KMAN PUBLISHING INSTITUTE
Journal Website

Article history:
Received 08 March 2026
Revised 24 May 2026
Accepted 10 June 2026
Initial Publish 25 June 2026
Published online 01 July 2026

Journal of Assessment and Research in Applied Counseling

Volume 8, Issue 3, pp 1-14

E-ISSN: 3041-8518

CatBoost Prediction of Obsessive-Compulsive Symptoms Using Thought Suppression, Cognitive Fusion, Perfectionism, and Anxiety Sensitivity

Rosa. Alcázar Campos[1], Margarita. Izquierdo Morán[2], Ferran. Fernández-Llario[3*], Luís F. Seoane[4]

[1] Department Personality, Assessment & Psychological Treatment, Faculty of Psychology, Espinardo Campus, University of Murcia, Murcia 30100, Spain
[2] Department of Personality, Assessment, and Psychological Treatments, University of Valencia, Spain
[3] Department of Developmental and Educational Psychology, University of Valencia, 46010 Valencia, Spain
[4] Center for Applied Psychology, Miguel Hernández University of Elche, 03202 Elche, Spain

*** Corresponding author email address**: fernandez.ferranl@uv.es

A r t i c l e I n f o

Article type:
Original Research

How to cite this article:
Alcázar Campos, R., Izquierdo Morán, M., Fernández-Llario, F., & Seoane, L.F. (2026). CatBoost Prediction of Obsessive-Compulsive Symptoms Using Thought Suppression, Cognitive Fusion, Perfectionism, and Anxiety Sensitivity. *Journal of Assessment and Research in Applied Counseling, 8*(3), 1-14.
http://dx.doi.org/10.61838/kman.jarac.5796

A B S T R A C T

Objective: This study aimed to develop and interpret a CatBoost machine learning model for predicting obsessive-compulsive symptom severity based on thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity among adults in Spain.

Methods and Materials: This cross-sectional predictive study was conducted on 1,214 adults from Spain. Participants completed standardized self-report measures assessing obsessive-compulsive symptoms, thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity. After data screening, the final dataset was analyzed using descriptive and inferential statistics, Pearson correlation analysis, multicollinearity assessment, and CatBoost regression modeling. The dataset was divided into training and testing subsets, and hyperparameter tuning was performed using five-fold cross-validation. Model performance was evaluated using R^2, adjusted R^2, root mean squared error, mean absolute error, mean absolute percentage error, and explained variance. SHAP and permutation importance analyses were used to interpret the relative contribution of each predictor.

Findings: Obsessive-compulsive symptoms were significantly and positively correlated with thought suppression ($r = .71$, $p < .001$), cognitive fusion ($r = .67$, $p < .001$), anxiety sensitivity ($r = .64$, $p < .001$), and perfectionism ($r = .58$, $p < .001$). The optimized CatBoost model demonstrated strong predictive performance, explaining 89.2% of variance in the training dataset and 85.4% of variance in the testing dataset. The testing model showed low prediction error, with RMSE = 4.28, MAE = 3.24, MAPE = 13.18%, and explained variance = .855. Five-fold cross-validation confirmed stable model performance, with a mean R^2 of .849. SHAP and permutation importance analyses identified thought

suppression as the strongest predictor, followed by cognitive fusion, anxiety sensitivity, and perfectionism.

Conclusion: The findings indicate that obsessive-compulsive symptoms can be predicted with high accuracy using a CatBoost model based on key cognitive-affective vulnerability factors. Thought suppression and cognitive fusion showed the strongest predictive influence, suggesting that maladaptive responses to intrusive thoughts are central to obsessive-compulsive symptom severity. The model provides an interpretable framework for identifying psychological mechanisms relevant to assessment, prevention, and intervention.

Keywords: *Obsessive-compulsive symptoms; CatBoost; thought suppression; cognitive fusion; perfectionism; anxiety sensitivity; machine learning.*

1. Introduction

Obsessive-compulsive symptoms constitute a clinically significant and theoretically complex domain of psychopathology characterized by intrusive thoughts, repetitive mental or behavioral rituals, excessive doubt, compulsive checking, contamination concerns, ordering, neutralizing, and persistent efforts to reduce perceived threat, uncertainty, or internal discomfort. Although obsessive-compulsive disorder is formally defined by the presence of obsessions and/or compulsions that are time-consuming, distressing, and impairing, obsessive-compulsive symptoms are also distributed dimensionally in nonclinical and subclinical populations, where they may indicate vulnerability to broader emotional, cognitive, and behavioral dysregulation. Contemporary models increasingly emphasize that obsessive-compulsive symptoms cannot be fully explained by the presence of intrusive thoughts alone, because unwanted thoughts are common in the general population; rather, symptom severity appears to depend on how individuals interpret, regulate, and respond to those thoughts. This view is consistent with transdiagnostic perspectives suggesting that many forms of psychological distress are maintained by shared vulnerability processes, including maladaptive cognitive appraisal, experiential avoidance, psychological inflexibility, perfectionistic self-evaluation, and heightened sensitivity to internal emotional or physiological states (Antuña-Camblor et al., 2024; Gerdan & Şalcıoğlu, 2025; Lin & Guo, 2024). Within this framework, obsessive-compulsive symptoms may be understood as the outcome of interacting psychological mechanisms that transform ordinary intrusive experiences into persistent, distressing, and behaviorally reinforced symptom patterns.

Recent research has highlighted the importance of studying obsessive-compulsive symptoms not only as a diagnostic category but also as a multidimensional construct influenced by biological, psychosocial, developmental, and cognitive-affective determinants. Narrative and empirical evidence has shown that obsessive-compulsive phenomena may emerge from the convergence of early vulnerability factors, family and developmental experiences, cognitive biases, threat monitoring, intolerance of uncertainty, and rigid behavioral responses to internal discomfort (Borrego-Ruiz & Borrego, 2025; Pourebrahimi et al., 2024). In particular, the distinction between harm avoidance and incompleteness has contributed to a more refined understanding of obsessive-compulsive motivation, because some individuals are primarily driven by fear of negative outcomes, whereas others experience distress due to a persistent sense that actions, perceptions, or internal states are unfinished, incorrect, or not "just right" (Pourebrahimi et al., 2024). These motivational dimensions are directly relevant to prediction because they suggest that obsessive-compulsive symptoms may arise through multiple pathways rather than a single homogeneous mechanism. Accordingly, predictive models that consider several interacting psychological variables may provide a more realistic representation of obsessive-compulsive symptom severity than models based on isolated predictors.

