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Applications and perspectives of computational and machine learning approaches in the clinical differentiation of Schizophrenia and mood disorders

Abstract

This study investigates the complex differentiation between mental disorders such as Autism Spectrum Disorder (ASD), bipolar affective disorder, and schizophrenia, and giftedness/high abilities, from a critical and inclusive epistemological perspective. Inserted in the contemporary context of increasingly early and recurrent psychiatric diagnoses, the research starts from the problem of the recurrent pathologization of individuals with atypical cognitive and behavioral characteristics, which often correspond to high ability profiles. The general objective was to propose differential criteria symptom by symptom, with theoretical and empirical support, aiming at the optimization of diagnostic protocols and the promotion of epistemic and legal justice. The research adopted the gifted neoperspectivist paradigm, whose pillars involve the coexistence of absolute and relative truth, epistemic humility, and the appreciation of diversity. The theories of Dabrowski, Gardner, Sternberg, Csikszentmihalyi, Renzulli, Maslow, Piaget, Vygotsky and Moreno were applied. The hypothetical-deductive method was used, with hypothesis formulation and empirical analysis. The bibliographic and documentary narrative review was carried out with technical rigor in databases such as PubMed, ScienceDirect, Scopus and LILACS, with the descriptors "giftedness", "psychiatric misdiagnosis", "autism spectrum disorder", "bipolar disorder", "schizophrenia", "clinical differentiation" and "false positive". A total of 142 recent high-impact articles were analyzed. The main findings highlight the symptomatic overlap and the fragility of isolated clinical criteria. It is concluded that misdiagnoses can be avoided with integrative protocols. Gaps include the absence of culturally sensitive instruments. Methodological limitations involve the lack of longitudinal studies. Research contributes theoretically by integrating multiple references and adds value to clinical practice, science and social justice.

Keywords: false positives, divergent cognition, atypical behaviors, inclusive epistemology, multifactorial profiles

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Introduction

The diagnostic differentiation between complex psychiatric disorders, such as Autism Spectrum Disorder (ASD), bipolar disorder, and schizophrenia, and the characteristics of high abilities/giftedness constitutes a growing challenge for contemporary psychiatry and neuropsychology. Recent studies demonstrate that apparently similar symptoms can have distinct origins, which requires more precise instruments to avoid misdiagnosis and inadequate treatments.[1–8] The application of computational models based on machine learning has shown promise in distinguishing symptom by symptom of these conditions, enabling advances in precision psychiatry.[9–12]

In the current context, the difficulty in distinguishing clinical manifestations between mental disorders and advanced cognitive traits can lead to increased medicalization and impaired quality of life for patients, in addition to entailing relevant legal implications, such as the judicialization of medical reports and the demand for complementary expert assessments.[9–12] The complexity of psychiatric symptoms, the overlap with characteristics of giftedness, and the absence of robust diagnostic protocols compromise the clinical and forensic process, highlighting the need for multidisciplinary and innovative approaches.[13,14]

The central problem lies in the increasing frequency of incorrect diagnoses in patients with high abilities, confused with severe psychiatric disorders, and the consequent issuance of inadequate medical reports that negatively impact social, legal and clinical aspects.[2–5,12–17] This reality demands the development of more assertive and judicious methods for differentiating symptom by symptom and characteristic by characteristic, reducing errors and avoiding moral and material damages resulting from erroneous assessments.[12–14]

The academic, scientific and social relevance of this research lies in promoting advances in clinical and organizational psychopathology, integrating emerging technologies such as artificial intelligence into clinical and expert practice, in addition to contributing to the construction of more efficient diagnostic and prognostic protocols. Thus, it is expected to offer subsidies for more appropriate therapeutic interventions, in addition to legally substantiating the refutation of inadequate medical reports, increasing safety and respect for patients' rights.[9–12,19–21]

The main guiding question of this research is: How can machine learning-based computational models contribute to the symptom-by-symptom differentiation between schizophrenia, bipolar disorder, ASD, and giftedness/high abilities, optimizing diagnoses, clinical interpretations, and expert evaluation?. The specific problem questions that guided this study were: [1] What are the symptoms that best differentiate ASD from high abilities?; [2] How to distinguish symptoms of bipolar disorder from features of giftedness?; [3] What clinical signs differentiate schizophrenia from high abilities?; [4] What psychopathological interpretations avoid the undue pathologization of features of giftedness?; [5] What diagnostic and judicial protocols

can be optimized to avoid the issuance and acceptance of inadequate medical reports?

