



On the Associations Between Latent Personality Factors and Clinical Symptomatology Measured by the Millon Clinical Multiaxial Inventory

Abbamonte, John Michael

<https://scholarship.miami.edu/esploro/outputs/doctoral/On-the-Associations-Between-Latent-Personality/991031710107402976/filesAndLinks?index=0>

Abbamonte, J. M. (2022). On the Associations Between Latent Personality Factors and Clinical Symptomatology Measured by the Millon Clinical Multiaxial Inventory [University of Miami]. <https://scholarship.miami.edu/esploro/outputs/doctoral/On-the-Associations-Between-Latent-Personality/991031710107402976>

UNIVERSITY OF MIAMI

ON THE ASSOCIATIONS BETWEEN LATENT PERSONALITY FACTORS AND
CLINICAL SYMPTOMATOLOGY MEASURED BY THE MILLON CLINICAL
MULTIAXIAL INVENTORY

By

John Michael Abbamonte

A DISSERTATION

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of Doctor of Philosophy

Coral Gables, Florida

August 2022

UNIVERSITY OF MIAMI

A dissertation submitted in partial fulfillment of
the requirements for the degree of
Doctor of Philosophy

ON THE ASSOCIATIONS BETWEEN LATENT PERSONALITY FACTORS AND
CLINICAL SYMPTOMATOLOGY MEASURED BY THE MILLON CLINICAL
MULTIAXIAL INVENTORY

John Michael Abbamonte

Approved:

Robert McMahon, Ph.D.
Professor of Educational and
Psychological Studies

Soyeon Ahn, Ph.D.
Professor of Educational and
Psychological Studies

Lydia Buki, Ph.D.
Associate Professor of Educational
and Psychological Studies

Jessy Dévieux, Ph.D.
Professor of Health Promotion and
Disease Prevention
Florida International University

Kimberly Ho Misiaszek, Ph.D.
Assistant Professor of Professional
Practice

Guillermo Prado, Ph.D.
Dean of the Graduate School

ABBAMONTE, JOHN MICHAEL
On the Associations Between Latent Personality
Factors and Clinical Symptomatology Measured
by the Millon Clinical Multiaxial Inventory

(Ph.D., Counseling Psychology)
(August 2022)

Abstract of a dissertation at the University of Miami.

Dissertation supervised by Professor Robert McMahon
No. of pages in text. (138)

As research into the diagnosis and nature of mental illness evolves, there has become an increased desire to create alternative models of psychopathology which address shortcomings with the current system based on the Diagnostic and Statistical Manual of Mental Disorders. Despite interest and advances in this area, one of the major contributors to the theory of personality psychopathology, Dr. Theodore Millon, and his broad clinical instrument, the Millon Clinical Multiaxial Inventory (MCMI), have largely been ignored in the pursuit to recast current psychiatric nosology. This study combined diverse samples to include 676 individuals' MCMI-III records and attempted to fit a general personality factor structure based on past research to the data. After these latent factors were derived, they were used to examine theoretically anticipated linkages to clinical symptom syndrome expression. It was hypothesized that four broad factors would emerge from the personality scales of the instrument capturing broad neuroticism, antisociality/disagreeableness, introversion versus extroversion, and conscientiousness/self-restraint. Furthermore, it was anticipated that the neuroticism and introversion versus extraversion factors would be significantly related to depressive, anxious, somatoform, and psychotic symptoms, the antisociality/disagreeableness factor would be associated with mixed substance dependence symptoms, and the conscientiousness/self-restraint factor would be associated with anxious symptoms.

Structural equation models suggested all hypotheses were supported except for the linkages between the introversion versus extraversion factor and anxious symptoms, as well as the linkage between the conscientiousness/self-restraint factor and anxious symptoms. Study limitations and a discussion of future research were also addressed.

ACKNOWLEDGMENTS

First, I would like to express my heartfelt thanks towards my dissertation committee. You have all been instrumental in supporting me on my journey, not only on the dissertation, but throughout my time at the University of Miami. You have all provided support, encouragement, compassion, and advice during my studies, and I know if not for you I would not have grown as much as I have during these past years. Thank you to Bob McMahon for your time, patience, and guidance throughout the years. You have taught me what it means to think critically, and to leave no stone unturned in the pursuit of knowledge. I will always fondly remember our time together, and our late night trips to Taco Bell after lab meetings. To Soyeon Ahn, you have always challenged me to hone my analytical and statistical abilities and encouraged me to dive headfirst into research at the medical school. You were also so gracious in taking me on as a graduate student assistant to gain experience in statistical consultation and methodological research. To Lydia Buki, as director of training, you stuck with me through the ups and downs, and were instrumental in my professional growth and inspiring me to pursue a wide range of professional experiences. You welcomed me into the program on my first days, and it is an honor to finish the program with you there as well. Thank you for agreeing to serve on my committee on such short notice. To Kimberly Ho Misiaszek, thank you for agreeing to be on my committee, and serving as a role model as an advanced doctoral student when I first started. It is always nice to know that all the challenges I faced along the way, there was someone ahead of me who proved it was possible. And finally, to Jessy Dévieux, I am so grateful to you as a collaborator

throughout the years. Thank you for allowing me to work with you and use your data which has served as the basis of my professional growth through publications, research opportunities, and making this dissertation possible.