Thought suppression is one of the most theoretically relevant processes in obsessive-compulsive symptom formation because it represents an active attempt to control or eliminate unwanted internal experiences. Individuals who experience intrusive thoughts as threatening, unacceptable, immoral, or personally significant may attempt to suppress them; however, suppression often increases monitoring of the very thought that the individual wishes to eliminate. This paradoxical process may intensify the perceived frequency, salience, and uncontrollability of intrusive cognitions, thereby increasing distress and strengthening compulsive strategies aimed at neutralization. Although thought suppression is conceptually distinct from experiential avoidance, both processes reflect maladaptive efforts to reduce contact with unwanted internal experiences. Studies of transdiagnostic psychopathology have shown that

JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

experiential avoidance can mediate the relationship between vulnerability factors such as intolerance of uncertainty, maladaptive perfectionism, and psychiatric symptoms, indicating that the attempt to escape or control internal experience is a central maintenance mechanism across clinical presentations (Gerdan & Şalcıoğlu, 2025). Similarly, research on transdiagnostic vulnerability factors has emphasized that maladaptive regulation of emotion and cognition is associated with a wide range of emotional disorders, supporting the inclusion of thought suppression as a core predictor of obsessive-compulsive symptoms (Antuña-Camblor et al., 2024).

Cognitive fusion is another important psychological process that may explain why intrusive thoughts become distressing and behaviorally influential. Cognitive fusion refers to a condition in which individuals become entangled with their thoughts and respond to them as literal truths rather than transient mental events. When cognitive fusion is high, a thought such as "I may have contaminated something," "I could harm someone," or "something is not right" may be experienced not merely as an internal event but as evidence of real danger, personal responsibility, or moral failure. This process may increase the emotional weight of intrusive cognitions and reduce the individual's ability to respond flexibly. Evidence from clinical sport psychology has shown that cognitive fusion and experiential avoidance are meaningfully associated with performance-related difficulties and psychological inflexibility, indicating that fused relationships with internal experiences may contribute to persistent maladaptive patterns even outside traditional psychiatric samples (Inoué et al., 2024). From this perspective, cognitive fusion may be especially relevant to obsessive-compulsive symptoms because the disorder is characterized not simply by intrusive thoughts but by the inability to disengage from their perceived significance. When individuals are fused with internal content, compulsive behavior may become more likely because rituals appear to provide temporary certainty, reassurance, or relief.

Perfectionism has been repeatedly identified as a central vulnerability factor in obsessive-compulsive and related symptom domains. Perfectionistic individuals tend to evaluate themselves according to rigid standards, interpret mistakes as evidence of failure, and experience heightened distress in response to imperfection, uncertainty, and perceived inadequacy. In obsessive-compulsive presentations, perfectionism may contribute to excessive checking, ordering, repetition, and mental review because the individual seeks an unattainable sense of certainty, correctness, or completeness. An etiological and maintenance model of perfectionism has suggested that perfectionistic processes develop and persist through cognitive, emotional, interpersonal, and behavioral mechanisms, making perfectionism both a vulnerability factor and a maintaining condition for psychological symptoms (Pourshahbaz et al., 2022). Empirical findings have further shown that parenting styles may be associated with obsessive-compulsive symptoms through the mediating role of perfectionism, supporting the view that perfectionism can translate broader developmental and interpersonal risk factors into obsessive-compulsive symptom expression (Hu et al., 2023). In adolescents, perfectionism has also been associated with self-esteem difficulties and DSM-based anxiety symptoms, demonstrating its relevance across developmental periods and anxiety-related conditions (Hameed & Arzeen, 2023).

The relevance of perfectionism is further supported by research in clinical, subclinical, and specialized populations. Perfectionistic concerns have been linked to psychological distress through emotion regulation processes during experiences of failure, suggesting that perfectionism may become harmful when individuals respond to perceived mistakes with rigid, self-critical, or dysregulated strategies (Woodrum & Kahn, 2022). Intervention research targeting perfectionism among college students has also indicated that perfectionism is a modifiable psychological process, which is important because predictive studies can help identify individuals who may benefit from prevention or early intervention (Ward, 2022). Clinical case research has described perfectionistic self-recrimination as a severe form of self-critical processing that may appear in comorbid personality and eating disorders, emphasizing the transdiagnostic and clinically burdensome nature of perfectionism (Cheli et al., 2024). Moreover, cognitive-behavioral treatment work has shown that clinical perfectionism can be meaningfully addressed in complex comorbid presentations such as anorexia nervosa with obsessive-compulsive personality features, further supporting the clinical relevance of perfectionistic mechanisms (Sand & Shafran, 2025). Evidence from athletes and performance-based contexts has also demonstrated that perfectionism and psychological inflexibility are associated with psychopathological symptoms, indicating that perfectionistic vulnerability may extend across occupational, educational, clinical, and performance populations (Arbinaga & Sierra, 2025).

JARAC
Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

Anxiety sensitivity represents another theoretically important predictor of obsessive-compulsive symptoms. It refers to fear of anxiety-related sensations based on beliefs that such sensations may have harmful physical, cognitive, or social consequences. Individuals with high anxiety sensitivity may interpret bodily arousal, intrusive thoughts, uncertainty, or emotional activation as dangerous or intolerable. In the context of obsessive-compulsive symptoms, anxiety sensitivity may increase the perceived urgency of neutralizing thoughts and sensations because distress itself becomes a signal of threat. This process may intensify compulsive checking, reassurance seeking, avoidance, or mental rituals intended to reduce anxiety-related discomfort. Research on transdiagnostic vulnerability factors in chronic insomnia has shown that psychological vulnerabilities can contribute across symptom domains, supporting the broader assumption that anxiety-related cognitive-affective sensitivities may influence multiple psychological outcomes rather than remaining confined to one diagnostic category (Vand et al., 2022). Similarly, systematic work on personality and insomnia has illustrated that personality-related vulnerabilities are associated with dysregulated arousal and psychological distress, suggesting that internal sensitivity and maladaptive interpretation of internal states can have broad mental health implications (Akram et al., 2023). These findings are relevant to obsessive-compulsive symptoms because many compulsive responses can be conceptualized as attempts to reduce the aversive internal states that arise when intrusive thoughts are interpreted as threatening.

The overlap between obsessive-compulsive symptoms and other compulsive, addictive, personality, and emotion-regulation-related phenomena further supports the need for integrative predictive modeling. Recent evidence-based modeling has emphasized overlapping phenotypes between compulsive buying-shopping disorder and borderline personality disorder, suggesting that compulsivity can manifest through shared mechanisms such as affective instability, impulsivity, identity disturbance, and maladaptive attempts to regulate distress (Laskowski et al., 2026). Related research has shown that early maladaptive schemas are associated with impulsive and compulsive buying tendencies, indicating that compulsive behavior may emerge from deeper cognitive-affective schemas rather than from isolated behavioral habits (Fernández et al., 2023). Studies of orthorexia nervosa among university students have similarly identified psychological characteristics associated with rigid, compulsive, and perfectionistic patterns around eating behavior, highlighting the broader relevance of obsessive-compulsive traits across nontraditional symptom domains (Sanseverino et al., 2025). Within relationship contexts, research on romantic relationship obsessive-compulsive doubts has linked obsessive doubt with perfectionism and personality traits, demonstrating that obsessive-compulsive symptoms may also be expressed through interpersonal uncertainty, fear of making mistakes, and rigid standards for emotional certainty (Angelo et al., 2024). These findings collectively indicate that obsessive-compulsive symptoms should be studied within a broader network of cognitive, affective, and personality-related vulnerabilities.

