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RESEARCH PAPER

A MULTIMETHOD PSYCHOMETRIC APPROACH TO ANALYSE THE PROFILE OF MENTAL FUNCTIONING – M AXIS OF THE PSYCHODYNAMIC DIAGNOSTIC MANUAL, 2ND EDITION (PDM-2): A FOCUS ON CLUSTER B PERSONALITY DISORDERS

Alessio Gori, Eleonora Topino, Laura Muzi, Vittorio Lingiardi, Giovanni Stanghellini

Abstract

Objective: Within the realm of international diagnostic systems, the *Psychodynamic Diagnostic Manual – 2nd edition* (PDM-2) stands out as a particularly effective instrument for evaluating mental functioning based on a psychodynamic perspective. This research aimed to explore the psychometric properties of the M Axis and to investigate the dynamics among its 12 capacities for individuals with Cluster B personality disorders.

Method: A sample of 285 psychotherapists who regularly use the PDM-2 in their professional practice was involved in this research. The collected data were analysed using an integrated approach combining factor and network analyses.

Results: The factor analytic approach supported the strong psychometric properties of the M Axis for the 4-factor model. Good indications of internal consistency emerged, along with evidence of both convergent and divergent validity. The network analysis approach suggested that the psychotherapists perceived the capacity for mentalization and reflective functioning as the most influential one within the network of capacities in Cluster B personality disorders.

Conclusions: The M Axis emerged as a psychometrically solid assessment measure with strong theoretical and empirical bases, which can provide valuable support for enhancing both research and clinical practice.

Key words: factor analysis approach, M axis, mental capacities, mental functioning, network analysis approach, personality organization, psychodynamic diagnostic manual

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The *Psychodynamic Diagnostic Manual* (PDM), first published in 2006 (PDM Task Force, 2006) and currently in its second edition since 2017 (PDM-2; Lingiardi & McWilliams, 2017), is a psychodynamically informed diagnostic system for the assessment of both psychopathology and the normal range of psychological organization. Through a multiaxial evaluation, it is proposed as a support for case formulation and treatment planning tailored to the patient (Lingiardi & McWilliams, 2015), as suggested by the explicit intention of not providing a "taxonomy of disorders", but rather a “taxonomy of people” (Lingiardi & McWilliams, 2017, p. 2). The PDM-2 is divided into age-specific groups, each characterized by three axes that can support the clinician in conceptualizing the patient: 1) P Axis, *i.e.,* levels of

personality organization and personality syndromes; 2) M Axis, *i.e.,* profile of mental functioning; 3) S Axis, *i.e.,* symptom patterns: subjective experience (Lingiardi & McWilliams, 2017). The PDM-2 adopts a distinct approach to diagnosis compared to the main international diagnostic systems (e.g., DSM-5-TR, American Psychiatric Association [APA], 2013, 2022; ICD-11, World Health Organization [WHO], 2022a). Rather than aiming to replace these systems, the PDM-2 was designed to complement them, offering a way to capture greater depth and nuance within diagnostic formulations (Lingiardi & McWilliams, 2017). In this regard, existing evidence has demonstrated the system's perceived utility among clinicians for their professional activity (Bornstein & Gordon, 2012; Huprich et al., 2015) and its high inter-rater reliability, particularly regarding the M Axis (Biberdzic & Grenyer, 2023; Etzi, 2014; Lingiardi et al., 2018; Porcerelli et al., 2011).

The M Axis capacities and the Cluster B Personality Disorders

The PDM-2 Profile of Mental Functioning (M Axis) allows the development of a detailed description of the personality organization of individuals by systematizing and operationalizing several distinct dimensions of mental functioning, thus assisting clinicians in capturing the complexity and individuality of their patients. More specifically, twelve categories of basic mental functions have been identified and can be schematically grouped into four domains: 1) *Cognitive and Affective Processes* (*i.e.*, capacity for regulation, attention and learning; capacity for affective range, communication and understanding; capacity for mentalization and reflective functioning; 2) *Identity and Relationships* (*i.e.*, capacity for differentiation and integration; capacity for relationships and intimacy; capacity for self-esteem regulation and quality of internal experience); 3) *Defense and Coping* (*i.e.*, capacity for impulse control and regulation; capacity for defensive functioning; capacity for adaptation, resiliency and strength; and 4) *Self-Awareness and Self-Direction* (*i.e.*, self-observing capacities [psychological mindedness]; capacity to construct and use internal standards and ideals; and capacity for meaning and purpose) (Lingiardi & McWilliams, 2017).

The M Axis enhances clinical utility by considering both adaptive and maladaptive functioning to support the planning of the most effective therapeutic interventions. It also helps anticipate challenges that may arise during treatment, delineate therapeutic goals, and evaluate treatment progress. Each of the four M Axis domains has demonstrated its relevance to the psychotherapy process and treatment outcomes. For instance, empirical studies have shown that affect-focused therapeutic techniques are important mechanisms of change, regardless of diagnosis (*e.g.,* Diener et al., 2007; Høglend & Hagtvet, 2019), as well as the development of greater insight or awareness, which has been recognized as an important goal of psychotherapy, particularly in psychodynamic approaches (Jennissen et al., 2018).

Empirical research has also highlighted the clinical applicability of the M Axis in managing psychopathology (*e.g.,* Mirabella et al., 2023), including personality disorders. Personality disorders, by their very nature, involve pervasive patterns of thought, emotion, and behaviour that deviate markedly from cultural expectations and cause significant distress or impairment (APA, 2013, 2022). The comprehensive evaluation of mental capacities offered by the M Axis may enable clinicians to design nuanced treatment plans tailored to these pervasive patterns. Indeed, McWilliams et al. (2018) highlighted that the M Axis facilitates a deeper understanding of personality pathology, enabling more nuanced and effective treatment strategies. Furthermore, among the personality disorders, those classified under the Cluster B present several challenges for clinicians due to the intrinsic nature of these conditions. When considering the M Axis capacities, patients with Cluster B personality disorders often exhibit intense emotional responses, identity diffusion, manipulative behaviours, impairment in mentalizing abilities, immature defense mechanisms, instability of self-esteem, and unstable relationships, which complicate the therapeutic process (Bora, 2021; Gagliardini et al., 2023; Oldham et al., 2007; Perry et al., 2013; Schmeck et al., 2013). Of note, the DSM-5-TR (APA, 2022) Section III conceptualization of personality disorders includes some of these capacities, such as the constructs of "identity" and "self-direction" within the self-domain, whereas interpersonal functioning is based on the concepts of "empathy" and "intimacy". Within this framework, The PDM-2's M Axis may help mental health professionals by providing a structured and integrative approach to understanding the underlying psychological mechanisms (Lingiardi, 2018; Patriarca et al., 2023).