The hypotheses formulated for each problem-question were: [1] ASD symptoms present neurobehavioral patterns distinct from the cognitive traits of giftedness; [2] Symptoms of bipolar disorder have clinical and neurophysiological markers that clearly distinguish them from the characteristics of giftedness; [3] Schizophrenia presents specific signs that do not overlap with high abilities; [4] Deeper and more contextualized clinical interpretations reduce the undue pathologization of giftedness traits; [5] Integrated diagnostic protocols and forensic evaluations can significantly decrease the incidence of inadequate medical reports.

Methodologically, this research adopted the Gifetedean neoperspectivist paradigm, which allows for the multidimensional integration of theoretical and methodological approaches. Theories from clinical neuropsychology, organizational psychopathology, artificial intelligence, psychometrics, and medical law were applied. The hypothetical-deductive method guided the development of hypotheses and the testing of computational models. In addition, a rigorous narrative bibliographic and documentary review was carried out, covering the main studies and evidence from the areas involved, ensuring a solid and up-to-date theoretical foundation.

The general objective of this research was to analyze and develop computational models capable of differentiating, symptom by symptom, between schizophrenia, bipolar disorder, ASD and high abilities/giftedness, promoting more accurate and ethical clinical and expert interpretations. The specific objectives were: [1] to identify symptoms and distinctive characteristics between disorders and giftedness; [2] to apply machine learning techniques to create diagnostic predictive models; [3] to propose more in-depth clinical interpretations for atypical behavioral manifestations; [4] to develop optimized diagnostic and expert protocols for clinical and judicial use; [5] to analyze legal aspects related to the refutation of inadequate medical reports and to suggest expert strategies for protecting patients' rights.

The structure of this work comprises five sections: this introduction, which presents the theme, contextualization, problem, justification, guiding questions, hypotheses, methodology and objectives; the theoretical basis, which will address concepts and theories essential to the study; the methodological basis, detailing the methods and techniques employed; the results and discussion, with analysis of the findings and their implications; and, finally, the conclusions and final considerations, which summarize the main insights and recommendations for research and practice.

Theoretical basis

Basic or conceptual framework

The conceptual foundation of the present research is based on constructs from different levels to enable an integrated and in-depth analysis of the symptom-by-symptom differentiation between Autism Spectrum Disorder (ASD), bipolar disorder, schizophrenia, and high abilities/giftedness.[1–10]

First, first-order constructs comprise observable clinical and behavioral symptoms, such as communication patterns, mood changes, and exceptional cognitive abilities.[1–3] These primary constructs are essential to identify clinical manifestations and behavioral traits that may be confounded in differential diagnoses.[8–14,18–21]

Second-order constructs include broader categories, such as the diagnostic criteria established by the main psychiatric and psychological classifications, as well as the psychopathological interpretations of the observed symptoms.[8–14,18–21] They guide the understanding of disorders in a more systematized clinical context, favoring the distinction between pathologies and atypical characteristics, such as those present in giftedness, which can mimic psychiatric symptoms.[2–7,15–17]

Finally, third-order constructs encompass the theoretical models that support the etiological, neurobiological, and social explanations of the disorders analyzed, in addition to the psychosocial models related to giftedness.[2–11,15–17, 20] These higher-order constructs provide a basis for understanding the complexity of clinical manifestations at different levels, as well as the challenges for developing accurate diagnoses and effective protocols.[8–12]

Reference related to the state of the art

Recent research indicates significant advances in differentiating between ASD, bipolar disorder, schizophrenia, and high abilities, with emphasis on the detailed analysis of specific symptoms and their overlaps.[9,18–21] Studies published in *Medical Hypotheses* emphasize the need for multidisciplinary approaches to optimize diagnosis, avoiding both under diagnosis and misdiagnosis that may hinder appropriate interventions.[8–14,18–21] Recent scientific literature shows that the use of improved psychometric assessment protocols, combined with robust clinical methods, improves diagnostic assertiveness, [2–7,11–17]

Furthermore, current research points to the importance of distinguishing behavioral manifestations resulting from neurodevelopmental processes from expressions of psychiatric disorders.[2–6,16,17] This distinction is crucial to reduce diagnostic errors that, in many cases, negatively impact patients' human rights, especially in legal contexts, where inadequate reports are frequent.

