ = 0.293 and ρ = 0.219), collinearity between years of professional practice and the number of bullfighting events performed in the previous two years (2024 and 2025) was low, fully justifying the simultaneous inclusion of both predictors within the same quantile regression model.

The quantile regression results (median), presented in Table 5, showed a consistent pattern across the different models, indicating that the number of bullfights performed in the previous two years was positively associated with the psychological indices and emerged as the main continuous predictor, with statistically significant effects on the basic and psychosomatic skills indices and a marginal trend for the global psychological index. In contrast, years of professional practice were not significantly associated with any of the indices analyzed. Professional role was included as a structural control variable, and specific differences between categories were observed in some domains of the psychological profile.

Table 5. Median quantile regression for the Global Psychological Index (GPI)

Predictor	GPI β (SE)	BSI β (SE)	PSI β (SE)	CSI β (SE)
Intercept	−0.037 (0.283)	−0.740 (0.436)	0.271 (0.183)	0.560 (0.257)*
Years of practice	0.003 (0.009)	0.002 (0.015)	−0.010 (0.006)	−0.011 (0.009)
Bullfights (last two years)	0.008 (0.004)†	0.014 (0.006)*	0.011 (0.002)***	0.002 (0.003)
Novillero	−0.490 (0.242)*	−0.023 (0.377)	−0.843 (0.158)***	−0.578 (0.220)*
Cavaleiro	0.073 (0.368)	1.185 (0.570)*	−0.978 (0.197)***	−0.087 (0.336)
Pseudo R^2	0.197	0.242	0.369	0.256
MAE	0.287	0.499	0.257	0.272

Note: Quantile regresión (q = 0.50). Reference category: Banderillero, * p < .05 *** p < .001, † p < .10 (marginal significance)

Table 5 presents the results of the quantile regression models at the median level (q = 0.50) for the Global Psychological Index (GPI) and for the three specific domains of the psychological profile: the Basic Skills Index (BSI), the Psychosomatic Skills Index (PSI), and the Cognitive Skills Index (CSI).

Overall, the models showed a consistent pattern: years of professional practice were not significantly associated with any of the psychological indices (p > 0.05), suggesting that accumulated career experience does not constitute a relevant predictor of the median level of psychological resources in this sample. In contrast, the number of bullfights performed in the previous two years showed positive associations with several domains of the psychological profile, emerging as the main continuous predictor. Specifically, a marginal positive association was observed for the GPI (β = 0.008, p < 0.10), a significant association for the BSI (β = 0.014, p < 0.05), and a strong and statistically significant association for the PSI (β = 0.011, p < 0.001), whereas no statistical significance was found for the CSI (p > 0.05). These results indicate that greater recent exposure to Toreo is associated with higher levels of psychological skills, particularly in the motivational and psychophysiological self-regulation domains.

Regarding the professional role, included as a categorical control variable (reference category: banderillero), statistically significant differences were observed across several domains. Novilleros showed significantly lower values on the GPI (β = −0.490, p < 0.05), the PSI (β = −0.843, p < 0.001), and the CSI (β = −0.578, p < 0.05), suggesting a less favorable overall and domain-specific psychological profile in these dimensions compared with banderilleros. In turn, cavaleiros showed significantly higher values on the BSI (β = 1.185, p < 0.05), indicating higher levels of basic psychological skills, but lower values on the PSI (β = −0.978, p < 0.001), pointing to relevant differences in psychosomatic regulation.

Regarding the model quality, pseudo-R^2 values ranged from 0.197 (GPI) to 0.369 (PSI), indicating moderate to high explanatory capacity, particularly in the psychosomatic domain. Mean absolute error

(MAE) values ranged from 0.257 to 0.499, suggesting acceptable levels of prediction error for models estimated under conditions of non-normal and heterogeneous data.

Taken together, these results support the relevance of recent exposure to Toreo practice as the variable most consistently associated with the psychological profile, rather than accumulated experience, and indicate the possibility of role-related differences in psychological profile across professional categories, reinforcing the dynamic and contextual nature of psychological resources in bullfighting performance.