The present research

Based on the framework described above, the PDM-2 (Lingiardi & McWilliams, 2017) can be effectively used by clinicians in integration with the DSM-5-TR (APA, 2022), offering an international reference diagnostic system that can facilitate communication between mental health professionals, while benefiting from further enrichment and integration of a psychodynamically oriented perspective. Although theoretical and empirical support exists for the clinical utility of the M Axis (*e.g.,* McWilliams et al., 2018; Mirabella et al., 2023), empirical studies exploring its psychometric properties remain limited. For example, there is research on inter-rater reliability, test-retest reliability, and external validity (Biberdzic & Grenyer, 2023; Gordon & Bornstein, 2018), but, to the best of our knowledge, no evaluations of the factor structure have been conducted so far. Therefore, the main aim of this study was to provide further psychometric evidence of the M Axis, while also exploring the centrality and dynamics among the 12 capacities for Cluster B personality disorders, focusing on the perspective of a sample of psychotherapists. The specific goals were:

1. To confirm the factor structure of the 12 M Axis capacities through a Factor Analysis Approach, based on the theoretical foundation of the instrument and utilizing data collected from psychotherapists evaluating Cluster B personality disorders;
2. To explore the dynamics among the 12 M Axis capacities within Cluster B personality disorders using a Network Analysis Approach, examining their interconnections and identifying their centrality within the network.

Method

Participants, procedures and ethics

The research involved a sample of 285 psychotherapists (46% psychodynamic, 16%

psychoanalytic, 38% integrated), who reported using the PDM-2 (Lingiardi & McWilliams, 2017) in their professional practice. All participants had a professional background in psychology and had completed training qualifying them to practice as licensed psychotherapists. The sample predominantly comprised females (79%) with a mean age of 43 years (*SD* = 11.709). Regarding their marital status, most of them were married (42%), single (26%), or cohabiting (25%). Participants were recruited online using a snowball sampling technique, started through the researchers' professional contacts. The initial participants were invited to complete the survey and encouraged to share the invitation with colleagues who met the inclusion criteria. These criteria required clinicians to be licensed to practice psychotherapy, possess a thorough knowledge of the PDM-2 (Lingiardi & McWilliams, 2017), actively use it in their clinical practice (both generally and with specific reference to the M Axis), and have adequate expertise in personality and personality disorders. Expertise was defined as clinical experience with patients presenting such conditions and a strong theoretical knowledge of personality disorders as described in the major international diagnostic systems. Participants completed the survey on the Google Forms platform after providing electronic informed consent. To prevent missing data, all survey items had a forced response. The software was used to prevent a single individual from responding to the survey multiple times. All the procedures of this research were approved by one author's institutional Ethical Committee.

Measure

M Axis of the Psychodynamic Diagnostic Manual - 2nd edition (PDM-2). The PDM-2 M Axis assesses 12 crucial areas: capacity for regulation, attention and learning; capacity for affective range, communication and understanding; capacity for mentalization and reflective functioning; capacity for differentiation and integration; capacity for relationships and intimacy; capacity for self-esteem regulation and quality of internal experience; capacity for impulse control and regulation; capacity for defensive functioning; capacity for adaptation, resiliency and strength; self-observing capacities (psychological mindedness); capacity to construct and use internal standards and ideals; and capacity for meaning and purpose. This Axis provides a rating procedure in which clinicians indicate, on a 5-point Likert scale, the level at which each mental function is evident in a given patient. Descriptors of key characteristics of levels of functioning (5 = healthy/optimal functioning, 3 = mild/moderate impairments, and 1 = major/severe impairments) are provided for each mental function to facilitate the assessment process. Descriptions of the 12 domains of mental functioning are written in an empirically grounded, assessment-relevant, and clinician-friendly way. In the present study, therapists were asked to assess the 12 abilities for each cluster B disorder (Antisocial, Borderline, Histrionic, and Narcissistic) using the Likert scale. Higher scores indicated greater levels of functioning. The total score for each ability was obtained by averaging the ratings across all disorders. In the present sample, good indications of internal consistency were shown (for more details on the factor structure and the reliability of the M Axis of the PDM-2, see the Results section).

