

Volume 13, n 1, 2025

Editorial

On the Relevance and Limitations of Predictive Models in Clinical Psychology

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Keywords:

Assessment; Causality; Clinical Psychology; Predictive models; Regression analysis.

Received: 23 March 2025

Accepted: 28 April 2025

Published: 30 April 2025

Citation: Merlo, E. M. (2025). On the Relevance and Limitations of Predictive Models in Clinical Psychology. *Mediterranean Journal of Clinical Psychology* 13(1).

<https://doi.org/10.13129/2282-1619/mjcp-4575>

Following a relevant contribution promoted by the American Psychological Association (Hanson, 2022), prediction statistics in Clinical Psychology represent a series of practices useful to consider the effect of an independent variable on possible outcomes.

Such practices would allow for causal clinical reasoning, but this must be evaluated with rigor and knowledge of the existing limitations. Hanson (2022) suggests that since the 1950s, with Meehl's contribution (1954, 1965, 1986), serious doubts have arisen about the use of predictive models in clinical practice (Grove & Lloyd, 2006). The reference was based on a possible misunderstanding, providing methods replacing clinical judgement.

The use of statistical methods to predict effects has a long history, with early examples including the work of Legendre (1805) and Gauss (1809). Today, the predictive role of independent variables is most studied through regression analyses.

However, analysing scientific hypotheses, like any scientific method, comes with its strengths and limitations. For instance, the appropriateness concerns sample representativeness, error-free measurement of independent variables, zero deviation, homoscedasticity, and uncorrelated residues (Ali & Younas, 2021; Chatterjee & Hadi, 2015; Freedman, 2009; Sarstedt et al., 2019). As emphasized by Arkes (2023), scientific methods must always take into account ethical issues related to integrity and standards.

Furthermore, the interpretation of the analyses must carefully consider both the limitations and the legitimate interpretations. Several contributions delved into, indeed, the limitations and pitfalls related to widely used statistical analysis methods (e.g., Janse et al., 2021; van Diepen et al., 2017).

Causality is a central issue in the scientific landscape. In this sense, van Diepen and colleagues (2017), specified the fundamental distinction between prediction and etiology. Although both scientific domains use multivariable modeling, clear differences are provided. Etiology is aimed at uncovering the causality of factors, avoiding the impact of confounding variables based on acquired knowledge, while predictive models are aimed at predicting risk for an outcome by employing multiple predictors collectively. The results of these models are based on statistical significance, which, when present, must be interpreted as not necessarily based on pure causality. The authors also suggest that methodologies (for etiological and predictive studies) are often confused, generating false interpretations of results.

Research in Clinical Psychology is often characterized by studying the existing dependencies between phenomena. In many cases, however, atheoretical approaches and a misleading degree of freedom from etiological considerations make it challenging to continue considering the causes closely related to the onset of psychopathology. This underscores the importance of multidisciplinary and interdisciplinary research as a key area of interest for studying the causes of major psychological alterations (e.g., Fujita & Vitevitch, 2022; Goldman, 2021; Merlo, 2024; Merlo & Myles, 2024). In this sense, etiological and predictive research assumes a key role in the history of clinical psychology. As mentioned above, an adequate level of knowledge of the constraints and limitations imposed by quantitative and qualitative data analysis processes is essential. Avoidance of bias and risk assessment related to diagnostic paths is also crucial (Brown et al., 2024; Navarro et al., 2021; Yarkoni & Westfall, 2017).

Examples of predictive studies in clinical psychology can be summarized essentially from the assessment and treatment-related outcomes domains. In any case, the use of psychodiagnostics tools is foreseen. The fields of phenomena are diverse and range from the study of the effects of socio-demographic variables (e.g., Carpallo-González et al., 2023; Gergov et al., 2024), to the study of quality of life in patients suffering from psychological and medical conditions (e.g., Costa et al., 2021; Giorgianni et al., 2024; Kaplan & Hays, 2022; Martino et al., 2021; Ricciardi et al., 2023), the study of psychological mechanisms underlying the occurrence of psychopathology and particular medical conditions (for relevant examples see Cohen & Herbert, 1996; Conversano, 2019; Di Giuseppe, 2024; Merlo et al., 2024; Mewes, 2022; Silvestro et al., 2025), and to the study of personality features as predictive factors of possible behavior (Anglim et al., 2020; Bleidorn et al., 2022; da Mota et al., 2024).

Further questions arise with the limits of predictive models. In line with the contribution of Wiggins (1981), which dates back more than 40 years, it is necessary to employ parsimony in the use of diagnostic tools and the interpretation of the results. This fact, in addition to referring to clinical research, should always be taken into account within the clinical reports (Myles & Johnson, 2023). In this sense, considering constraints and limits, the irreplaceable clinical reasoning is of absolute importance.

The concepts of bias and overfitting related to predictive models applied to psychopathology, as well as the necessary risk assessment practices, suggest the need to always refer to accuracy and precision. In particular, as suggested by Meehan and colleagues (2022), it would be necessary to evaluate predictive models to understand their clinical usefulness. Generalizability of these models represents a considerable concern (Chekroud et al., 2024; Richter et al., 2025; Wan et al., 2022). Beyond the limits inherent to the regression method, as in the case of linearity, sensitivity to outliers and multicollinearity, overfitting and overinterpretation, the focal point is the irreplaceable clinical judgment mediated by experienced clinical professionals. In this perspective, multidisciplinary research enables modern training practices to adhere to the state of the art.

This point implies a necessary transition from clinical research to teaching and training of future professionals who should be aware of the constraints and limitations of the various research methodologies.

Conflict of Interest Statement

The author declares that the research was conducted in the absence of any potential conflict of interest.

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