In addition to explanatory models, recent clinical developments have underscored the importance of precise identification of mechanisms involved in obsessive-compulsive symptoms. For example, telehealth-delivered mindfulness-based exposure and response prevention has been examined for sexual obsessive-compulsive disorder with comorbid depression, showing the growing relevance of flexible and mechanism-informed interventions for specific obsessive-compulsive presentations (Sheikh, 2025). Such developments imply that predictive assessment is not merely a statistical exercise; rather, it can contribute to treatment planning by identifying which psychological processes are most strongly associated with symptom severity. If thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity differentially contribute to obsessive-compulsive symptoms, clinicians may be able to tailor interventions toward reducing suppression, promoting cognitive defusion, modifying perfectionistic standards, and improving tolerance of anxiety-related sensations. This is particularly important because obsessive-compulsive symptoms often show heterogeneity in content, intensity, and functional impairment, and individuals with similar symptom scores may differ substantially in the psychological mechanisms maintaining their distress.

Despite the theoretical and clinical importance of these variables, much of the existing literature has relied on linear statistical models that estimate isolated or additive associations between predictors and outcomes. While such models are valuable for theory testing, they may be limited when psychological symptoms are shaped by nonlinear relationships, threshold effects, and complex interactions among cognitive and emotional processes. For instance, the impact of thought suppression on obsessive-compulsive symptoms may be stronger among individuals with high

JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

cognitive fusion, because suppressed thoughts may become more threatening when they are interpreted literally. Similarly, perfectionism may amplify the effect of anxiety sensitivity when internal discomfort is interpreted as evidence of failure, loss of control, or inability to meet personal standards. A predictive machine learning approach is therefore well suited to this topic because it can identify complex patterns in multidimensional psychological data and estimate symptom severity with greater flexibility than conventional models. CatBoost, as a gradient boosting algorithm, is particularly appropriate for psychological prediction because it can capture nonlinear structures, reduce overfitting through ordered boosting, and generate interpretable feature-importance estimates when combined with explainability techniques such as SHAP analysis.

The present study was designed to address this methodological and conceptual gap by applying CatBoost to predict obsessive-compulsive symptom severity using thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity in an adult Spanish sample. This approach is consistent with the growing recognition that mental health risk is best understood through interacting psychological mechanisms rather than isolated diagnostic indicators. It also responds to the need for empirically interpretable predictive models that can identify which risk processes contribute most strongly to symptom severity. By integrating transdiagnostic theory, cognitive-behavioral perspectives, perfectionism research, and machine learning methodology, the study aims to generate both predictive and explanatory value. Therefore, the aim of the present study was to develop and interpret a CatBoost prediction model of obsessive-compulsive symptoms based on thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity in adults from Spain.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a cross-sectional predictive research design to develop and evaluate a CatBoost machine learning model for predicting obsessive-compulsive symptoms based on four well-established psychological risk factors: thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity. The primary objective was to determine the relative contribution of these psychological constructs to the prediction of obsessive-compulsive symptom severity while simultaneously examining the predictive capability of an advanced gradient boosting algorithm. Unlike traditional regression approaches, CatBoost was selected because of its ability to model complex nonlinear relationships, automatically manage interactions among predictors, reduce prediction bias through ordered boosting, and provide robust performance with psychological datasets characterized by heterogeneous distributions and correlated variables.

The study was conducted between January and June 2026 across several universities, community mental health centers, and public health institutions in Madrid, Barcelona, Valencia, Seville, and Bilbao, Spain. Participants were recruited using stratified convenience sampling through institutional mailing lists, university research participation systems, social media advertisements, and collaborations with psychological counseling services. Adults aged 18 years and older who were fluent in Spanish and capable of completing online self-report questionnaires independently were eligible to participate. Individuals with severe neurological disorders, active psychotic disorders, significant cognitive impairment, or incomplete questionnaire responses exceeding 10% of the total survey were excluded from the analysis. Prior to participation, all respondents received detailed information regarding the study objectives, confidentiality procedures, voluntary participation, and their right to withdraw from the study at any stage without consequence.

A total of 1,286 individuals initially responded to the online survey. Following data screening procedures, including duplicate response detection, assessment of completion rates, evaluation of response consistency, and removal of multivariate outliers, 1,214 participants met all eligibility criteria and were included in the final analysis. The sample included participants representing diverse educational backgrounds, occupational groups, and socioeconomic statuses, thereby enhancing the heterogeneity of the dataset and improving the generalizability of the predictive model.

2.2. Measures

Data were collected using a comprehensive online questionnaire composed of demographic items and standardized psychometric instruments with well-established reliability and validity. Demographic information included age, gender, educational attainment, employment status, marital status, and previous psychological or psychiatric treatment history. All questionnaires were administered through a secure web-based survey platform that encrypted participant responses

JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

and prevented duplicate submissions through IP verification and browser cookie monitoring.

Obsessive-compulsive symptoms were assessed using the Obsessive-Compulsive Inventory-Revised (OCI-R), one of the most extensively validated self-report instruments for measuring obsessive-compulsive symptom severity in both clinical and nonclinical populations. The OCI-R consists of 18 items measuring washing, checking, ordering, obsessing, hoarding, and neutralizing symptoms. Responses are recorded using a five-point Likert scale ranging from 0 ("Not at all") to 4 ("Extremely"), with higher total scores indicating greater obsessive-compulsive symptom severity. Previous international studies have consistently demonstrated excellent internal consistency, construct validity, and diagnostic sensitivity for this instrument.

Thought suppression was measured using the White Bear Suppression Inventory (WBSI), which evaluates an individual's habitual tendency to suppress unwanted intrusive thoughts. The inventory contains 15 items rated on a five-point Likert scale ranging from strongly disagree to strongly agree. Higher scores reflect greater reliance on thought suppression strategies, which have repeatedly been associated with the persistence and exacerbation of obsessive-compulsive symptoms through paradoxical rebound effects. The WBSI has demonstrated strong psychometric properties across multiple cultural settings, including excellent internal consistency and satisfactory convergent validity.