Data Analysis

The collected data were analysed using the JASP software (v. 0.18.3.0; JASP Team, Amsterdam, The Netherlands) for Windows. First, an item analysis was conducted to evaluate the distributional properties of the data. According to Kim (2013), values of skewness and kurtosis less than 1.96 are indicative of a normal distribution. Then, the suitability of the data for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test of sphericity. The KMO statistic measures sampling adequacy, with values greater than 0.7 considered acceptable, while Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix, with significant values considered acceptable (Mulaik, 2009). The four-factor model proposed by Lingiardi and McWilliams (2017) was tested by conducting a Confirmatory Factor Analysis (CFA). Model fit was evaluated through the following indices: Chi-Square/Degrees of Freedom ($\chi 2$/DF), with values lower than 5 indicating a good fit between the model and the data (Marsh & Hocevar, 1985); the Goodness of Fit Index (GFI), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI), with values above 0.90 that are generally considered to reflect a good fit (Kline, 2015; Hu & Bentler, 1999); and the standardized root mean square residual (SRMR), with values below 0.05 indicating a good fit and those in the range of 0.05–0.08 considered acceptable (Hooper et al., 2008). The four-factor model was then compared with a unifactorial solution using the $\Delta\chi 2$ (Jackson et al., 2009; Kock et al., 2021), where a significant value would indicate that the four-factor model fits the data better, justifying the use of a more complex structure (Byrne, 2020). The internal consistency of the scales was analysed using Cronbach's alpha (Cronbach, 1951) and McDonald's omega (McDonald, 2013). Pearson's correlations were implemented to evaluate the associations between the factors. Furthermore, convergent and divergent validity were investigated through the Average Variance Extracted (AVE) and the Heterotrait-Monotrait ratio of correlations (HTMT). AVE values greater than 0.50 indicate adequate convergent validity (Hair et al., 2018), while HTMT values below 0.90 (preferably below 0.85) indicate adequate divergent validity (Henseler et al., 2015). Furthermore, a network analysis was carried out to further evaluate the structure of the M axis of the PDM-2. The network was defined using the EBICglasso model, *i.e.,* a graphical Least Absolute Shrinkage and Selection Operator (LASSO; Friedman et al., 2008) regularization based on the Extended Bayesian Information Criterion (EBIC; Chen & Chen, 2008). Within the network, nodes represent the observed variables (in this case, the M-axis capacities), while edges denote the relationships between these nodes (Burger et al., 2023). The edge weights (*i.e.,* the magnitude of association between the nodes) were explored to investigate the global network structure, using the following criteria: values ≤ 0.2 were considered small; $0.2 >$ values ≤ 0.5 were considered moderate; and values > 0.5 were considered large (Ferguson, 2016). Three centrality indices were examined to test the importance of each M-axis capacity within the network: 1) *Betweenness,* measuring the extent to which a node lies on the shortest path between other nodes; 2) *Closeness,* measuring how close a node is to all other nodes in the network; 3) *Strength,* measuring the sum of the weights of the edges connected to a node (Epskamp et al., 2018; Opsahl et al., 2010). The stability of the network was assessed through case-dropping bootstrapping performed 1,000

times with 95% confidence intervals, with coefficients exceeding 0.50 considered acceptable (Epskamp et al., 2017, 2018).

Results

Factor structure and internal consistency

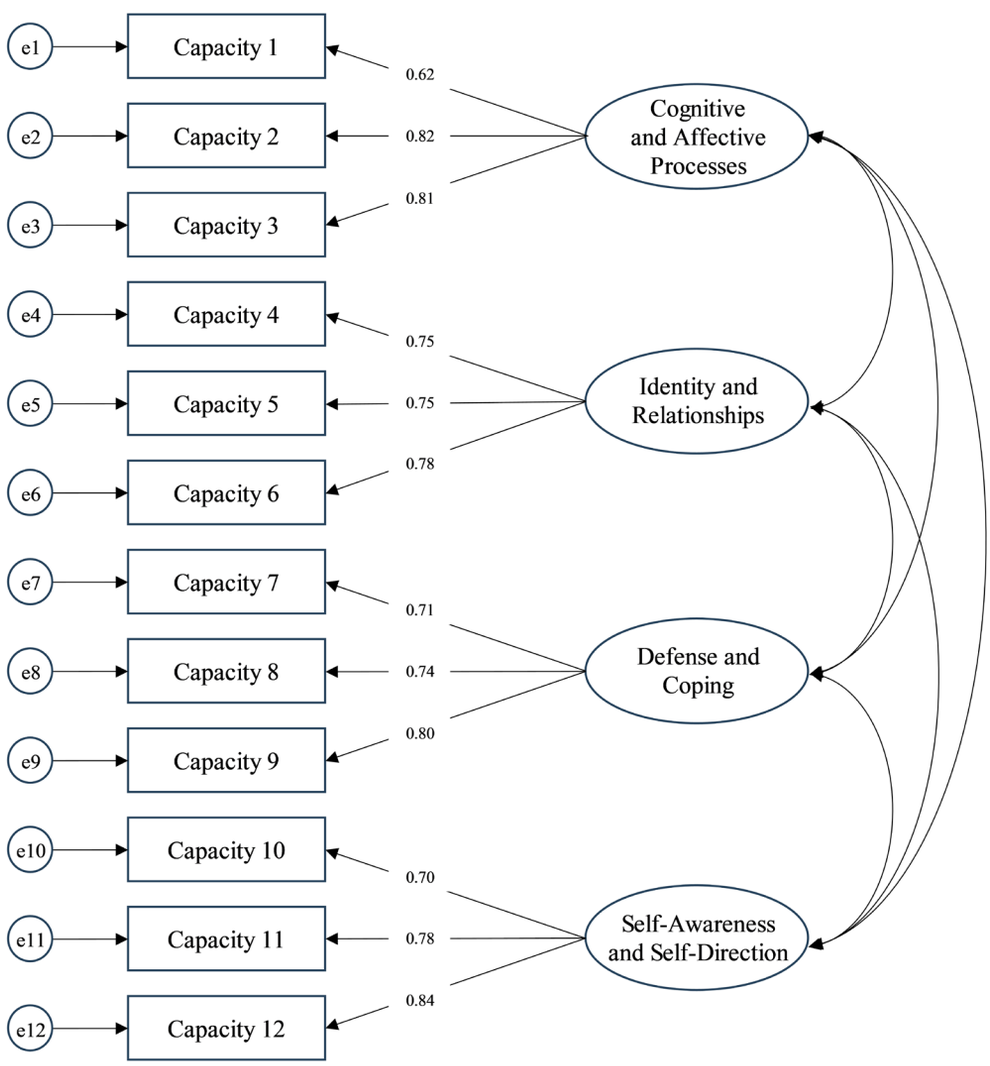
The item analysis suggested a normal distribution, with the highest skewness absolute value of .578 (Capacity 6, *i.e.,* capacity for self-esteem regulation and quality of internal experience), and the highest kurtosis absolute value of 1.54 (Capacity 6, *i.e.,* capacity for self-esteem regulation and quality of internal experience). The KMO value of 0.914 and the statistical significance of Bartlett's test of sphericity ($p < 0.001$) supported the suitability of the data for factor analysis. The CFA demonstrated the statistical adequacy of the four-factor model, indicating a good fit to the data: $\chi 2$/DF = 3,633, CFI = 0.929, TLI = 0.902, GFI = 0.992, and SRMR = 0.052 (see **figure 1**). Furthermore, the $\Delta\chi 2$ analysis supported the fit superiority of the 4-factor structure compared with the unifactorial model: $\Delta\chi 2 = 158.155$, $\Delta df = 6$, $p < 0.001$ (see **table 1**).