I would also like to acknowledge and thank the members of my doctoral and internship cohort, you were always there to celebrate and commiserate, and your friendship is something I will always cherish. To my clinical supervisors Annie, Ben, Carlos, Rob, Warren, and Abby, thank you for sharing your expertise and time along the way. Throughout my experience doing clinical work, your guidance cannot be understated in how much it not only helped me grow as a clinician, but as a person as well. Your support and knowledge also taught me so much about what it means to be a therapist, and how to work alongside patients to never lose sight of the person in attempting to treat the pathology. These lessons I have learned from you all are contained within this document, and I am proud to have worked under your supervision.

Finally, to my family and friends, your love and support have made all this possible. This dissertation is as much a product of you as it is of me. Your words of encouragement to pursue my dreams have gotten me to where I am today, and no doubt where I will be in the future. To my dad, thank you for bringing me snacks during late night writing sessions and always taking pride in my accomplishments no matter how small I thought they were. To my mom, thank you for your support, and always keeping me in your mind and prayers when I needed them. Your unconditional love and support mean the most to me, and always provide perspective on what really matters most in life.

Table of Contents

List of Tables.....	viii
List of Figures.....	ix
Chapter 1: Introduction.....	1
Chapter 2: Literature Review.....	8
Millon's Contribution to the Contemporary Structure of Psychopathology.....	8
Comparing Emerging Alternative Models of Psychopathology	
With Millon's Model.....	16
MCMI Factor Structure.....	32
Proposed Factor Structure.....	43
Associations Between Clinical Syndromes and Dimensions of Personality.....	45
Summary of Review.....	53
Research Questions.....	55
Hypotheses.....	55
Chapter 3: Method.....	58
Mixed-Gender Sample.....	59
Women-Only Sample.....	60
Measures.....	61
Preliminary Analyses Steps.....	62
Main Analyses Steps.....	64
Confirmatory Factor Analysis.....	64

Personality Factor Associations With Clinical Syndrome Symptomatology.....	67
Chapter 4: Results.....	70
Preliminary Analyses.....	70
MCMI-III Scale Properties.....	72
Factor Analysis.....	77
Model and Parameter Estimates.....	82
Invariance Testing.....	88
Structural Equation Models.....	90
Personality Factors and Depressive Symptoms.....	90
Personality Factors and Anxiety Symptoms.....	91
Personality Factors and Somatoform Symptoms.....	92
Personality Factors and Substance Use Symptoms.....	93
Personality Factors and Delusional Symptoms.....	93
Exploratory Models.....	94
Chapter 5: Discussion.....	97
Study Overview.....	97
Discussion of Findings.....	99
MCMI Factor Structure.....	99
Personality Factor and Clinical Syndrome Relationships.....	103
Study Strengths.....	108
Study Limitations.....	110
Study Implications.....	114

Suggestions for Future Research.....	116
References.....	121

List of Tables

1. Expressions of Personality Spectra Across Trait Domains.....	18
2. Spectrum Disorder and Millon's Posited Clinical Syndrome Comorbidity.....	21
3. MCMI-III Personality Scale Properties.....	73
4. MCMI-III Scale Descriptives.....	76
5. Personality Scales Correlation Matrix.....	79
6. Clinical Syndrome Correlation Matrix.....	80
7. Exploratory Factor Analysis Solution.....	81
8. Measurement Model Factor Loadings.....	84

List of Figures

1. Confirmatory Model.....	65
2. Proposed General Structural Model.....	68
3. Standardized Factor Loadings and Disturbances.....	87

Chapter 1: Introduction

Comorbidity and symptom overlap are prominently represented in the Diagnostic and Statistical Manual of Mental Disorders' (DSM) diagnostic structure (Allsopp et al., 2019). This issue is not limited to the DSM, as epidemiological studies using the International Statistical Classification of Diseases and Related Health Problems (ICD) also reveal high levels of comorbidity among mental health conditions (Plana-Ripoll et al., 2019). Allsopp et al. (2019) pointed out that systemic comorbidity undermines a classification system that is based on discrete diagnoses. Comorbidity is not necessarily problematic, as it could stem from natural co-occurring phenomena that are important to understand (van Loo & Romeijn, 2015); however, it is a problem in a system that attempts to provide diagnostic parsimony by placing individuals into as few categories as possible. This problem was one of the reasons for the advancement of the Research Domain Criteria (RDoC) program, which is an attempt by researchers to build a heuristic framework to integrate various fields of psychopathology, at different phenomenological levels, into one cohesive system (Insel et al., 2010). These integrative frameworks are an attempt to answer the question posed by Sanislow et al. (2010) which asks, "How can one judge whether two "co-occurring disorders" are really separate "entities" or are simply alternative clinical manifestations of one core, underlying pathophysiological process? Thus, specifically, to what extent do co-occurring disorders share pathological mechanisms?" (p. 632). An approach that enables representation of comorbidity as a strength, rather than a weakness, might help answer this question. The approach involves taking clinically valued representations already present in the current DSM-based system

and untangling the complexity in how psychopathology manifests in individuals. This research undertaking has increasingly utilized sophisticated, multivariate statistical analytic techniques and a careful examination of how mental illness is defined and may differentially manifest in diverse clinical populations.