Discussion

The present study aimed to deepen understanding of the psychological profile of professional bullfighters, considering the singular nature of *tauromaquia* as a performance context marked by real life-threatening risk, high unpredictability, and extreme psychophysiological demands.

The findings of this study allow for an integrated and pragmatic interpretation of the psychological profile of professional bullfighters, combining the present empirical evidence with previous findings specific to *tauromaquia* and with the literature on high-risk activities. Overall, basic skills (goal setting, self-confidence, commitment) and cognitive strategies (imagery, mental practice) appeared relatively well developed in the sample, whereas fear control, stress regulation, and attentional focus appeared comparatively less developed than the remaining psychological domains assessed. These patterns are consistent with previous studies documenting the high psychophysiological load of *Toreo* (Teba-del-Pino et al., 2024a; Zafrilla et al., 2014) and with clinical and forensic reports on the potentially severe consequences of horn injuries (Byard, 2025).

The distinct relationship between accumulated experience and recent exposure to bullfighting activity emerged as one of the most relevant patterns and was consistent with the initial hypothesis proposed in this study. The results of the quantile regression models consistently showed that years of practice did not significantly predict any of the psychological indices, whereas the number of bullfights performed in the previous two years was positively associated with different domains of the psychological profile, with stronger effects on basic skills and, above all, psychosomatic skills, in addition to a marginal trend for the global psychological index. This pattern reinforces the idea that, in contexts of real risk, the maintenance and mobilization of psychological resources appear to be more closely associated with ongoing recent exposure than with the mere temporal accumulation of experience. This interpretation is consistent with studies highlighting the importance of deliberate practice and continuous exposure for sustaining psychological readiness in tasks involving high uncertainty (Ericsson et al., 2018), bringing *Toreo* closer to other high-risk activities in which ongoing situational exposure appears to contribute to the functional state of readiness (Brymer & Schweitzer, 2017; Martinho et al., 2024).

The observation that psychological skills — particularly basic and psychosomatic skills — were positively associated with recent exposure to bullfighting activity further supports the hypothesis that recent practice volume may be more relevant than accumulated experience in understanding the psychological profile of professional bullfighters. From a practical perspective, these findings suggest that mental preparation programs should include active maintenance strategies during periods of reduced bullfighting activity. Structured mental training regimes, contextualized simulations (*toreo de salón*), and *tentaderos* that reproduce conditions of uncertainty and psychological pressure may help preserve self-confidence, goal structuring, and psychophysiological regulation. From a theoretical perspective, these findings align with dynamic resilience frameworks (Fletcher & Sarkar, 2012), according to which psychological resources should be understood as dynamic states, susceptible to activation or attenuation depending on interaction with the performance context.

The specific literature on *Toreo* supports and complements these interpretations. Recent psychophysiological studies have shown very high heart-rate peaks and internal loads during real bullfights, comparable to those observed in high-intensity efforts (Teba-del-Pino et al., 2024a; Zafrilla et al., 2014), reinforcing the importance of regular exposure to stressful performance contexts in maintaining efficient autonomic regulation mechanisms. In addition, narrative investigations and reviews on determi-

nants of performance in *Toreo* highlight multifactorial influences—strategic, technical, and psychophysiological—that shape performance, supporting the multidimensional nature evidenced in the present study (Teba-del-Pino et al., 2025).

The issue of injury and traumatic impact cannot be dissociated from the psychological discussion. Forensic reports and clinical studies highlight that horn injuries involve life-threatening risk and long-term functional implications (Byard, 2025; Teba-del-Pino et al., 2026). These findings reinforce the need to integrate specific components of post-trauma recovery, confidence rehabilitation, and progressive re-exposure to bullfighting activity into psychological preparation protocols, in line with established practices in high-risk sports (Weinberg & Gould, 2019).