As shown in **table 2**, both the Cronbach alpha and McDonald's omega suggested good reliability for both the four factors and the total score ($\alpha = 0.913$; $\omega = 0.925$). Pearson's correlations, AVE, and HTMT indicated good convergent and divergent validity (**table 2**)

Network analysis

The network of the *M Axis* capacities consisted of 12 nodes, and 45/66 edges were non-zero (see **figure 2**). Within the network, moderate associations between nodes belonging to the same factor were highlighted:

Figure 1. *The factorial structure of the M-axis of the PDM-2*



Note: Capacity 1 = capacity for regulation, attention and learning; Capacity 2 = capacity for affective range, communication and understanding; Capacity 3 = capacity for mentalization and reflective functioning; Capacity 4 = capacity for differentiation and integration; Capacity 5 = capacity for relationships and intimacy; Capacity 6 = capacity for self-esteem regulation and quality of internal experience; Capacity 7 = capacity for impulse control and regulation; Capacity 8 = capacity for defensive functioning; Capacity 9 = capacity for adaptation, resiliency and strength; Capacity 10 = self-observing capacities (psychological mindedness); Capacity 11 = capacity to construct and use internal standards and ideals; Capacity 12 = capacity for meaning and purpose.

Table 1. *Fit statistics of the M Axis for the 4-factor and unifactorial models and the chi-square variation test*

	χ2	*df*	CFI	TLI	GFI	SRMR	*Δχ2*	*Δdf*	*p*
Four-factor Model	174.349	48	0.929	0.902	0.992	0.052			
Unifactorial Model	332.504	54	0.843	0.808	0.982	0.065			
							158.155	6	< 0.001

Table 2. *Descriptive Statistics, Reliability Analysis, Correlation Coefficients (Below the Diagonal), HTMT Values (Above the Diagonal), and AVE scores*

	Min	Max	*M*	*SD*	*α*	*ω*	F1	F2	F3	F4	AVE
Cognitive and affective processes	3.50	11.75	6.97	1.60	0.789	0.784	-	0.718	0.849	0.784	0.554
Identity and relationships	3.25	11.50	6.54	1.66	0.806	0.807	0.592**	-	0.828	0.645	0.582
Defense and coping	3.00	11.75	7.20	1.64	0.788	0.794	0.668**	0.661**	-	0.826	0.562
Self-awareness and self-direction	3.00	11.50	7.33	1.68	0.810	0.825	0.630**	0.525**	0.666**	-	0.601
Total Score	12.50	42.50	27.52	5.67	0.913	0.925	0.850**	0.821**	0.884**	0.835**	-

Note. **. Correlation is significant at the 0.01 level (2-tailed). F1 = Cognitive and affective processes; F2 = Identity and relationships; F3 = Defense and coping; F4 = Self-awareness and self-direction; AVE = Average Variance Extracted.

capacities 2-3 (r = 0.300; capacity for affective range, communication and understanding – capacity for mentalization and reflective functioning) for Cognitive and affective processes; capacities 4-5 (r = 0.235; capacity for differentiation and integration – capacity for relationships and intimacy) and capacities 5-6 (r = 0.273; capacity for relationships and intimacy – capacity for self-esteem regulation and quality of internal experience) for Identity and relationships; capacities 8-9 (r = 0.246; capacity for defensive functioning – capacity for adaptation, resiliency and strength) for Defense and coping; capacities 10-11 (r = 0.424; self-observing capacities/psychological mindedness – capacity to construct and use internal standards and ideals) for Self-awareness and self-direction. The highest inter-factor edges were between Capacity 2 and Capacity 6 (r = 0.206; capacity for affective range, communication and understanding – capacity for self-esteem regulation and quality of internal experience), and between Capacity 3 and Capacity 10 (r = 0.336; capacity for mentalization and reflective functioning – self-observing capacities/psychological mindedness).

The centrality measures are shown in **figure 3.** Capacity 12 (*i.e.,* capacity for meaning and purpose) has the highest betweenness, while Capacity 3 (*i.e.,* capacity for mentalization and reflective functioning) has the highest levels of closeness and strength. However, bootstrap analysis confirmed that strength has the most acceptable values, as they are higher than 0.50 (**figure 4**).