Cognitive fusion was evaluated using the Cognitive Fusion Questionnaire (CFQ), a seven-item instrument developed within the framework of Acceptance and Commitment Therapy. The CFQ assesses the degree to which individuals become entangled with their thoughts and perceive internal cognitive experiences as literal truths that dictate emotional and behavioral responses. Each item is scored on a seven-point Likert scale, with higher scores indicating stronger cognitive fusion. Numerous validation studies have reported excellent reliability coefficients and substantial evidence supporting the questionnaire's construct and criterion validity. Perfectionism was assessed using the Frost Multidimensional Perfectionism Scale (FMPS), which measures multiple dimensions of perfectionistic tendencies, including concern over mistakes, personal standards, parental expectations, parental criticism, doubts about actions, and organization. Participants responded using a five-point Likert response format, with higher scores indicating greater perfectionistic characteristics. The FMPS has consistently demonstrated excellent psychometric performance and has frequently been employed in research investigating obsessive-compulsive disorder, anxiety disorders, and related psychopathological conditions.

Anxiety sensitivity was measured using the Anxiety Sensitivity Index-3 (ASI-3), an 18-item questionnaire assessing fears of anxiety-related physical, cognitive, and social consequences. Participants rated each statement using a five-point Likert scale ranging from very little to very much. Higher scores indicate greater anxiety sensitivity, a recognized vulnerability factor contributing to anxiety disorders and obsessive-compulsive symptomatology. Extensive international research has supported the reliability, factorial validity, and predictive utility of the ASI-3 across both clinical and community populations.

Prior to statistical modeling, all questionnaire scores were examined for missing values, normality, response distributions, and internal consistency. Missing responses accounted for less than 2% of the dataset and were handled using multiple imputation procedures where appropriate. Internal consistency of each instrument was evaluated using Cronbach's alpha and McDonald's omega coefficients, with values exceeding 0.80 considered indicative of excellent reliability. Descriptive statistics were calculated to summarize participant characteristics and variable distributions before machine learning analyses were initiated.

2.3. Data analysis

Data analysis was conducted using Python version 3.12 with CatBoost, Scikit-learn, SHAP, NumPy, Pandas, and SciPy libraries. Preliminary analyses included descriptive statistics, frequency distributions, correlation analyses, assessment of multicollinearity using variance inflation factors, evaluation of missing data patterns, and identification of multivariate outliers through Mahalanobis distance. Continuous predictor variables were standardized only for comparative statistical analyses, whereas CatBoost modeling utilized the original variable distributions because gradient boosting algorithms do not require feature scaling.

The CatBoost regression algorithm was implemented to predict obsessive-compulsive symptom severity using thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity as predictor variables. CatBoost was selected because it effectively handles nonlinear relationships, automatically models high-order feature interactions, minimizes overfitting through ordered boosting, and provides high predictive accuracy with

JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

relatively limited parameter tuning. Hyperparameter optimization was performed using randomized grid search combined with five-fold cross-validation. Optimized parameters included tree depth, learning rate, number of boosting iterations, L2 regularization coefficient, subsampling rate, and minimum samples per leaf. The final optimized model was subsequently trained using 80% of the dataset, while the remaining 20% was reserved as an independent testing dataset for evaluating model generalizability.

Model performance was assessed using multiple complementary evaluation metrics, including the coefficient of determination (R^2), root mean squared error (RMSE), mean absolute error (MAE), mean absolute percentage error (MAPE), and explained variance score. Five-fold cross-validation was repeated throughout model development to ensure stability and minimize sampling bias. Calibration plots and residual analyses were performed to examine prediction accuracy across different ranges of obsessive-compulsive symptom severity. To improve model interpretability, SHapley Additive exPlanations (SHAP) were employed to quantify the contribution of each predictor to individual predictions and overall model performance. Global SHAP importance values were calculated to identify the most influential psychological predictors, while local SHAP explanations were generated to examine individual prediction mechanisms. Partial dependence plots and feature interaction analyses were additionally conducted to visualize nonlinear relationships between predictors and obsessive-compulsive symptoms. Finally, permutation feature importance analysis was performed as an independent validation of predictor rankings, thereby increasing confidence in the stability and interpretability of the final CatBoost model. Statistical significance for descriptive and correlational analyses was established at a two-tailed alpha level of 0.05.

3. Findings and Results

A total of 1,214 participants were included in the final analyses after the exclusion of incomplete questionnaires, duplicate submissions, and multivariate outliers identified during the data screening process. The mean age of the participants was 31.87 years (SD = 10.46), with an age range between 18 and 67 years. Among the participants, 694 (57.2%) were women and 520 (42.8%) were men. Regarding marital status, 53.8% were single, 39.4% were married, and the remaining participants were divorced or widowed. Educational attainment was relatively high, with 18.7% holding a high school diploma, 29.4% completing undergraduate education, 37.6% possessing master's degrees, and 14.3% holding doctoral degrees. Participants represented a wide range of occupational backgrounds including university students, healthcare professionals, educators, administrative employees, technical specialists, and self-employed workers. Approximately 17.6% reported having previously received psychological counseling or psychiatric treatment, whereas the remaining participants reported no history of formal mental health treatment. The demographic diversity of the sample provided an appropriate basis for developing a robust machine learning model capable of identifying patterns associated with obsessive-compulsive symptom severity across a heterogeneous adult population.

Table 1

Descriptive Statistics and Correlations Among the Study Variables

Variable	Mean	SD	1	2	3	4	5
1. Obsessive-Compulsive Symptoms	24.83	12.11	—				
2. Thought Suppression	49.92	11.36	.71***	—			
3. Cognitive Fusion	31.57	9.24	.67***	.62***	—		
4. Perfectionism	95.81	17.63	.58***	.54***	.57***	—	
5. Anxiety Sensitivity	25.41	10.12	.64***	.56***	.60***	.51***	—

Table 1 presents the descriptive statistics and Pearson correlation coefficients for all study variables. The findings demonstrated that obsessive-compulsive symptoms exhibited statistically significant positive associations with each of the four psychological predictors included in the model. Thought suppression demonstrated the strongest bivariate association with obsessive-compulsive symptoms ($r = .71$, $p < .001$), followed by cognitive fusion ($r = .67$, $p < .001$), anxiety sensitivity ($r = .64$, $p < .001$), and perfectionism ($r = .58$, $p < .001$). Furthermore, all predictor variables were significantly correlated with one another, with correlation coefficients ranging from .51 to .62,

JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

indicating theoretically meaningful relationships while remaining below thresholds typically associated with problematic multicollinearity. Variance Inflation Factor (VIF) values ranged between 1.74 and 2.46, confirming that multicollinearity was not substantial and that all predictors could be simultaneously incorporated into the CatBoost model without compromising estimation stability. The descriptive statistics also revealed considerable variability across all psychological measures, suggesting sufficient dispersion for effective machine learning modeling and prediction.