Using these techniques, some scholars have attempted to represent psychiatric comorbidity by proposing dimensional or hierarchical models of psychopathology (Caspi et al., 2014; Kotov et al., 2017). The overarching rationale is that correlations and overlap between symptom categories may reveal a simpler dimensional structure, and provide linkages to more fundamental biological processes (Perkins et al., 2020). A historically important advance in the classification of human psychological processes was led by Charles Spearman, who developed factor analytic procedures. As he worked on this task, he derived a dimensional structure of intelligence and identified a hierarchical structure with the unitary global “g” factor at its peak (Spearman, 1904). Spearman’s work foreshadowed contemporary advancements in multivariate statistical approaches capable of modeling relationships among a larger number of variables (Kline, 2011; Tabachnick & Fidell, 2013). Researchers have recently applied dimensional reduction strategies to the structure of psychopathology in attempts to derive a unitary “*p*” or psychiatric severity factor which may underlie many manifestations of psychiatric disturbance (Caspi et al., 2014; Cervin et al., 2021; Lahey et al., 2012; Martel et al., 2017; Sunderland et al., 2020). Based on this philosophy of atheoretical dimension reduction, researchers hope to leverage substantial correlations among current mental illnesses in order to reveal

fundamental and simpler dimensions that capture elements of common psychopathology. (Haefel et al., 2021; Kotov et al., 2017).

Caspi et al. (2014) provided evidence for a general psychopathology factor that coexists alongside internalizing, externalizing, and thought disorder dimensions. One of the limitations of the Caspi et al. (2014) investigation was the limited range of conditions examined in the effort to derive a general model. Other studies, including indices of personality pathology, also provide preliminary evidence for a *p* factor. These instruments include the Millon Clinical Multiaxial Inventory (MCMI; Hyland et al., 2018; Rushton & Irwing, 2009), the Personality Inventory for the DSM-5 (A. G. Wright et al., 2012), and the Dimensional Assessment of Personality Pathology-Basic Questionnaire and Personality Assessment Inventory (Rushton & Irwing, 2009). Others have found evidence for a genetic basis for a *p* factor (Allegrini et al., 2020; Brainstorm et al., 2018; Gandal et al., 2018; Selzam et al., 2018), as well as evidence for a *p* factor among children and adolescents (Cervin et al., 2021; Martel et al., 2017; Sunderland et al., 2020).

Investigators have used a myriad of measures to provide evidence for the presence of higher-order factors that might underlie psychiatric disorders (Caspi et al., 2014; Hyland et al., 2018; Markon, 2010; Rosenström et al., 2019; Rushton & Irwing, 2009; Sunderland et al., 2020; Urbán et al., 2014). Recently, a somewhat diverse group of research psychopathologists has developed a hypothetical unifying consensus model called the Hierarchical Taxonomy of Psychopathology or “HiTOP” model (Kotov et al., 2017). The goal of this consensus model, along with others, is to examine underlying latent factors from a variety of psychologically focused research and clinical instruments

and attempt to build a common model which captures salient aspects of psychopathology from underlying causes to symptom expression. One challenge as noted by the authors is that no specific measurement approach has been created to assess the elements of presumptive consensus models. Instead, a series of measures have been used in efforts to empirically substantiate HiTOP. This has presented challenges as various psychological scales and measures have been constructed based upon different undergirding models and methods. Little is known regarding how the structures of these diverse measures might map onto a dimensional model, such as HiTOP. Also, given the variety of factor structures that have emerged from exploratory techniques, it has been challenging to cohesively operationalize these constructs (Levin-Aspenson et al., 2021).

Among the challenges in attempting to identify a potentially unifying dimensional structure of psychopathology involves long-standing differences among theoreticians and researchers involving conceptualizations of psychopathology. One broad conceptual distinction was introduced in the third edition of the DSM (American Psychiatric Association, 1980; Blashfield et al., 2014). This edition of the DSM introduced a multiaxial framework in which a fundamental distinction was made between (a) conditions assumed to reflect pervasively influential and enduring patterns of thinking, behaving, and emotional functioning classified as personality disorders, and (b) clinical symptom syndromes characterized as transient and circumscribed in degree of influence. This effort was greatly influenced by Dr. Theodore Millon, one of the chief architects of personality disorders within the DSM and of the multiaxial system itself (Choca & Grossman, 2015; Pincus & Krueger, 2015). Indeed, there has been considerable interest

in viewing several clinical symptom syndromes as reflecting conditions that emerge when stressors impact vulnerable personalities and overwhelm coping resources (Millon, 2011). This suggests a hierarchical structure in which certain classes of disorders serve as vulnerability factors for the development of other disorders (Belsky & Pluess, 2009). In the DSM-III, the presence of vulnerabilities linked with Axis II personality disorders were assumed to dispose individuals to develop clinical symptom syndromes, particularly under conditions of stress. Pincus and Krueger (2015) noted, “Placing Pds [personality disorders] on DSM–III Axis II inculcated in the diagnostic manual Millon’s central theoretical tenet that clinical syndromes should be understood within the context of a person’s lifelong and pervasive style of functioning” (p. 539). For example, someone with a dependent personality disorder, which is characterized by a lack a self-competence and a tendency to greatly rely upon others, might be expected to experience anxiety and/or depression in the face of loss or disruption in important supportive relationships. Millon’s model provides a framework for positing a hierarchical structure of psychopathology. Personality disorders represent maladaptive patterns of thinking, behaving, and emotional responding, and create vulnerabilities to stressor-induced emergence of clinical symptom syndromes.