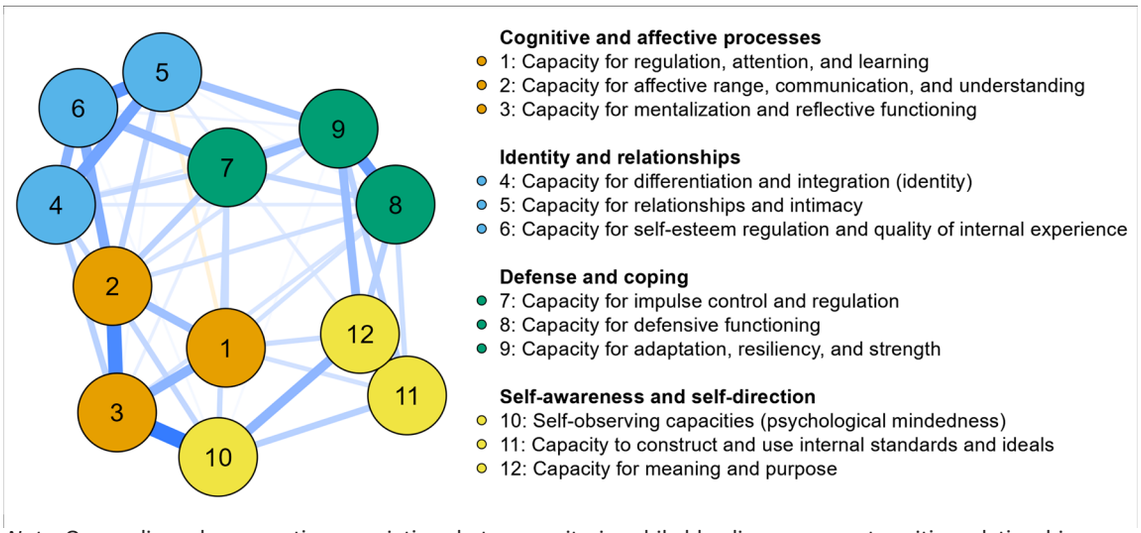
Discussion

The PDM-2 has proven to be a useful instrument to guide the therapeutic process (Lingiardi & McWilliams, 2017), integrating and supporting other international classification systems. Indeed, the primary utility of diagnostic systems in the mental health field is to inform treatment plans (Hilsenroth et al., 2018), and the person-centered perspective of the PDM-2 on conceptualizing and classifying mental functioning appears to be a powerful resource for enhancing case formulation and facilitating therapeutic interventions (Bornstein, 2018; Etzi, 2014; Muzi et al., 2021). The present research specifically focused on the PDM-2 M Axis, with the aim of exploring its psychometric properties and investigating the centrality and dynamics among the 12 capacities for Cluster B personality disorders based on the perspective of a sample of psychotherapists.

The M Axis Factor Structure

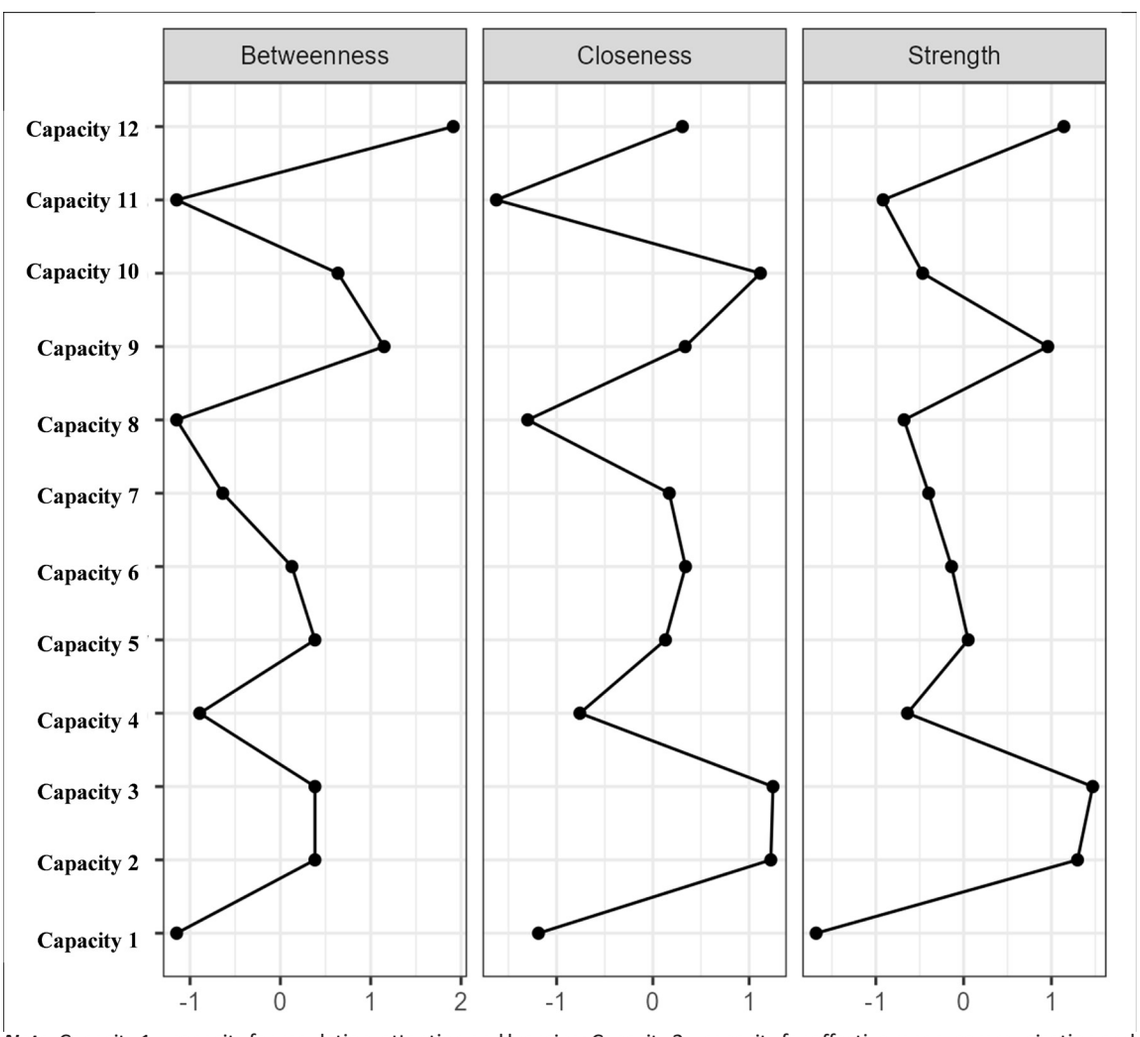
The Factor Analytic Approach supported the excellent psychometric properties of the M Axis, including strong evidence of validity and reliability. Specifically, the CFAs confirmed the goodness-of-fit of the four-factor model (see **figure 1**), in line with the theoretical conceptualization formulated by the authors of the instrument (Lingiardi & McWilliams, 2017). The first factor, namely Cognitive and Affective Processes, encompasses abilities directly related to the cognitive and emotional realms, which have been highlighted as key factors for individual functioning (*e.g.,* Kraiss et al., 2020) and treatment outcomes (*e.g.,* Luyten et al., 2024). The second factor, *i.e.,* Identity and Relationships, refers to the ability to differentiate oneself and establish intimacy– an array of attributes also known as relational patterns. This dimension is also useful for understanding the patient's mental functioning and organizing the therapeutic process (Hilsenroth et al., 2018). Evidence suggests that when a patient's relational patterns are adequately utilized and managed in therapy, both diagnostic and therapeutic processes are enhanced (Colli et al., 2014; Iwakabe et al., 2023; Lincoln et al., 2022). The third factor, Defense and Coping, describes the psychological processes employed to cope with stressors, ambivalence, or conflict, as well as the ability to regulate impulses, and the level of resilience. These elements provide insights into the patient's internal dynamics and experiences,