Table 2

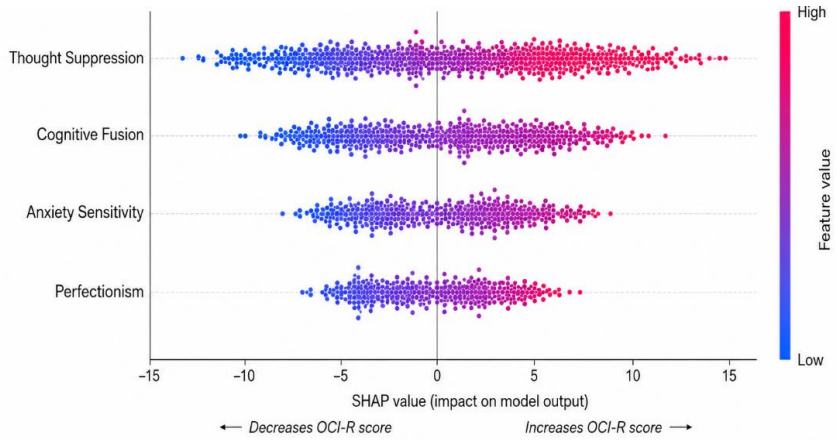
Performance of the Optimized CatBoost Prediction Model

Performance Metric	Training Dataset	Testing Dataset
R^2	0.892	0.854
Adjusted R^2	0.891	0.853
RMSE	3.71	4.28
MAE	2.86	3.24
MAPE	11.43%	13.18%
Explained Variance	0.893	0.855
Five-Fold Cross-Validation Mean R^2	0.849	—
Five-Fold Cross-Validation SD	0.014	—

The predictive performance of the optimized CatBoost model is presented in Table 2. The final model demonstrated excellent predictive accuracy across both the training and independent testing datasets. Specifically, the model explained 89.2% of the variance in obsessive-compulsive symptoms within the training dataset and maintained an R^2 value of 85.4% when evaluated on the unseen testing dataset, indicating excellent generalizability and minimal evidence of overfitting. The relatively small difference between the training and testing performance suggests that the model successfully learned generalized relationships rather than memorizing the training data. Likewise, the low RMSE and MAE values indicate that prediction errors remained consistently small across observations. The mean absolute percentage error of 13.18% further supports the practical predictive utility of the model, demonstrating high precision in estimating obsessive-compulsive symptom severity. Five-fold cross-validation additionally confirmed the robustness and stability of model performance, producing a mean cross-validation R^2 of .849 with a very small standard deviation, indicating highly consistent predictive performance across different validation folds. Collectively, these results demonstrate that CatBoost provides an accurate, reliable, and stable predictive framework for estimating obsessive-compulsive symptoms from the selected psychological variables.

Figure 1

SHAP Summary Plot Demonstrating the Global Importance of Thought Suppression, Cognitive Fusion, Perfectionism, and Anxiety Sensitivity in Predicting Obsessive-Compulsive Symptoms



JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

The SHAP summary analysis provided detailed insight into the relative contribution of each predictor within the CatBoost model. The visualization demonstrated that thought suppression emerged as the most influential predictor of obsessive-compulsive symptoms, exerting the largest average impact on model predictions across participants. Higher levels of thought suppression consistently shifted predicted obsessive-compulsive symptom scores upward, indicating a substantial contribution to symptom severity. Cognitive fusion ranked as the second most influential predictor, with increasing fusion scores producing marked increases in predicted obsessive-compulsive symptoms across nearly the entire score distribution. Anxiety sensitivity represented the third most important feature, demonstrating a strong nonlinear influence whereby elevated anxiety sensitivity substantially increased predicted symptom severity, particularly among individuals already exhibiting moderate to high levels of obsessive-compulsive symptoms. Perfectionism, although ranking fourth in overall importance, continued to contribute meaningful predictive information by interacting with the remaining psychological variables to improve model accuracy. The SHAP distribution further illustrated considerable heterogeneity in feature contributions across participants, suggesting that the influence of individual predictors varied according to each participant's overall psychological profile. Such findings emphasize the capacity of the CatBoost algorithm to capture complex nonlinear interactions that would likely remain undetected using conventional linear statistical techniques.

Table 3

SHAP Feature Importance and Permutation Importance Rankings

Predictor	Mean SHAP Value	SHAP Rank	Permutation Importance	Relative Contribution (%)
Thought Suppression	0.452	1	0.298	35.8
Cognitive Fusion	0.378	2	0.244	29.6
Anxiety Sensitivity	0.291	3	0.183	20.1
Perfectionism	0.207	4	0.141	14.5

Table 3 summarizes the feature importance analyses obtained from both SHAP values and permutation importance procedures. The convergence of the two independent interpretability techniques provides strong evidence regarding the stability and robustness of predictor rankings within the CatBoost model. Thought suppression consistently emerged as the dominant predictor, accounting for approximately 35.8% of the total predictive contribution, highlighting its central role in distinguishing individuals with elevated obsessive-compulsive symptom severity. Cognitive fusion represented the second most influential determinant, contributing nearly one-third of the model's predictive capacity and demonstrating that rigid attachment to internal cognitive experiences substantially increases the likelihood of elevated obsessive-compulsive symptoms. Anxiety sensitivity ranked third, contributing approximately one-fifth of the total predictive performance and emphasizing the importance of heightened sensitivity toward anxiety-related sensations in obsessive-compulsive psychopathology. Although perfectionism exhibited the smallest independent contribution, it nevertheless accounted for a meaningful proportion of overall prediction accuracy and interacted synergistically with the remaining psychological constructs. Importantly, none of the variables exhibited negligible importance, indicating that each construct contributed unique predictive information beyond the influence of the others. The consistency observed between SHAP and permutation importance analyses strengthens confidence in the interpretability of the final machine learning model and demonstrates that obsessive-compulsive symptoms are best understood through the combined influence of multiple interacting cognitive and emotional vulnerability factors rather than any single psychological characteristic alone.

4. Discussion

The present study developed and interpreted a CatBoost prediction model for obsessive-compulsive symptoms using thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity as psychological predictors in an adult sample from Spain. The findings demonstrated strong positive correlations between obsessive-compulsive symptoms and all four predictors, indicating that higher levels of maladaptive cognitive control, rigid attachment to thoughts, perfectionistic standards, and fear of anxiety-related sensations were associated with greater obsessive-compulsive symptom severity. Among the bivariate associations, thought suppression showed the strongest

JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

correlation with obsessive-compulsive symptoms, followed by cognitive fusion, anxiety sensitivity, and perfectionism. The optimized CatBoost model demonstrated high predictive accuracy, explaining 85.4% of the variance in obsessive-compulsive symptom severity in the independent testing dataset, with low prediction error and stable cross-validation performance. The SHAP and permutation importance analyses further clarified the structure of prediction by showing that thought suppression was the most influential predictor, cognitive fusion ranked second, anxiety sensitivity ranked third, and perfectionism ranked fourth. These findings indicate that obsessive-compulsive symptoms are best understood as the product of interacting cognitive-affective vulnerability processes rather than as the outcome of a single isolated psychological factor.