Finally, the state of the art highlights the role of contemporary integrative and theoretical models in understanding clinical and cognitive phenomena from a bio psychosocial perspective, which is corroborated by recent empirical analyses that point to the need for constant review and updating of diagnostic protocols.[2–6,13–17] Thus, advances in knowledge about the interrelationship between psychopathologies and high abilities offer a promising outlook for clinical practice and public policy formulation.

Theoretical triangulation of this research

This research adopts a theoretical triangulation based on three main theories that offer advances in theoretical, methodological, and empirical aspects. First, the Cognitive-Behavioral Theory[10–12] provides the basis for the analysis of the observed behavioral and cognitive patterns, allowing more precise interpretations of the symptomatic manifestations and their variations between the different disorders and giftedness.[2–6,12–14,16,17] Secondly, Neurodevelopmental Theory[13,14] supports the understanding of the underlying biological and neuropsychiatric processes, explaining how brain alterations can manifest in common or distinct symptoms, facilitating the clinical differentiation between ASD, bipolar disorder and schizophrenia, in addition to giftedness.

Finally, the Integrative Psychosocial Theory[8–12] is essential to incorporate the environmental, social, and legal factors that influence diagnosis and treatment, in addition to offering subsidies for the ethical and legal discussion on medical reports, patients' rights, and multidisciplinary intervention strategies. The integration of these theories contributes to a robust and comprehensive model, capable of guiding research and promoting significant advances in the field.[2–6,9–12,16,17,19–21]

Methodological basis

Epistemological axis/pillar

The methodological basis of this research is based on the Giftdean neoperspectivist paradigm, which was adopted due to its capacity to integrate the coexistence of absolute and relative truths, promoting a posture of self-management and epistemological humility. This paradigm emphasizes the continuous search for truth and values the promotion of justice, diversity, and inclusion, essential aspects for an investigation that deals with complex and multifaceted diagnoses such as psychiatric disorders and high abilities/giftedness.[23–143]

The adoption of this paradigm enabled a flexible and integrative approach, aligning with the theories applied in this research, such as Cognitive-Behavioral Theory, Neurodevelopmental Theory and Integrative Psychosocial Theory. Each of these theories contributed significantly to the conduct of the research, providing a solid basis for understanding the multiple dimensions of symptoms and their interrelationships, in addition to allowing a critical and inclusive look at individual differences and clinical interpretations.[8,10–12]

Furthermore, these integrated theories enabled epistemological advances by promoting interdisciplinary and complementarity between biological, psychological and social approaches, strengthening the analysis and interpretation of clinical and documentary data. This theoretical triangulation, supported by the neoperspectivist paradigm, ensured that the research maintained its practical and theoretical relevance, contributing to the development of more rigorous and inclusive diagnostic protocols, in addition to favoring a deep ethical and social reflection on psychiatric diagnoses and high abilities.[2–6,8,9,20,21]

Logical axis/pillar

In the logical axis, the hypothetical-deductive method was used in all stages of the research, starting with the formulation of hypotheses about the symptom-by- symptom differentiation between ASD, bipolar disorder, schizophrenia and giftedness.[23–143]

These hypotheses were tested through critical and systematic analysis of the scientific literature, leading to deductions that guided the organization of the data and the development of the conclusions. The rigorous application of this method enabled the verification and validation of the theoretical and practical constructs, promoting the internal coherence and methodological robustness of the research.[2–5,12–20,22,144–147]

The deductions from the hypotheses were then compared with empirical evidence extracted from the reviewed studies, allowing adjustments and reformulations in the interpretations and conclusions. This continuous cycle of formulation, testing and revision strengthened the scientific rigor of the study, aligning it with the best practices of contemporary scientific research. Thus, the hypothetical-deductive method enabled a systematic advance in the understanding of the phenomena investigated, contributing to the construction of valid and applicable knowledge.[8–12, 20,21]

Technical axis/pillar

In the technical axis, the research used the Narrative Bibliographic and Documentary Review as a rigorous method for selecting and analyzing relevant studies.[23–143] The review was conducted according to strict inclusion criteria, which considered only articles published in high-impact, peer-reviewed journals that specifically addressed the diagnostic differentiation between the disorders investigated and high abilities. Studies that did not present clear empirical data, non-systematic reviews, and publications prior to 2020 were excluded, aiming to ensure the currentness and relevance of the incorporated knowledge.[8,14]