Figure 2. *The network of M-axis capacities*



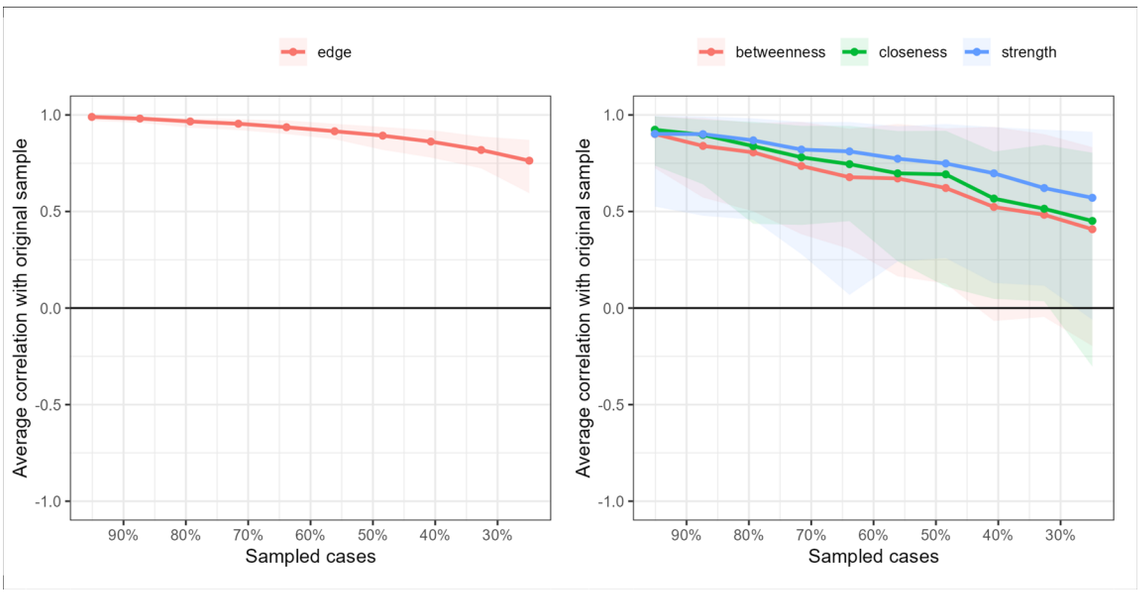
Note: Orange lines show negative associations between criteria, while blue lines represent positive relationships between them.

Figure 3. *Centrality Plot*



Note: Capacity 1 = capacity for regulation, attention and learning; Capacity 2 = capacity for affective range, communication and understanding; Capacity 3 = capacity for mentalization and reflective functioning; Capacity 4 = capacity for differentiation and integration; Capacity 5 = capacity for relationships and intimacy; Capacity 6 = capacity for self-esteem regulation and quality of internal experience; Capacity 7 = capacity for impulse control and regulation; Capacity 8 = capacity for defensive functioning; Capacity 9 = capacity for adaptation, resiliency and strength; Capacity 10 = self-observing capacities (psychological mindedness); Capacity 11 = capacity to construct and use internal standards and ideals; Capacity 12 = capacity for meaning and purpose.

Figure 4. *Accuracy of the edge-weight estimates and stability of centrality indices based on bootstrap*



both conscious and unconscious, thus providing valuable information for treatment (Friedberg & Malefakis, 2022). The final factor, Self-Awareness and Self-Direction, pertains to the ability to understand oneself and adhere to internal standards, ideals, and purposes. Within this framework, scientific literature has long been interested in the construct of meaning in life, defined as a sense of existential significance (King & Hicks, 2021), which can be included among the objectives of therapeutic intervention (Hill, 2017; Vos & Vitali, 2018). Such a detailed and multifaceted description, achieved through the 12 M Axis capacities (in integration with the other PDM-2 Axes), enables the PDM-2 not only to categorize patients within a general framework of mental illness but also to emphasize the uniqueness of each individual, by conceptualizing symptoms within a broader framework of personal particularities, deficits, capacities, and resources (Kernberg, 2018).

Moreover, both the total score and the 4 factors showed good internal consistency (Cronbach, 1951; McDonald, 2013), indicating a strong cohesion among the included dimensions. Indeed, Lingiardi and McWilliams (2017) stated that the 12 capacities span a wide range of psychological processes, which, given their connection, may exhibit overlapping elements. This observation was supported by significant and positive correlations among the factors and by the Average Variance Extracted (AVE) analysis scores. Parallelly, the questionnaire showed also good evidence of discriminant validity (Henseler et al., 2015), further confirming the reliability of the M Axis for assessing distinct dimensions of mental functioning.

The dynamics among the 12 M Axis capacities

The network analysis approach enables the conceptualization of the capacities as interconnected nodes, highlighting their mutual influence in shaping the network of an individual's personality organization, rather than viewing them as entirely separate elements (see Borsboom & Cramer, 2013 for a review). This method may provide insights into the dynamics between M Axis capacities concerning Cluster B of personality disorders, based on the perspective of a sample of psychotherapists.