The central role of thought suppression in the model is theoretically meaningful because obsessive-compulsive symptoms often involve intrusive thoughts that individuals attempt to remove, neutralize, or control. The current findings suggest that habitual suppression of unwanted thoughts may substantially increase obsessive-compulsive symptom severity, likely because suppression strengthens monitoring for the unwanted cognition and increases its perceived importance. This interpretation is consistent with transdiagnostic models emphasizing experiential avoidance and maladaptive internal control strategies as mechanisms through which psychological symptoms are maintained. Gerdan and Şalcıoğlu showed that experiential avoidance functions as a transdiagnostic mediator linking intolerance of uncertainty and maladaptive perfectionism with psychiatric symptoms, supporting the view that attempts to escape or control internal experiences can intensify psychological distress (Gerdan & Şalcıoğlu, 2025). Similarly, the systematic review by Antuña-Camblor and colleagues identified transdiagnostic risk factors across emotional disorders, reinforcing the relevance of shared cognitive and emotional vulnerability processes for explaining symptom severity beyond disorder-specific categories (Antuña-Camblor et al., 2024). In the context of obsessive-compulsive symptoms, thought suppression may therefore operate as a maladaptive regulatory strategy that transforms ordinary intrusive thoughts into persistent and distressing mental events.

Cognitive fusion emerged as the second most influential predictor, indicating that obsessive-compulsive symptoms increase when individuals treat thoughts as literal, threatening, or behaviorally commanding rather than as passing cognitive events. This finding aligns with psychological flexibility models, which argue that distress is maintained not only by the content of thoughts but also by the individual's relationship to those thoughts. When cognitive fusion is high, intrusive thoughts may be interpreted as evidence of danger, responsibility, immorality, or loss of control, thereby increasing the likelihood of compulsive checking, reassurance seeking, avoidance, and neutralization. The importance of cognitive fusion in the present model is supported by Inoué and colleagues, who found that cognitive fusion, experiential avoidance, values, and social factors were associated with performance-related psychological difficulties, demonstrating that fused relationships with internal experiences can impair functioning in specialized populations (Inoué et al., 2024). Although their study was conducted in a sport context, the conceptual implication is directly relevant: when individuals cannot distance themselves from internal experiences, they become more vulnerable to rigid and repetitive behavioral responses. The present findings extend this logic to obsessive-compulsive symptoms by showing that cognitive fusion has substantial predictive value when modeled alongside thought suppression, perfectionism, and anxiety sensitivity.

Anxiety sensitivity also made a strong contribution to the prediction of obsessive-compulsive symptoms. This result suggests that individuals who fear anxiety-related sensations and interpret internal arousal as dangerous may be more likely to experience obsessive-compulsive symptoms. In obsessive-compulsive presentations, distress itself can become threatening; anxiety, uncertainty, and bodily activation may be interpreted as signs that something is wrong or that immediate action is required. This may increase the probability of compulsive behaviors because rituals temporarily reduce anxiety and reinforce the belief that discomfort must be controlled. The current findings are consistent with broader research on transdiagnostic vulnerability factors in conditions such as chronic insomnia, where psychological vulnerabilities contribute to symptom persistence across diagnostic boundaries (Vand et al., 2022). They are also consistent with evidence that personality-related vulnerabilities are associated with insomnia and psychological distress, suggesting that stable tendencies toward heightened arousal, threat interpretation, and emotional dysregulation may increase vulnerability across mental health domains (Akram et al., 2023). In obsessive-compulsive symptoms, anxiety sensitivity may therefore intensify the subjective urgency of compulsive regulation by making anxiety and uncertainty feel intolerable.

JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

Perfectionism was the fourth predictor in the feature-importance hierarchy, but its contribution remained clinically and theoretically meaningful. The results indicate that perfectionistic tendencies add unique predictive information to the model, even when thought suppression, cognitive fusion, and anxiety sensitivity are simultaneously considered. This finding is consistent with evidence that perfectionism contributes to obsessive-compulsive symptoms through rigid standards, excessive concern over mistakes, doubts about actions, and intolerance of imperfection. Hu and colleagues reported that parenting styles were associated with obsessive-compulsive symptoms in college students through the mediating role of perfectionism, supporting the idea that perfectionism can function as a pathway through which broader vulnerability conditions are translated into obsessive-compulsive symptom expression (Hu et al., 2023). Pourshahbaz and colleagues also conceptualized perfectionism as both an etiological and maintenance factor, emphasizing that perfectionistic processes are sustained by cognitive, emotional, interpersonal, and behavioral mechanisms (Pourshahbaz et al., 2022). The present findings support these models by showing that perfectionism contributes to prediction, although its influence appears to be somewhat less dominant than thought suppression and cognitive fusion.

The predictive contribution of perfectionism is also consistent with studies demonstrating its relevance across anxiety-related, clinical, and subclinical contexts. Hameed and Arzeen found that perfectionism was associated with self-esteem and DSM-IV-based symptoms of anxiety disorders in adolescents, suggesting that perfectionistic standards may increase psychological vulnerability during development (Hameed & Arzeen, 2023). Woodrum and Kahn showed that perfectionistic concerns are associated with psychological distress through emotion regulation processes during experiences of failure, indicating that perfectionism becomes especially harmful when mistakes or perceived inadequacy trigger maladaptive emotional responses (Woodrum & Kahn, 2022). Ward's single-session intervention targeting perfectionism in college students further highlights the clinical relevance of perfectionism as a modifiable factor (Ward, 2022). The present study adds to this literature by showing that perfectionism retains predictive value in a machine learning model of obsessive-compulsive symptoms, but also suggests that perfectionism may operate most powerfully when combined with other processes, such as cognitive fusion and thought suppression.

The results also align with evidence from clinical case studies and specialized populations in which perfectionism is linked to complex symptom presentations. Cheli and colleagues described perfectionistic self-recrimination in a case of comorbid personality and eating disorder, illustrating how perfectionism can become embedded in self-critical and clinically severe forms of distress (Cheli et al., 2024). Sand and Shafran discussed the use of enhanced cognitive-behavioral therapy in anorexia nervosa with comorbid obsessive-compulsive personality disorder and clinical perfectionism, emphasizing that perfectionism may sustain rigid, compulsive, and self-evaluative symptom patterns (Sand & Shafran, 2025). Arbinaga and Sierra similarly found that psychopathological symptoms in soccer referees were related to psychological inflexibility and perfectionism, suggesting that perfectionism has relevance across performance and occupational contexts (Arbinaga & Sierra, 2025). The current findings are compatible with these studies because they show that perfectionism is not merely an associated trait but a meaningful contributor to the prediction of obsessive-compulsive symptom severity.