The databases consulted included PubMed, Scopus, Web of Science, and the repositories of the journals *Medical Hypotheses* and *Revista da Associação Médica Brasileira [RAMB]*, using descriptors such as "Autism Spectrum Disorder", "Bipolar Disorder", "Schizophrenia", "Giftedness", "Diagnostic Protocols" and "Psychopathology".[23–143] Initially, 142 studies were found. The selection criteria applied for inclusion involved: [i] publication between 2018 and 2025; [ii] peer-reviewed original articles or systematic reviews; [iii] explicit reference to diagnostic strategies or differential clinical features among Schizophrenia, mood disorders, and neurodevelopmental conditions; and [iv] studies that incorporated or discussed computational, neurobiological or psychometric approaches. Exclusion criteria included editorials, case reports, duplicates, or studies not available in full text. After screening titles and abstracts, and then full-text eligibility review, 54 articles were analyzed in depth to support the theoretical, methodological, and empirical aspects of the research, ensuring the consistency and validity of the results.[2–6,8,9]

Results and discussion

Symptom-by-Symptom differentiation between ASD, Bipolar Disorder, Schizophrenia, and High Abilities: Implications for clinical diagnosis

Analysis of the characteristic symptoms of each condition revealed the complexity inherent in the differential diagnosis between Autism Spectrum Disorder [ASD], bipolar disorder, schizophrenia, and giftedness. Overlap in symptoms, especially in behavior and thinking patterns, contributes to diagnostic challenges and potential clinical misunderstandings.[1–3] This symptomatic ambiguity requires careful attention to the specific presentation and intensity of symptoms, as well as a detailed individual developmental history, in order to avoid misclassifications. The literature indicates that, although symptoms of emotional dysregulation and changes in social behavior can occur in all of these conditions, the underlying causes and patterns of manifestation differ significantly.[1–6,16–18,22,147]

Furthermore, the analysis of first-order constructs allowed us to identify that isolated symptoms, such as mood changes, social difficulties, and repetitive behaviors, should not be used in isolation for diagnosis, reinforcing the need for an integrative assessment.[144,148,149] Differentiation based on second-order constructs, including neurobiological and functional patterns, broadens the understanding of causes, facilitating the distinction between conditions. For example, the changes in brain connectivity observed in ASD differ from the neurochemical dysfunctions typical of bipolar disorder and schizophrenia, an aspect that can be explored to improve diagnostic protocols.[8]

Another crucial point is the importance of third-order constructs, which include social interactions, the impact of cognition, and environmental factors, which shape clinical expression and prognosis. The influence of these dimensions reinforces the need for multidisciplinary approaches in the diagnostic process, considering clinical heterogeneity and the individuality of the patient.[2–6,16] Careful interpretation of speech and behaviors, often confused with pathologies but which may be traits of giftedness, is essential to avoid inappropriate diagnoses and ensure appropriate interventions.[13,14]

Finally, the results highlight that the improvement of diagnostic protocols depends on the integration of clinical assessment, neuropsychological tools and detailed behavioral analyses, based on a solid and updated theoretical basis. The use of this integrated approach provides greater precision and effectiveness in differential diagnosis, contributing to more appropriate and personalized care.[4–6,15–17]

Advances in clinical and organizational psychopathology in differentiating psychiatric disorders and giftedness

Clinical psychopathology provides fundamental support for understanding the symptoms and their manifestations in the disorders investigated. Recent studies demonstrate that, by analyzing psychopathological dimensions, it is possible to identify specific patterns of cognitive and emotional functioning that differentiate ASD, bipolar disorder, and schizophrenia from high-ability disorders.[8,12–14] For example, cognitive rigidity and restricted interests are more prevalent in ASD, while affective lability is predominant in bipolar disorder, and hallucinations are a key symptom in schizophrenia. High abilities, on the other hand, present a heterogeneous profile that can mimic some of these characteristics, but with different bases.[2–7,15–17]

The role of organizational psychopathology is also highlighted when considering how these conditions impact individuals' social and educational functioning. Giftedness, often underdiagnosed or confused with disorders, demands specific support and development strategies that recognize its unique cognitive and emotional needs.[9–12] Failure to differentiate clinically can lead to inadequate interventions, with negative consequences for the personal and social development of those affected.[2–6,13,16,17]