Specifically, from a node-node perspective, moderate associations were observed between capacities belonging to the same factor (see **figure 2**). These data provide additional evidence, through an alternative methodological lens, supporting the dimensionality of the M Axis. Notably, focusing on the inter-factor connections, the strongest link was between node 3 (Capacity for mentalization and reflective functioning) and node 10 (Self-observing capacities [psychological mindedness]). This finding is consistent with previous declinations and definitions of these constructs, which although distinct present some overlapping elements. For instance, both capacities involve reflection on aspects of mental life, but the mentalization integrates self-other dimensions (Bateman & Fonagy, 2019a; Gori & Topino, 2023; Gori et al., 2021), whereas psychological mindedness appears more unbalanced towards the self (see Choi-Kain & Gunderson, 2008 for an in-depth discussion).

From a nodes-network perspective, the Capacity for mentalization and reflective functioning was identified as the node with the highest total sum of edge weights (strength) and, consequently, the most influential within the network. This is in line with previous evidence identifying significant impairments in mentalization among individuals with Cluster B personality disorders (Bora, 2021; Dolan & Fullam, 2004; Gagliardini et al., 2023; Lecours et al., 2013). Mentalizing has been conceptualized (Bateman & Fonagy, 2019a) and operationalized (Gori & Topino, 2023; Gori et al., 2021) in four polarities, each of which may exhibit weaknesses in the personality disorders of this cluster. The first one pertains to Automatic—Controlled (implicit-explicit) mentalizing. Scientific literature highlighted a loss of explicit mentalizing and a predominance of implicit processes during emotional arousal for patients with borderline personality disorder (Fonagy & Luyten, 2012). Evidence also showed altered explicit mentalizations that hide painful and disappointing elements of the self (Narcissistic; Choi-Kain et al., 2022), occur without any emotional component (Antisocial; Bateman et al., 2013), or present theatricality and excessive impressionism (Histrionic; Dorfman, 2000). Concerning the Self—Other mentalizing, individuals with Cluster B

disorders often exhibit a tendency to become experts in reading the minds of others, abusing this ability to manipulate others in order to satisfy their own needs (Bateman & Fonagy, 2008; Bateman et al., 2013). Other manifestations of dysfunction within this facet of mentalizing are also seen in the defensive approach characteristic of borderline personality disorder (Fonagy & Luyten, 2012), which can include projecting one's own experiences onto others, or confusing the experiences of others with one's own (contagion). Consistent with this, dysfunction on the dimensions of Internal—External mentalizing may manifest as psychic equivalence, where individuals perceive their internal world as indistinguishable from the external reality (Fonagy et al., 2002). Alternatively, there may be a tendency to avoid self-affective states, so as not to develop a true understanding of one's inner world and resulting in an externalized focus during the mentalising process (Bateman & Fonagy, 2008). Finally, deficits related to Cognitive-Affective mentalizing can be observed through a split between these two polarities. Individuals with borderline or histrionic characteristics may be overwhelmed by the emotional dimension, making it difficult to integrate these emotions with more reflective aspects (Blatt, 2008). Conversely, patients with antisocial or narcissistic disorders may exhibit a predominance of cognitive understanding of mental states, without connecting with the affective core of these experiences (Blair, 2008; Blatt, 2008). Therefore, the results of the present research further enrich the existing evidence by empirically confirming clinicians' perception of mentalizing as a central capacity within the M Axis network, highlighting its role in influencing the entire network in Cluster B personality disorders.

Although the Capacity for mentalization and reflective functioning emerged as the most influential, three additional capacities also exhibited significant centrality (see **figure 3**): the Capacity for affective range, communication and understanding; Capacity for adaption, resiliency, and strength; Capacity for meaning and purpose.

Regarding the first one, this finding aligns with previous research emphasizing the prevalence of affective dysregulation in individuals with Cluster B personality disorders (*e.g.*, Newhill et al., 2004). Specifically, this capacity reflects the ability to experience a wide range of emotional states at varying levels of intensity. In this context, it is worth noting that patients within this cluster may present emotional numbing (*e.g.*, in narcissistic personalities; Dimaggio, 2012; Kerig & Stellwagen, 2010) or constricted emotional responses (*e.g.*, in antisocial personalities; Frick & White, 2008; Huffman & Oshri, 2022). Another critical component of this capacity is the effective and adaptive communication of emotional experiences, which, for example, is often lacking in individuals with histrionic personality disorder. These individuals may exhibit theatricality and self-dramatization, to the extent that their emotions may seem inauthentic or superficial to others (APA, 2022; Gabbard, 2014). The final aspect of this capacity involves the ability to recognize one's own and others' emotions in adaptive, empathetic, and relationship-oriented ways. In this regard, individuals with borderline personality disorder often exhibit maladaptive tendencies to hyperfocus on others' emotional experiences (Cyrkot et al., 2021). Similarly, those with antisocial personality disorder may exploit their understanding of others' emotions to manipulate and control them for personal gain (Bateman et al., 2013).

Concerning the Capacity for adaptation, resiliency, and strength, scientific literature has consistently highlighted its significance in promoting overall mental health (*e.g.,* Davydov et al., 2010; Duan, 2016). The severity of impairments typically associated with Cluster B personality disorders might explain the significantly greater focus on psychopathological symptoms over adaptive functioning in the literature (*e.g.,* Stanga et al., 2019). However, as the World Health Organization has described since 1948, mental health is more than simply the absence of mental disorders or pathological symptoms (World Health Organization, 2022b). Rather, mental health exists on a continuum and is also influenced by protective factors, including psychological resources and well-being (Vaillant, 2012). On the other hand, evidence points to low levels of adaptation in individuals with antisocial or histrionic personality disorders (Alink & Egeland, 2013; Rubino et al., 2003) and low resilience in those with the borderline and narcissistic ones (Fonagy et al., 2017; Kealy et al., 2017). Furthermore, aligning with the findings regarding its centrality, this capacity encompasses elements identified as transversal, which are linked to emotional regulation (Polizzi & Lynn, 2021), interpersonal relationships (Bradley & Hojjat, 2017), and defensive functioning (Békés et al., 2024). These aspects are often impaired in individuals with Cluster B personality disorders (Barnow et al., 2012; Gewirtz-Meydan & Finzi-Dottan, 2018; Perry et al., 2013).