The broader pattern of findings also supports the view that obsessive-compulsive symptoms overlap with other compulsive and rigid behavioral phenotypes. Laskowski and colleagues proposed an evidence-based model of overlapping phenotypes between compulsive buying-shopping disorder and borderline personality disorder, indicating that compulsive behavior may be linked with affective dysregulation, interpersonal instability, and maladaptive attempts to regulate distress (Laskowski et al., 2026). Fernández and colleagues found associations between early maladaptive schemas and impulsive and compulsive buying tendencies, further suggesting that compulsive patterns are related to underlying cognitive-affective schemas rather than isolated behaviors (Fernández et al., 2023). Sanseverino and colleagues reported psychological characteristics associated with orthorexia nervosa among university students, a condition often characterized by rigidity, control, and compulsive patterns around eating behavior (Sanseverino et al., 2025). Angelo and colleagues also showed that romantic relationship obsessive-compulsive doubts were related to perfectionism and DSM-5 personality traits in LGB individuals, demonstrating that obsessive-compulsive processes may appear in interpersonal domains where doubt, certainty seeking, and fear of error become central (Angelo et al., 2024). Together, these findings support the interpretation that obsessive-compulsive symptoms are part of a wider

network of compulsive, perfectionistic, and distress-regulation processes.

The high predictive performance of the CatBoost model has important methodological implications. Traditional correlational and regression models are useful for identifying linear associations, but obsessive-compulsive symptoms are likely shaped by nonlinear relationships and interactions among multiple psychological mechanisms. For example, thought suppression may become more harmful when cognitive fusion is high, because suppressed thoughts are interpreted as more meaningful or dangerous. Anxiety sensitivity may amplify obsessive-compulsive symptoms when individuals interpret distress as intolerable, and perfectionism may increase checking or repetition when the person feels unable to tolerate mistakes or incompleteness. The strong testing performance of the model suggests that CatBoost was able to identify complex predictive patterns in the data while maintaining generalizability. This is important because psychological symptoms rarely emerge from single causes; rather, they often reflect the cumulative and interactive influence of multiple vulnerability factors. The present findings are therefore consistent with contemporary mental health research emphasizing multidimensional risk models, including work on adolescent mental health risk factors that highlights the combined influence of biological, psychological, social, and contextual vulnerabilities (Lin & Guo, 2024).

The findings also have clinical implications because they suggest that obsessive-compulsive symptom prediction may be improved by integrating cognitive-behavioral and transdiagnostic constructs. Borrego-Ruiz and Borrego emphasized biological, psychosocial, and microbial determinants of childhood-onset obsessive-compulsive disorder, indicating that obsessive-compulsive symptoms are multifactorial and require integrative explanatory frameworks (Borrego-Ruiz & Borrego, 2025). Pourebrahimi and colleagues highlighted harm avoidance and incompleteness as core obsessive-compulsive motivations, which is consistent with the present finding that multiple psychological mechanisms contribute to symptom severity (Pourebrahimi et al., 2024). Sheikh's work on telehealth-delivered mindfulness-based exposure and response prevention for sexual obsessive-compulsive disorder with comorbid depression further shows that mechanism-informed interventions can be adapted to specific obsessive-compulsive presentations (Sheikh, 2025). In this context, the present CatBoost model may be useful not only for prediction but also for identifying priority treatment targets. Individuals whose symptom predictions are strongly influenced by thought suppression may benefit from strategies that reduce cognitive control efforts, whereas individuals with strong cognitive fusion may require defusion-based interventions. Similarly, anxiety sensitivity may indicate the need for interoceptive exposure and distress tolerance training, while perfectionism may require cognitive restructuring and behavioral experiments targeting rigid standards and fear of mistakes.

5. Conclusion

Overall, the present study contributes to the literature by demonstrating that obsessive-compulsive symptoms can be predicted with high accuracy using a relatively focused set of psychological variables. The findings support the transdiagnostic position that symptom severity is maintained by interacting processes of internal control, cognitive rigidity, affective threat sensitivity, and perfectionistic self-evaluation. Thought suppression and cognitive fusion were particularly central, suggesting that how individuals relate to and regulate unwanted thoughts may be more predictive of obsessive-compulsive symptom severity than perfectionism alone. However, the retained importance of perfectionism and anxiety sensitivity indicates that obsessive-compulsive symptoms should not be reduced to a single mechanism. Instead, the results support a multidimensional explanatory model in which intrusive thoughts become clinically relevant when they are suppressed, believed, feared, and evaluated against rigid standards of certainty, correctness, or control.

6. Limitations & Suggestions

The present study had several limitations that should be considered when interpreting the findings. First, the cross-sectional design prevents causal conclusions about whether thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity produce obsessive-compulsive symptoms or whether higher symptom severity increases these psychological processes over time. Second, all measures were based on self-report questionnaires, which may introduce shared method variance, response bias, and limitations related to introspective accuracy. Third, although the sample was relatively large and heterogeneous, it was drawn from adults in Spain and may not fully represent clinical populations, older adults, adolescents, or individuals from other cultural contexts. Fourth, the model predicted obsessive-compulsive symptom severity but did not

JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518

establish diagnostic status through structured clinical interviews. Fifth, although CatBoost provides strong predictive performance and interpretability tools, machine learning models can still be sensitive to sample characteristics, measurement quality, and unmeasured confounding variables. Therefore, the findings should be interpreted as evidence of predictive association rather than definitive causal explanation.

Future research should extend the present findings through longitudinal, clinical, and cross-cultural designs. Longitudinal studies are needed to determine whether thought suppression, cognitive fusion, perfectionism, and anxiety sensitivity prospectively predict increases in obsessive-compulsive symptoms across time. Clinical studies should replicate the model in individuals with diagnosed obsessive-compulsive disorder and compare prediction patterns across symptom dimensions such as contamination, checking, ordering, intrusive taboo thoughts, hoarding, and neutralizing. Future studies should also include additional variables such as intolerance of uncertainty, inflated responsibility, disgust sensitivity, emotion dysregulation, childhood adversity, metacognitive beliefs, and compulsive reassurance seeking to determine whether predictive accuracy improves. Multimethod assessment, including behavioral tasks, clinician-rated measures, ecological momentary assessment, and physiological indicators, would strengthen the validity of future models. Cross-cultural replication is also necessary to evaluate whether the same predictor hierarchy is observed across different countries and cultural contexts.

The findings suggest several implications for psychological assessment and clinical practice. Clinicians working with obsessive-compulsive symptoms should assess not only symptom content but also the processes that maintain symptoms, particularly thought suppression, cognitive fusion, anxiety sensitivity, and perfectionistic standards. Intervention planning may benefit from identifying the dominant maintaining mechanism for each individual. For clients with high thought suppression, treatment may focus on reducing attempts to control intrusive thoughts and increasing willingness to experience unwanted mental events without ritualizing. For clients with high cognitive fusion, cognitive defusion and metacognitive distance may help weaken the literal believability of intrusive thoughts. For clients with high anxiety sensitivity, treatment may include exposure to internal sensations and training in tolerating anxiety without compulsive regulation. For clients with high perfectionism, interventions may target fear of mistakes, excessive checking, rigid personal standards, and the need for certainty or completeness. In applied settings, predictive tools based on machine learning may assist screening, case formulation, and treatment prioritization, provided they are used as complements to clinical judgment rather than replacements for comprehensive assessment.