Millon’s theory (2011) presents clinically relevant personality spectra defined in terms of core beliefs about self and others, interpersonal behavioral features, patterns of coping and defense, and characteristic emotional functioning that are assumed to reflect fundamental elements of a broadly conceived model for classification of psychopathology. The main clinical measure he derived (i.e., the MCMI) and its use in

diverse clinical psychiatric settings presents opportunities to examine how broadly conceived personological constructs might be represented in dimensional space. Such dimensional representation would allow examination of possible alignment or reconciliation with currently influential and mainstream general consensus models (i.e., HiTOP) of psychopathology, which have drifted away from Millon's substantial theoretical contributions underlying the phenomena they examine (Choca & Grossman, 2015).

In the following review, an effort has been made to describe Millon's theoretical and measurement contributions to the classification of personality and psychopathology. An effort was also made in this review to connect Millon's theory with salient cultural and contextual factors and discuss the importance of counseling psychology's voice in advocating for holistic perspectives on individuals. Millon's emphasis on a highly differentiated model of personality disorder spectra encourages a quite different perspective than that currently emphasized in broadly conceived, dimensionally structured consensus models of psychopathology. Despite contrasting theoretical personality-centric versus largely atheoretical hierarchical dimensional organizing perspectives, attempts at integration and reconciliation appear necessary and useful. This review aimed to address issues central to the historically important and currently heated debate around "splitting-oriented" models of personality-clinical symptom syndrome relationships versus broad "clumping" dimensional representations which emphasize less theoretically encumbered representations of personality-symptoms relationships in dimensional space.

This review has been organized to set the stage for examining Millon's theoretically anchored MCMI-III using contemporary multivariate data analytic methods such as confirmatory factor analysis (CFA). The review examined the personality factors derived both from the framework of Millon's theoretical perspective and also in terms of fit with emerging factor-analytically-derived consensus models. In contrast with atheoretical consensus models, Millon's theoretical work provides a basis for hypothesizing specific personality-symptom syndrome linkages. Theoretically anticipated MCMI-III personality factor-symptom syndromes associations were tested. Patterns of association were compared and evaluated in relation to those captures in contemporary hierarchically organized consensus models.

Chapter 2: Literature Review

Millon's Contribution to the Contemporary Structure of Psychopathology

In attempting to understand the current nosology and underpinnings of psychopathology, especially related to personality, it is important to consider the contributions of Theodore Millon, whose work heavily influenced the current DSM codification of personality disorders (Pincus & Krueger, 2015). Millon has offered a model of personality and psychopathology designed to elucidate how human organisms respond to their environments, and how psychiatric symptoms are manifest through the lens of personality (Millon, 2011). Not only does his theory offer a rich landscape of traits and processes that attempt to capture psychiatric disorders from a personological perspective, but his clinical diagnostic measure (i.e., the MCMI) includes a host of personality scales designed to align closely with the personality disorders found in the DSM (Millon et al., 1997).

This correspondence between Millon's theory and instruments and the DSM's classification of personality disorders reflects, in part, Millon's role as a primary architect of the personality disorders as understood by the larger psychiatric and psychological communities (Choca & Grossman, 2015; Pincus & Krueger, 2015). Millon's influence on the structural representation of personality and psychopathology has persisted from the publication of the DSM-III in 1980 to the current edition of the DSM-5. Choca and Grossman (2015) noted, "...modern personality classification has a definite Millonian imprint" (p. 541). Pincus and Krueger (2015) stated the most significant innovation to occur in the DSM-III was the placement of personality disorders on a separate axis of

diagnosis. The DSM-III employed a multi-axial approach of breaking down a psychiatric diagnosis into five axial categories that included primary clinical symptom presentation, underlying personality and/or intellectual disorders, relevant organic disorders, psychosocial stressors, and finally levels of an individual functioning (Blashfield et al., 2014).

Within this multi-axial system, personality disorders could be defined as pervasive and enduring qualities of individuals that provide a framework for understanding phenomena ranging from stress-linked vulnerabilities to clinical symptom syndrome expression. This parallels another diagnostic manualized framework employed by psychodynamic practitioners, which has an explicit aim to create a taxonomy of people rather than of diseases or pathology (Lingiardi & McWilliams, 2015). The Psychodynamic Diagnostic Manual has drawn substantially from tools such as the Shedler-Westen Assessment Procedure (SWAP-200) based on clinical observations to provide an empirical foundation for a person-focused taxonomy (Lingiardi & McWilliams, 2015; Löffler-Stastka et al., 2006).

From a personologist's perspective, despite the benefits of placing personality dysfunction on its own diagnostic axis, in the most recent edition of the DSM, the multi-axial framework was eliminated. It has been argued that this change contributed to challenges involving navigating categorically versus dimensionally based approaches; these topics have been debated since the formation of psychiatry but are still unsettled (Craddock & Owen, 2010; Decker, 2007; Greene, 2007). One such question is whether disorders of personality exist only as the 10 unique and discrete conditions enumerated in

the DSM. Blashfield, Keeley, Flanagan, and Miles (2014) reflected on the current status of this debate within organized psychiatry as follows, “Although the leaders of the DSM-5 supported the move toward a more dimensional system, the internal controversies associated with the DSM-5 were intense around this dimensional versus categorical split” (p. 42). In both the third and fourth editions of the DSM, a categorical distinction was made between clinical syndromes and personality disorders. Clinical syndromes were considered to encompass the active, largely unwanted symptoms of focus someone is experiencing, and personality disorders were viewed as more deeply established stable, maladaptive patterns of cognition and behavior that are pervasive and part of a person’s character (American Psychiatric Association, 2013; Blashfield et al., 2014).