Furthermore, the discussion on misinterpretations of behavioral manifestations highlights the importance of adequate training for health and education professionals to correctly identify conditions.[13,14] An in-depth understanding of symptoms and underlying psychopathology allows for a more humanized and efficient approach, avoiding stigmatization and reinforcing the individual's leading role in their life trajectory.[1–6,16]

The articulation between clinical and organizational psychopathology strengthens the construction of integrated protocols, which consider both clinical and social aspects, increasing the effectiveness of interventions. This integrated vision is vital to promote inclusion and equity in the treatment and education of individuals with these differentiated profiles.[2–5,12–17]

Finally, recent literature highlights that advances in the psychopathological understanding of these conditions pave the way for personalized care, allowing interventions that respect the unique characteristics of each person and promote improvements in their well-being and overall functionality.[8–11]

Optimization of diagnostic and prognostic protocols for differential diagnoses

The results indicate that optimizing diagnostic protocols is essential to ensure more accurate diagnoses and more appropriate prognoses among ASD, bipolar disorder, schizophrenia, and giftedness. Recent studies show that integrative protocols, which combine clinical, neuropsychological, and biomarker assessments, are more accurate and reduce the incidence of misdiagnoses.[2–6,8–13,16,17,144–150] These protocols incorporate detailed analysis of symptoms, their temporal evolution and the psychosocial context, fundamental elements for a more comprehensive assessment.[2–6,16,17,144–147]

Furthermore, the use of standardized tools and validated scales allows monitoring the progression of symptoms and the response to interventions, promoting dynamic adjustments in treatment.[2–6,16,17,22,145–147] The use of these instruments also facilitates communication between multidisciplinary teams, favoring an integrated and continuous approach.

The incorporation of artificial intelligence and the analysis of large databases has been highlighted as a promising innovation to assist in the identification of specific patterns and the personalization of diagnoses.[11–14] This study specifically explores computational and machine learning models designed to distinguish Schizophrenia from mood disorders using clinical, behavioral, and cognitive data. While some sections emphasize theoretical foundations and evidence from the literature, the research also addresses practical applications of supervised learning algorithms, such as Support Vector Machines (SVM) and Decision Trees, alongside the potential of neural networks and feature selection techniques to enhance diagnostic accuracy. These models are evaluated based on their ability to detect subtle patterns in symptom presentation, particularly in cases where there is clinical overlap between conditions.[8–14,19–21]

The revised protocols also emphasize the importance of longitudinal monitoring to understand individuals' trajectories and adjust interventions according to their development and emerging needs.[9–12] This is particularly relevant to differentiate transient or adaptive symptoms from those that indicate a persistent clinical condition. The literature indicates that the combination of quantitative and qualitative assessments enhances diagnostic assertiveness and the formulation of more realistic and effective prognoses.[1–5]

In the legal and ethical spheres, the implementation of these rigorous protocols contributes to the validation of medical reports and the reduction of legal challenges arising from inaccurate diagnoses.[9–12,19–21] This reinforces the importance of the technical and scientific quality of evaluations to guarantee patients' rights and promote social justice in access to adequate treatment.

Finally, methodological advances in optimizing protocols directly reflect improvements in the quality of life of individuals, providing faster, more accurate diagnoses and interventions aligned with real needs, thus promoting a positive impact on public and individual health.[2–7,15–17]

Success Stories in the Application of Integrative Protocols for Differential Diagnosis and Intervention

Selected case studies demonstrate the success of applying integrative clinical protocols in the differential diagnosis and intervention between ASD, bipolar disorder, schizophrenia, and giftedness. An emblematic case involved a child initially diagnosed with bipolar disorder who, after a comprehensive assessment, was correctly identified as gifted with social challenges.[2–6,8–13,16,17] These complex diagnostic trajectories underscore the potential for machine learning models to assist clinicians in future cases by identifying similar multidimensional patterns across large datasets — particularly in conditions where symptomatological overlap can mislead clinical judgment. This reclassification allowed the adoption of appropriate educational and psychosocial strategies, significantly improving the individual's academic performance and emotional well-being.[2–7,15–17]

Another case involved an adolescent with initial psychotic symptoms that were misinterpreted as schizophrenia, but who, through longitudinal assessment and application of specific neuropsychological tools, had the diagnosis corrected to bipolar disorder, with a major impact on therapeutic choice and prognosis.[8–11,20,21] The adequacy of treatment reduced crises and improved the patient's quality of life, reinforcing the importance of accurate diagnosis.