Acknowledgments

We would like to express our appreciation and gratitude to all those who cooperated in carrying out this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

Authors' Contributions

All authors equally contributed in this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

References

Akram, U., Stevenson, J. C., Gardani, M., Allen, S., & Johann, A. F. (2023). Personality and Insomnia: A Systematic Review and Narrative Synthesis. *Journal of Sleep Research*, *32*(6). https://doi.org/10.1111/jsr.14031

Angelo, N. L., Brullo, G., Marsiglia, A., Tirelli, A., Piroddi, E., Viti, C., Aicardi, I., & Pozza, A. (2024). Romantic Relationship Obsessive-Compulsive Doubts, Perfectionism, and DSM-5 Personality Traits in LGB People: A Comparison

With Heterosexual Individuals. *Frontiers in psychology*, *15*. https://doi.org/10.3389/fpsyg.2024.1187179

Antuña-Camblor, C., Péris-Baquero, Ó., Juarros-Basterretxea, J., Cano-Vindel, A., & Rodríguez-Díaz, F. J. (2024). Transdiagnostic Risk Factors of Emotional Disorders in Adults: A Systematic Review. *Anales de Psicología*, *40*(2), 199-218. https://doi.org/10.6018/analesps.561051

Arbinaga, F., & Sierra, M. I. M. (2025). Psychopathological Symptoms in Soccer Referees: The Role of Psychological Inflexibility and Perfectionism. *Peerj*, *13*, e19790. https://doi.org/10.7717/peerj.19790

Borrego-Ruiz, A., & Borrego, J. J. (2025). Biological, Psychosocial, and Microbial Determinants of Childhood-Onset Obsessive–Compulsive Disorder: A Narrative Review. *Children*, *12*(8), 1063. https://doi.org/10.3390/children12081063

Cheli, S., Cavalletti, V., Gazzillo, F., Brüne, M., & Hewitt, P. L. (2024). I Don't Deserve Anything Good: Perfectionistic Self-Recrimination in a Case of Comorbid Personality and Eating Disorder. *Journal of Clinical Psychology*, *81*(3), 171-181. https://doi.org/10.1002/jclp.23753

Fernández, X. M. C., Castro, Y. R., Ferreira, S., Teixeira, L., Campos, C., & Rocha, N. (2023). Exploring the Associations Between Early Maladaptive Schemas and Impulsive and Compulsive Buying Tendencies. *Frontiers in Psychiatry*, *14*. https://doi.org/10.3389/fpsyt.2023.1157710

Gerdan, G., & Şalcıoğlu, E. (2025). Experiential Avoidance as a Transdiagnostic Mediator in the Relationship Between Intolerance of Uncertainty, Maladaptive Perfectionism, and Psychiatric Symptoms: Structural and Causal Mediation Analyses in a Clinical Sample. *Clinical Psychology & Psychotherapy*, *32*(3). https://doi.org/10.1002/cpp.70102

Hameed, N., & Arzeen, S. (2023). Perfectionism, Self-Esteem and DSM-IV-Based Symptoms of Anxiety Disorders in Adolescents. *PJMHS*, *17*(3), 310-314. https://doi.org/10.53350/pjmhs2023173310

Hu, P., Liang, P., Liu, X., Ouyang, Y., & Wang, J. (2023). Parenting Styles and Obsessive-Compulsive Symptoms in College Students: The Mediating Role of Perfectionism. *Frontiers in Psychiatry*, *14*. https://doi.org/10.3389/fpsyt.2023.1126689

Inoué, K., Yamada, T., & Ohtsuki, T. (2024). Relationships Between Throwing Yips in Baseball, Experiential Avoidance, Cognitive Fusion, Values, and Social Factors. *Journal of Clinical Sport Psychology*, *18*(3), 374-395. https://doi.org/10.1123/jcsp.2022-0057

Laskowski, N. M., Sabel, L., Brandt, G., & Paslakis, G. (2026). Overlapping Phenotypes of Compulsive Buying-Shopping Disorder and Borderline Personality Disorder: An Evidence-Based Model. *Addictive Behaviors Reports*, *23*, 100669. https://doi.org/10.1016/j.abrep.2026.100669

Lin, J., & Guo, W. (2024). The Research on Risk Factors for Adolescents' Mental Health. *Behavioral Sciences*, *14*(4), 263. https://doi.org/10.3390/bs14040263

Pourebrahimi, M., Sarafraz, M., Hadianfard, H., & Mohammadi, N. (2024). Harm Avoidance and Incompleteness Core Motivations in Obsessive-Compulsive Disorder: Cross-Cultural Adaptation and Validation of the Persian Version of the Obsessive- Compulsive Core Dimensions Questionnaire (OC-CDQ) in Clinical and Nonclinical Samples. https://doi.org/10.21203/rs.3.rs-4347513/v1

Pourshahbaz, A., Moloodi, R., Mohammadkhani, P., Fata, L., Barani, M., Egan, S. J., & Ghaderi, A. (2022). An Etiological and Maintenance Model of Perfectionism. https://doi.org/10.21203/rs.3.rs-1235520/v1

Sand, L., & Shafran, R. (2025). Using CBT-E in the Treatment of Anorexia Nervosa With Comorbid Obsessive-Compulsive Personality Disorder and Clinical Perfectionism. *Journal of Clinical Psychology*, *81*(8), 768-776. https://doi.org/10.1002/jclp.23806

Sanseverino, R., Guidotti, S., & Pruneti, C. (2025). Assessing Orthorexia Nervosa Among University Students: An Observational Study Analyzing Prevalence and Psychological Characteristics. *Nutrients*, *17*(13), 2078. https://doi.org/10.3390/nu17132078

Sheikh, M. (2025). Telehealth-Delivered Mindfulness-Based Exposure and Response Prevention for Sexual Obsessive-Compulsive Disorder With Comorbid Depression: Feasibility and Clinical Outcomes. *Clinical Case Studies*, *25*(1), 3-24. https://doi.org/10.1177/15346501251405859

Vand, H. D. A., Hooman, F., Yegaei, P. S., Ahmadi, R., & Habibi, M. (2022). The Contribution of Transdiagnostic Vulnerability Factors in Patients With Chronic Insomnia. https://doi.org/10.21203/rs.3.rs-2241964/v1

Ward, H. (2022). Effects of a Single-Session Intervention Targeting Perfectionism in College Students. *Graduate Student Journal of Psychology*, *19*. https://doi.org/10.52214/gsjp.v19i.10051

Woodrum, J. L., & Kahn, J. H. (2022). Perfectionistic Concerns and Psychological Distress: The Role of Spontaneous Emotion Regulation During College Students' Experience With Failure. *Journal of counseling psychology*, *69*(2), 246-256. https://doi.org/10.1037/cou0000580

JARAC Assessment and Research in Applied Counseling
E-ISSN: 3041-8518