The differences observed between professional categories were also consistent with the hypothesis that psychological skills would vary according to professional role, reflecting the technical, contextual, and risk-related demands specific to each function in *Toreo*. *Cavaleiros* showed particularly high levels of relaxation, fear control, and performance planning, as well as higher levels of basic skills in the multivariate model, suggesting greater psychophysiological and cognitive self-regulation capacity. This pattern may be associated with the greater physical distance from the bull, the control of the horse as a mediator of action, and the greater structural predictability of bullfighting on horseback, characteristics described in the context of *Rejoneo* (Thompson, 2012).

In turn, *Novilleros* placed greater emphasis on cognitive skills such as imagery, or on basic skills such as goal setting, but showed lower values on several indices in the multivariate model (GPI, PSI, and CSI), suggesting a profile that is still developing and possibly more dependent on cognitive preparation strategies than on psychophysiological stabilization. This interpretation is consistent with sport career development models, which identify differentiated phases of psychological investment throughout the athlete's trajectory (Wylleman & Lavallee, 2004).

From a physiological and health perspective, studies documenting the prevalence of musculoskeletal disorders in bullfighters, particularly at the shoulder level (Navas-Mosqueda et al., 2022), add a relevant dimension: chronic pain and functional limitations may influence confidence, emotional regulation, and coping strategies throughout the career. Thus, the integration of clinical and physiological assessment (Byard, 2025; Navas-Mosqueda et al., 2022; Teba-del-Pino et al., 2024a; Zafrilla et al., 2014) alongside psychological training appears essential for a holistic approach.

Compared with other high-risk activities, the emerging pattern—in which recent exposure to bullfighting activity assumes greater relevance than accumulated experience—is consistent with findings from contexts such as paragliding, mountaineering, and motor sports, where continuous exposure, situational adaptability, and constant behavioural calibration appear to contribute to maintaining both performance and safety (Fletcher & Sarkar, 2012; Brymer & Schweitzer, 2017; Martinho et al., 2024). *Toreo* therefore shares with these activities the need for training that includes controlled exposure to uncertainty, decision-making under pressure, and psychophysiological recovery strategies.

Some limitations should be acknowledged. First, the imbalance in group sizes limits the generalizability of comparisons across roles. Second, the cross-sectional design precludes causal inferences regarding the relationship between recent exposure and psychological profile. In addition, the small size of some professional groups should be considered when interpreting the results. It should also be noted that *matadores* were not included and that the sample was exclusively male, which limits the generalizability of the findings.

Future studies should use larger and more balanced samples, ideally with longitudinal designs, allowing the evolution of the psychological profile to be analyzed across the season, after periods of inactivity, or following severe injuries. The integration of objective psychophysiological measures (heart-rate variability, cortisol, portable EEG) may deepen understanding of self-regulation mechanisms in the bullfight context. Furthermore, comparisons with other high-risk activities may help clarify specificities and points of convergence.

From an applied perspective, the findings reinforce the importance of structured psychological training programs tailored to professional role and career stage. The emphasis should be placed not only on the development of skills, but also on their maintenance over time, particularly during periods of re-

duced bullfighting activity. Interventions focused on emotional self-regulation, fear management, cognitive restructuring after trauma, and the continuous updating of psychological routines may contribute to the safety, performance, and longevity of professional bullfighters' careers.

Conclusions

This study made it possible to characterize the psychological profile of professional bullfighters, revealing generally high levels of basic and cognitive skills, alongside comparatively weaker psychosomatic skills associated with fear control, stress reactions, and attentional control, reflecting the demands of a performance context marked by real risk. Comparisons across professional categories revealed significant differences in several psychological dimensions, suggesting that the bullfighter's psychological profile may vary according to the role performed in the bullfight and the specific demands associated with each functional role. Multivariate analysis, using quantile regression, consistently showed that recent exposure to Toreo practice was the factor most consistently associated with the different domains of the psychological profile, with particularly evident effects on basic and psychosomatic skills, whereas accumulated experience did not emerge as a significant predictor. These results reinforce the dynamic, contextual, and recent-exposure-sensitive nature of psychological resources in professional Toreo. Taken together, the findings highlight the need for differentiated and continuous approaches to the psychological assessment and preparation of bullfighters, tailored to professional role, specific skill domain, and career stage.

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