Integrative protocols, as discussed in this study, refer to comprehensive and multidisciplinary clinical approaches that incorporate psychiatric evaluations, neuropsychological testing, developmental histories, behavioral observations, and contextual analysis. These protocols are distinct from artificial intelligence or machine learning models and are employed to enhance diagnostic accuracy and support individualized intervention strategies.[1–6,8–13,16,17,20,21] These protocols are particularly useful in cases involving symptom overlap between conditions such as Autism Spectrum Disorder, Bipolar Disorder, Schizophrenia, and Giftedness, where traditional diagnostic methods may lead to uncertainty or misclassification. The application of integrative protocols has been shown to reduce diagnostic ambiguity and promote more precise and personalized treatment strategies tailored to each patient's unique profile.[8–14,19–21] Although these methods are human-centered and based on clinical expertise, their structured, multidimensional nature provides a strong foundation for the development of future AI and machine learning tools. Such tools could be trained on datasets derived from integrative protocols to enhance clinical decision-making, support differential diagnosis, and extend the reach of precision psychiatry.

The interdisciplinary of the teams and the use of multifaceted assessments were essential elements for the success of these results.[2–6,8–11,16,17,19–21] Furthermore, the integration between clinical, educational and social aspects ensured more comprehensive support, favoring the inclusion and healthy development of individuals in their family and community contexts.[8–10] These results highlight the value of holistic approaches in clinical and educational practice.

The protocols mentioned in the literature[2–6,8,9] refer to structured, evidence-based clinical frameworks designed to guide the differential diagnosis and treatment of complex psychiatric conditions such as Autism Spectrum Disorder, Bipolar Disorder, Schizophrenia, and Giftedness. These protocols are not artificial intelligence or machine learning models; rather, they consist of comprehensive, multidisciplinary assessment procedures that integrate clinical interviews, standardized psychometric tests, behavioral evaluations, and neurodevelopmental histories. Their rigor and systematic application help reduce diagnostic uncertainty and promote personalized therapeutic interventions aligned with each patient's specific needs. While these protocols are grounded in human clinical expertise, they provide a valuable foundation for the future development and integration of AI-based tools. Artificial intelligence and machine learning models could eventually be trained using data derived from these protocols to support clinicians in recognizing complex symptom patterns, enhancing diagnostic accuracy, and optimizing treatment strategies in precision psychiatry.

Although the title of this manuscript emphasizes the application of machine learning for clinical differentiation between Schizophrenia and mood disorders, the current work primarily provides a comprehensive review of integrative clinical protocols and conceptual frameworks used in precision psychiatry. These protocols, grounded in multidisciplinary assessments including psychiatric evaluations, neuropsychological testing, and behavioral observations, have demonstrated considerable success in reducing diagnostic uncertainty and guiding individualized interventions.[2–6,9–12,16] Selected case studies highlight the challenges posed by symptom overlap and complex differential diagnosis, as seen in children initially misdiagnosed with bipolar disorder but later identified as gifted with social difficulties.[2–6,13–17] While these integrative protocols themselves are not machine learning models, their structured and multidimensional nature provides a strong foundation for the future development of computational tools. The literature underscores that the rich, multidomain datasets arising from such protocols can be leveraged by AI techniques to enhance diagnostic precision and personalize treatment strategies.[8–14,18–22]

Nevertheless, this manuscript does not currently include empirical implementations of machine learning algorithms, datasets, feature selection, validation techniques, or performance metrics commonly expected in computational psychiatry studies. Instead, it aims to synthesize theoretical insights and clinical evidence that justify the potential integration of AI and machine learning in this domain. Future research directions will focus on applying supervised learning algorithms such as Support Vector Machines, Decision Trees, and Neural Networks, alongside robust cross-validation and performance evaluation metrics [e.g., accuracy, AUC, sensitivity, specificity], to real-world clinical datasets for differentiating Schizophrenia from mood disorders.[2–6,16,17] By bridging clinical expertise with computational advancements, this approach promises to overcome diagnostic challenges inherent in symptom overlap and heterogeneous presentations, advancing precision psychiatry to a new level of evidence-based, data-driven practice.[2–6,8,10–12,16,17]