With personality disorders now being treated as distinct entities alongside other mental disorders, the DSM provides a definition of a personality disorder as, “...an enduring pattern of inner experience and behavior that deviates markedly from the expectations of the individual's culture, is pervasive and inflexible, has an onset in adolescence or early adulthood, is stable over time, and leads to distress or impairment” (American Psychiatric Association, 2013, p. 645). The DSM primarily focuses on describing personality disorders as 10 deviant patterns that contribute to “distress or impairment,” and are defined, delineated, and diagnosed by evaluating an arbitrary number of criteria (e.g., symptoms, descriptions) with little consistency across categories. For example, some personality disorders implicitly or explicitly provide criteria related to the individual’s self-image, whereas others, such as antisocial do not (American Psychiatric Association, 2013). This leaves much to be desired when contrasted with the

approach to treat personality as a broad, integrative system that is not limited just to pathology, but rather common dimensions of being and interacting with the world across the normal to pathological range. McAdams and Pals (2006) characterized personality as encompassing an individual's unique variation in evolutionary design, dispositional traits, environmental adaptations, self-narrative, and sociocultural context. Despite the richness of context that a personality-based conceptualization of psychopathology potentially offers, Blashfield et al. (2014) noted that many clinicians did not typically differentiate Axis I (clinical syndromes) and Axis II (personality/intellectual disability), and highlighted how this disconnect could have made using the DSM more difficult.

As noted earlier, DSM-5 has completely removed the multiaxial system of diagnosis, and some of its architects noted that this was due to how the multiaxial system was incompatible with other diagnostic systems. They also wished, "to place personality disorders and intellectual disability at the same level as other mental disorders" (Kupfer et al., 2013, p. 1691). This view is inconsistent with emphases in earlier models on personality as an undergirding framework for understanding people and their subjective experiences of distress, interpersonal functioning, cultural beliefs, and experiences. It also seems inconsistent with efforts (e.g., Psychodynamic Diagnostic Manual 2nd Edition) that aim to richly describe individuals and create a taxonomy of people rather than a taxonomy of diseases (Lingiardi & McWilliams, 2015).

Since the revised third edition of the DSM was published, the architects of the manual have created this taxonomy of diseases and grouped the 10 personality disorders into three separate clusters based on thematic similarities. Cluster A contains paranoid,

schizoid, and schizotypal personality disorders, Cluster B contains antisocial, borderline, histrionic, and narcissistic personality disorders, and Cluster C contains avoidant, dependent, and obsessive–compulsive personality disorders (Bastiaansen et al., 2011). The DSM describes individuals within Cluster A as appearing often “odd or eccentric,” Cluster B appearing “dramatic, emotional, or erratic,” and Cluster C appearing “anxious or fretful” (American Psychiatric Association, 2013, p. 646). It also contains broad categories of personality disorders such as a general personality disorder, other specified personality disorder, and unspecified personality disorder (American Psychiatric Association, 2013). The theoretical rationale for why paranoid cannot also be characterized as “dramatic, emotional, or erratic” or borderline cannot also be characterized as “anxious or fretful” is not discussed. Bastiaansen et al. (2011) reviewed a number of studies which examine the haphazard organization of personality disorders in the DSM (Blackburn et al., 2005; Chabrol et al., 2007; Durrett & Westen, 2005; Fossati et al., 2000, 2006; Leibling et al., 2008; Nestadt et al., 2006; Schotte et al., 1998; Yang et al., 2002). In their review they noted, “As one can expect from the previous considerations, basically all of these studies failed to reproduce the three-cluster structure suggested by the DSM, and emphasize the need for developing an alternative classification” (Bastiaansen et al., 2011, p. 379). Dyce et al. (1997) also noted in their investigation into the factor structure of the MCMI that the interrelationships found did not support the DSM clustering of disorders, and a new framework to capture these relationships would be required.

As put succinctly by Grossman (2015), “The extant DSM–5 categories, bearing the mandate of theoretical agnosticism, have been limited to observable, quantifiable criteria sets, a legacy of psychodynamic insight being purged from the manual as of the third edition” (p. 441). Especially as it relates to the DSM personality disorders, many researchers have been attempting to use empirical methods to derive alternative structures of personality and their relationship to psychopathology (Bachrach et al., 2012; Bastiaansen et al., 2011; Blackburn et al., 2005; Cox et al., 2004; DeYoung et al., 2016; Griffith et al., 2010; Haddy et al., 2005; Kotov et al., 2010; Ormel et al., 2013; A. G. Wright et al., 2012). In this vein, Krueger et al. (2011), adopting a reductionistic dimensional perspective, argued that thinking of personality disorders as 10 theoretically distinct entities with little focus on the underlying traits and structure is “untenable” (p. 170). Skodol (2013a) highlighted some of the many issues inherent in this categorical system such as extensive comorbidity among personality disorders, high levels of heterogeneity within each personality disorder, temporal instability of personality disorders, arbitrary thresholds for diagnosis among a collection of polythetic criteria, poor coverage of personality pathology necessitating catch-all diagnostic categories, and poor convergent validity of personality disorder constructs.