Finally, the Capacity for meaning and purpose describes the extent to which individuals are able to construct a personal narrative that provides a sense of coherence, direction, and purpose. In this regard, the scientific literature highlights dysfunctional patterns across the four Cluster B personality disorders (*e.g.,* Marco et al., 2017; Sedikides et al., 2013). For example, individuals with antisocial personality disorder often prioritize short-term gratification and rewards over ethical behaviours and culturally or legally established norms (Lynam & Vachon, 2012). On the other hand, individuals with borderline personality disorder frequently experience feelings of emptiness and struggle to define who they are or what they want in life. The absence of a coherent narrative hinders their ability to find meaning or continuity across past, present, and future experiences (Miller et al., 2020). Similarly, individuals with histrionic and narcissistic personality disorders often pursue externally driven goals. Histrionic individuals aim to gain attention for temporary gratification, while narcissistic individuals seek external approval to maintain their self-esteem (Lewis & Mastico, 2017; Ronningstam, 2016).

Practical implications

The M Axis enables the conceptualization of personality organization by exploring twelve capacities, thereby promoting a broad and detailed understanding of individuals' mental functioning (Lingiardi & McWilliams, 2017). The exploration of the psychometric properties of this instrument supports its use both in research and in clinical practice, to facilitate a more comprehensive and integrated diagnostic evaluation and guide informed treatments (Kernberg, 2018). Furthermore, the exploration of the dynamics between the different capacities in Cluster B personality disorders has primarily highlighted the centrality of the capacity for mentalization and reflective functioning. This data is in line with the countless evidence supporting the effectiveness of

treatments focused on mentalization for patients with these personality disorders (*e.g.,* Bateman & Fonagy, 2019b; Bateman et al., 2023; Drozek & Unruh, 2020). The results underscore the importance of rebalancing the various polarities of mentalization (Bateman & Fonagy, 2019a; Gori & Topino, 2023; Gori et al., 2021), to improve the personality organization of patients with mental Cluster B personality disorders. Consistently, the ability to mentalize and promote this process in others is a key element of therapist expertise, which has been shown to facilitate positive outcomes in clinical practice (Castonguay & Hill, 2017; Gori et al., 2022, 2023; Hill et al., 2017). This element was therefore confirmed by the results of the present study, which support the utility of focusing therapeutic efforts on mentalization as a central node, given its potential cascading influence on other capacities within the network (see Borsboom & Cramer, 2013 for an in-depth discussion). Although to a lesser extent, other capacities also showed a relevant centrality within the network. This opens up the possibility of focusing the clinical work also on the Capacity for affective range, communication, and understanding, consistently with evidence from therapeutic approaches oriented toward affect regulation therapy (*e.g.,* Mucci, 2018), or on the Capacity for adaptation, resiliency, and strength, which have been identified as key factors to enhance both positive treatment outcomes (*e.g.,* Gianotti & Danielian, 2017) and higher quality of life (*e.g.,* Guillén et al., 2021). Indeed, some authors have highlighted that the dysfunctions in mentalization, emotional regulation, and resilience often have their roots in primary relational contexts (Bateman et al., 2018), supporting the potential of the therapeutic relationship in addressing these foundational vulnerabilities. Finally, the Capacity for meaning and purpose also emerged as a central element within the network. This result highlights its potential as a crucial target in clinical interventions, particularly for patients with Cluster B personality disorders, who often struggle with fragmented self-concepts and a lack of meaningful goals or continuity in their life experiences (Miller et al., 2020). Therapeutic approaches aimed at enhancing this capacity may focus on fostering insight orientation, encouraging patients to identify and integrate their life experiences into a cohesive narrative (Gori et al., 2015). Therapists can help this exploration by encouraging the patient to connect with their values, set meaningful goals, and identify sources of fulfilment in their lives (da Ponte et al., 2018; Frankl, 1985).

Limitations and suggestions for future research

This study has several limitations that should be addressed. First, the psychotherapists involved in this research were recruited using a snowball sampling technique, which may introduce selection bias and limit the generalizability of the findings. Future research should consider employing random sampling methods to ensure a more representative sample and enhance the external validity of the results. Moreover, the M Axis relies on clinician-reported information based on their aggregated expertise and professional experience. While this approach may contribute to the measure validation by highlighting its clinical applicability and perceived relevance across a variety of cases, it is also subject to potential biases inherent in clinician-reported data. Previous research has supported the inter-rater reliability of this instrument (Biberdzic & Grenyer, 2023), but future studies could confirm the results by involving M Axis ratings to individual patients and should aim to integrate multiple sources of information, such as patient-reported outcomes or behavioural observations, to obtain more detailed and accurate data. Furthermore, this study specifically focused on Cluster B personality disorders, and the findings regarding the M Axis factor structure should be generalized to other personality clusters or psychological conditions with caution. Future research should replicate these findings while expanding the focus to include other diagnoses, thereby assessing the robustness and applicability of the M Axis across a broader range of psychological conditions. Finally, network analysis often suggests reciprocal relationships between variables. However, it is important to exercise caution when interpreting these results, as this study relies on cross-sectional data, which cannot establish causality. Future research should employ longitudinal designs to better examine the directionality and causality of the relationships between the variables identified in this study.

Conclusions

To the best of the authors' knowledge, this is the first research that empirically confirms the factor structure of the M Axis of the PDM-2, and that also uses a network analysis approach to explore the dynamics among the 12 capacities for Cluster B personality disorders from the perspective of psychotherapists. The findings support the validity of this instrument and, consequently, its practical utility in informing clinical treatment. Furthermore, the centrality of four capacities emerged, among which the capacity for mentalization and reflective functioning showed the highest levels of strength for Cluster B personality disorders, enriching and aligning with previous evidence in this field (*e.g.,* Bateman & Fonagy, 2019b). In conclusion, the M Axis proves to be a psychometrically sound, theoretically grounded, and clinically useful tool, offering significant contributions to both research and clinical practice. Its application can enhance the diagnostic and treatment processes, emphasizing the nuanced understanding of personality organization and facilitating targeted, evidence-based interventions.

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