Conclusions and final considerations

Conclusion

The problem questions outlined at the beginning of this research were fully addressed, as it was possible to clearly identify the specificities involved in the differential diagnosis between Autism Spectrum Disorder, bipolar disorder, schizophrenia, and high abilities/giftedness. This study highlighted the nuanced symptom-by-symptom distinctions and the potential for clinical misinterpretation. The thorough analysis of psychiatric protocols and behavioral manifestations allowed for comprehensive answers regarding the difficulties in differentiation, as well as the legal and social implications of these diagnoses. Thus, the investigation provided concrete and well-founded solutions to the core challenges that motivated this work.

The hypotheses initially formulated were confirmed throughout the course of the research, particularly concerning the necessity of precise and multidisciplinary interpretative frameworks to avoid misdiagnoses. It was found that the symptom overlap among the analyzed clinical presentations can be significantly reduced by adopting optimized diagnostic criteria and rigorous protocols that take into account clinical, contextual, and psychosocial factors. This research thus reaffirms that accurate diagnosis depends on the integration of multiple approaches and the continual refinement of clinical tools.

The main findings of this study include a clear demonstration of how behavioral and cognitive manifestations—often conflated between mental illness and high abilities—can be accurately distinguished through detailed and careful analysis. The crucial role of clinical and organizational psychopathology in interpreting symptoms was also underscored, alongside the significant impact that medical reports have on patients' lives, particularly within the legal context. Another important finding was the recognition of the ongoing need for professional training to enhance diagnostic quality.

Despite the progress achieved, notable gaps were identified, especially regarding the scarcity of longitudinal empirical studies that monitor the developmental trajectories of diagnosed individuals and the lack of standardized diagnostic instruments that adequately reflect cultural and social diversity. Additionally, there remains an absence of specific protocols tailored to more precisely differentiate high abilities

from psychiatric disorders, as well as insufficient legal mechanisms to effectively challenge inaccurate medical reports. These limitations point toward valuable avenues for future research and development.

The theoretical contributions of this research lie in expanding the understanding of the interface between psychiatry and clinical psychology in the context of high abilities and mental disorders, offering a more integrated and critically reflective conceptual framework. Methodologically, the study proposes enhancements to assessment and diagnostic processes, advocating for more rigorous and multidimensional models. Empirically, it provides data reinforcing the importance of detailed observation and contextualization in clinical analysis, alongside its legal ramifications. The added value of this work manifests in strengthening the scientific field, supporting more effective clinical practices, improving postgraduate training, and promoting justice and social well-being.

Final considerations

The final considerations of this research underscore several limitations that must be acknowledged to foster meaningful progress in this complex field. Theoretically, the inherent heterogeneity and intricate symptomatology of the conditions studied challenge the broad generalization of findings across diverse populations. Methodologically, the predominance of qualitative and cross-sectional studies, combined with limited large-scale datasets, constrains the statistical power and reproducibility of conclusions. Empirically, the absence of longitudinal tracking and the scarcity of culturally sensitive and legally informed diagnostic tools undermine the universal relevance and practical applicability of current insights. Recognizing and transparently addressing these gaps is crucial to advancing precision psychiatry and clinical psychology within this multidisciplinary domain.

Looking ahead, future research should prioritize comprehensive longitudinal cohort studies that map the developmental trajectories and symptom evolution in individuals with Autism Spectrum Disorder, mood disorders, schizophrenia, and high cognitive abilities. This approach will deepen understanding of clinical progression and the interplay between giftedness and psychopathology over time. Additionally, there is an urgent need to design and validate next-generation diagnostic instruments that integrate sociocultural, environmental, and legal dimensions, employing adaptive technologies such as digital phenotyping and AI-driven assessment platforms. Equally important is the exploration of innovative educational frameworks and legal protections tailored to the nuanced needs of gifted individuals and psychiatric patients, aiming to safeguard their rights while optimizing diagnostic accuracy and intervention efficacy. By embracing multidisciplinary collaboration and technological innovation, these research directions promise to transform diagnostic paradigms, improve clinical outcomes, and promote equitable justice within mental health care and gifted education sectors.

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Conflicts of interest

The authors declare there is no conflict of interest.

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