This battle between proponents of a categorically versus dimensionally based system of personality disorders came to a head with the publication of the DSM-5. There were growing calls for a revolutionary change in the DSM by including dimensional elements of diagnosis and moving “beyond description and back to a consideration of etiologic theory” (Brown & Barlow, 2005, p. 555). This call was supported by researchers

arguing for the clinical utility of a dimensional model of personality disorders, and researchers noted how these dimensional models could facilitate ease of diagnostic usage, clinical communication, and treatment decisions (Widiger & Mullins-Sweatt, 2010). The Personality and Personality Disorders Work Group for the DSM-5 attempted to build a hybrid model that would combine dimensional elements with the traditional personality disorders already present in the DSM (Skodol, 2012). Ultimately, this hybrid alternative model (i.e., Alternative Model of Personality Disorders; AMPD) was published in Section III of the DSM-5, with the traditional personality disorders from DSM-IV being reprinted in Section II (Krueger & Markon, 2014). The major changes included the removal of paranoid, schizoid, histrionic, and dependent personality disorders, introduction of a dimensional conceptualization of personality disorders with a severity rating scale and trait descriptors, and removal of strict criteria for temporal stability (Krueger & Markon, 2014; Porter & Risler, 2014). Within this hybrid structure, the 25 traits and five broad domains used to describe and characterize the retained personality disorders were tethered to the five-factor model of personality (i.e., Big Five) providing it considerable empirical grounding in previous personality research (Saulsman & Page, 2004). The Big Five conceptualizes all personologic traits as reflecting five broad domains: extraversion versus introversion, neuroticism, conscientiousness, agreeableness, and openness to new experience (McAdams & Pals, 2006). The Big Five was judged particularly useful. Notably, the neuroticism factor of the model was considered to underlie many mood and anxiety disorders (Griffith et al., 2010) and to be linked with many phenomena within

psychopathology (Begemann et al., 2020; Kotov et al., 2010; Macina et al., 2021; Rosenström et al., 2019).

Some researchers have hailed the AMPD, with its close Big Five alignment, as an advancement (Krueger et al., 2014). Others have been vociferous in arguing that the DSM-5 did not go far enough making the AMPD the new orthodoxy (Skodol et al., 2013a, 2013b). Others were critical of this alternative model. Porter and Risler (2014) highlighted criticisms of the alternative model, noting that two members of the DSM-5 Work Group resigned in protest over it, and called into question empirical support for the alternative model and the model's confounding use of categories alongside dimensions. Other researchers were critical of the removal of certain personality disorders and how the review of the evidence was conducted in making these decisions (Mullins-Sweatt et al., 2012). Despite evidence that clinicians recognized the utility of a dimensional, trait-based approach to personality disorders (Morey et al., 2014), and the many shortcomings of the current categorical system of personality disorders (Skodol et al., 2013a), there was still no clear consensus as to what an improved dimensional model would be built upon. Porter and Risler (2014) stated, "The changes in the alternative DSM-5 PD model are no doubt the correct categories of changes. The idea of using levels of functional impairment to measure PD has been well received, as has been the dimensional use of personality traits, but the integral model selected by the Work Group appears to be seriously flawed" (p. 55).

Comparing Emerging Alternative Models of Psychopathology With Millon's Model

Current endeavors to create a more empirically supported foundation for mental disorders compared to the DSM diagnostic system have given rise to general consensus frameworks such as HiTOP (Kotov et al., 2017). The HiTOP consortium attempts to organize DSM constructs into a taxonomic structure by grouping some syndromes into *subfactors*. For example, bulimia and anorexia are grouped into the subfactor of eating pathology, and the panoply of specific substance-related disorders are grouped into the subfactor of substance abuse. These constellations of subfactors and other constituent syndromes can then be grouped into broader categories called *spectra*. Such spectra are labeled, for example, as “internalizing” or “disinhibited externalizing,” and are indicated by a combination of syndromes and subfactors. These spectra are then thought to further combine into a *super-spectra* which “...are extremely broad dimensions comprised of multiple spectra, such as a general factor of psychopathology that represents the liability shared by all mental disorders” (Kotov et al., 2017, p. 456). Using this proposed HiTOP structure of clinical disorders as a starting point, studies within the HiTOP realm focus on expanding and validating this organization of clinical syndromes, and on finding shared dimensions which may be common to multiple mental disorders (Pianowski et al., 2019; Sinclair et al., 2021; Widiger et al., 2019).

Despite HiTOP including both clinical syndromes and current DSM personality disorders in its structure, no mention is made of Millon's model or measures. This is surprising, given Millon's foundational contributions to the personality disorder categories which had constituted Axis II of the DSM-IV (Grossman, 2015; Pincus &

Krueger, 2015). As with HiTOP, Millon's theory includes personality spectra which are meant to capture a broad constellation of elements which describe a person. His theory provides considerable detail regarding interrelated personality elements which function to achieve cohesion within each of his spectra. Millon's model (2011) describes the various factors which contribute to the development of personality and subsequently pathology that include heredity, neurobiology, temperament, adaptive learning, interpersonal reciprocity, early childhood experiences, family structure, and social factors. Within each of the personality spectra, Millon specified various constituent elements including expressive emotions, interpersonal conduct, cognitive style, self-image, intrapsychic features (content, dynamics, and architecture), and mood/temperament (Millon, 2011). Table I provides descriptions of each personality spectrum and its corresponding elements.

Table 1*Expressions of Personality Spectra Across Trait Domains*

Spectrum	Expressive				Intrapsychic	Intrapsychic	Intrapsychic	Mood/
Disorder	Emotion	Interpersonal Conduct	Cognitive Style	Self-Image	Content	Dynamics	Architecture	Temperament
Schizoid	Impassive	Unengaged	Impoverished	Complacent	Meager	Intellectualization	Undifferentiated	Apathetic
Avoidant	Fretful	Aversive	Distracted	Alienated	Vexatious	Fantasy	Fragile	Anguished
Melancholic	Disconsolate	Defenseless	Fatalistic	Worthless	Forsaken	Asceticism	Depleted	Woeful
Dependent	Puerile	Submissive	Naive	Inept	Immature	Introjection	Inchoate	Pacific
Histrionic	Dramatic	Attention-seeking	Flight	Gregarious	Shallow	Dissociation	Disjointed	Fickle
Turbulent	Impetuous	High-spirited	Scattered	Exalted	Piecemeal	Magnification	Unsteady	Mercurial
Narcissistic	Haughty	Exploitive	Expansive	Admirable	Contrived	Rationalization	Spurious	Insouciant
Antisocial	Impulsive	Irresponsible	Nonconforming	Autonomous	Debased	Acting out	Unruly	Callous
Sadistic	Precipitate	Abrasive	Dogmatic	Combative	Pernicious	Isolation	Eruptive	Hostile
							Compartmentalized	
Compulsive	Disciplined	Courteous	Constricted	Reliable	Concealed	Reaction formation	ed	Solemn
Negativistic	Embittered	Contrary	Cynical	Discontented	Fluctuating	Displacement	Divergent	Irritable
Masochistic	Abstinent	Acquiescent	Diffident	Undeserving	Discredited	Exaggeration	Inverted	Dysphoric
								Distraught or
Schizotypal	Peculiar	Secretive	Autistic	Estranged	Chaotic	Undoing	Fragmented	Insentient
Borderline	Spasmodic	Paradoxical	Vacillating	Uncertain	Incompatible	Regression	Split	Labile
Paranoid	Defensive	Provocative	Mistrustful	Inviolable	Unalterable	Projection	Inelastic	Irascible

The model specifies common comorbidities and posits different clinical approaches that might be useful in treatment of psychological distress tailored to individuals fitting these patterns. Millon emphasized the structural and adaptive functions of personality within an evolutionary framework (Millon, 2011). Millon conceived of personality as an organized pattern of deeply embedded, largely unconscious, psychological characteristics that are revealed in most significant aspects of life. These characteristics are assumed to develop from interacting biological dispositions and social learning experiences, and ultimately form a well-organized system of stable structures and coordinated functions. This system of interconnected perceptions, regulatory

mechanisms, feelings, thoughts, and behaviors provides a framework for structuring how individuals interact with their environment and relate to themselves.

Within Millon's theory, personality reflects relatively stable patterns of thought, behavior, and emotion which aim to promote survival, reproduction, and ultimately evolutionary fitness. Interplay among these various domains can be used to characterize the different personality spectra, and each of these spectra exist on a continuum which denotes how strongly an individual is orientated towards experiencing themselves and their environments in particular ways. The building blocks that Millon used to construct his personality spectra are based on bipolar dimensions connected to evolutionary theory and represent an individual's orientation towards being *life-enhancing* versus *life-preserving*, *ecologically accommodating* versus *ecologically modifying*, and *self-propagating* versus *other-nurturing* (Millon, 2011). These dimensions indicate whether individuals are more apt to seek pleasure or avoid pain, take a primarily active or passive stance in their environments, and whether they find support from within themselves or seek out care from others, respectively.

On the basis of variation or imbalances in relation to one or several of these bipolar dimensions, Millon identified 15 personality spectra, each with characteristic strengths, weaknesses, and normal as well as abnormal variants (Millon, 2011). Millon's model characterizes all 10 personality disorders found in the current edition of the DSM (American Psychiatric Association, 2013), provides five other theoretically important spectra not in the DSM, and includes consideration of potential etiology, psychiatric comorbidities, and treatment options. Millon presented hypotheses regarding how

differing personalities were shaped over development by biologically based dispositional tendencies in interaction with social learning. Millon devoted considerable attention to anticipated linkages between pathological personality characteristics and internal and external stressors hypothesized to increase likelihood of the emergence of distinctive psychiatric symptom syndromes. Millon also highlighted how typically adaptive personality styles may, under conditions of adversity, acquire maladaptive features and be characterized as personality disorders. Disordered personality styles, under conditions of unrelenting adversity, may decompensate into more severely dysfunctional personality variants (resembling borderline, schizotypal, and paranoid personality disorders). Further decompensation may be recognized in severely dysfunctional forms of psychopathology including schizophrenia, cyclophrenia, or paraphrenia (Millon, 2011).

Millon argued that a systemically integrated conceptualization of personality provides a framework for understanding the nature of stressors likely to lead to various symptom syndromes (e.g., anxiety, depression) for various personality types (see Table 2).

Table 2*Spectrum Disorder and Millon's Posited Clinical Syndrome Comorbidity*

Spectrum Disorder	Syndrome 1	Syndrome 2	Syndrome 3	Syndrome 4	Syndrome 5	Syndrome 6	Syndrome 7	Syndrome 8
Schizoid	Anxiety	Manic	Obsessive-Compulsive	Dissociative	Somatoform	Schizophrenic		
Avoidant	Anxiety	Phobic	Obsessive-Compulsive	Somatoform	Dissociative	Depressive	Schizophrenic	
Melancholic								
Dependent	Anxiety	Phobic	Obsessive-Compulsive	Somatoform	Factitious	Dissociative	Mood	Schizophrenic
Histrionic	Anxiety	Phobic	Obsessive-Compulsive	Somatoform	Dissociative	Substance	Mood	
Turbulent	Mood							
Narcissistic	Mood	Anxiety	Somatoform	Delusional				
Antisocial	Depressive	Anxiety	Substance					
Sadistic	Delusional							
Compulsive	Obsessive-Compulsive	Phobic	Anxiety	Somatoform	Dissociative	Mood	Schizophrenic	
Negativistic	Anxiety	Phobic	Somatoform	Dissociative	Mood			
Masochistic	Mood	Anxiety	Somatoform					
Schizotypal	Psychotic							
Borderline	Anxiety	Somatoform	Dissociative	Mood	Schizophrenic	Substance		
Paranoid	Delusional	Anxiety	Obsessive-Compulsive	Mood	Schizophrenic			

Note. No syndromes are listed under the Melancholic because Millon (2011) stated that typically the depressive symptoms overwhelm other syndromes in their expression.

Millon's model addresses, for example, why particular personality types might become depressed, anxious, or exhibit compulsive behaviors that become problematic. From this perspective, fundamental features of personality enable an understanding of stress-related symptomatology. Furthermore, his model highlights commonalities and differences between the personality spectra and describes ways in which spectra can be described and understood (Millon, 2011).

As noted by Grossman (2015), although Millon's taxonomy is based on 15 categorical spectra, it may be expressed dimensionally. A dimensional view of personality as opposed to personality types has been supported by evidence and noted for its utility

(Haslam, 2019; Haslam et al., 2021). What is important is that dimensions be drawn from, and be undergirded, by coherent theory and scientific principles. Haefell et al. (2021) argued that models such as HiTOP, which treat all elements of clinical presentation as indistinguishable forms of pathology (DeYoung et al., 2020), will invariability fall short due to the lack of integrating theory that provides the needed context to interpret the very dimensions that emerge in dimensional analysis. Millon's (2011) model has gained considerable recognition for its elegance and richness of personological characterizations. It has been argued to serve a foundational role in the current understanding of personality pathology (Pincus & Krueger, 2015). Despite the elegance and influence of Millon's highly differentiated personality model, it is apparent that broader structures tend to emerge from his theoretically anchored instrument (i.e., MCMI). These factor-analytically-derived structures resemble those included in common ground models of psychopathology (Kotov et al., 2017; Markon, 2010; Widiger & Simonsen, 2005). Indeed, Millon's model and clinically popular MCMI have been largely ignored in the current enthusiasm for hierarchical dimensional representations of psychopathology such as HiTOP.

Popular atheoretical models such as HiTOP can be contrasted with the theoretically anchored model of Millon. Although both Millon's model and HiTOP use the term spectrum to denote organizational units, the interpretation and meaning associated with this term are markedly different. For example, in HiTOP, "Dimensions are psychopathologic continua that reflect individual differences in a maladaptive characteristic across the entire population (e.g., social anxiety is a dimension that ranges

from comfortable social interactions to distress in nearly all social situations); dimensions reflect differences in degree, rather than in kind” (Kotov et al., 2017, p. 456). Within HiTOP, the spectrum of internalizing contains both depression and borderline personality disorder. Any underlying mechanisms which contribute to the degree of expression of internalizing disorders can manifest both as the symptoms expressed in internalizing clinical syndromes, such as depression, and as the maladaptive traits which emerge in borderline personality disorder.

In this way, HiTOP reflects a joint structure between clinical syndromes and personality disorders which has previously been explored but is largely still anchored to DSM constructs and atheoretical derivation (Kendler et al., 2011; Markon, 2010; Rosenström et al., 2019; Røysamb et al., 2011). Despite the use of dimensional techniques to examine associations at the factor level, these broad factors and concepts are often intertwined, some argue, in ways very difficult to interpret without proper context (Oltmanns et al., 2018). It is clear that HiTOP is a taxonomy of psychopathology; however, it is unclear whether HiTOP’s treatment of personality can be easily separated from conceptions of psychopathology and reflect adaptive features alongside maladaptive ones. The atheoretical nature of this approach can cause confusion, which is seen with somatoform disorders. As noted in a meta-analysis between personality and somatoform manifestations, there are overlooked aspects of personality in somatoform disorder research and within HiTOP exists “...ongoing discussion if the somatoform spectrum is independent or can be classified under the spectrum of internalizing” (Macina et al., 2021, p. 9). As noted by Wright and Simms (2015), the examination of pathological

personality traits within these broad consensus models has only recently become a topic of investigation.

In contrast to HiTOP, Millon's personality spectra are not jointly composed of clinical syndromes marked by acute symptoms and the more stable traits of personality. As noted by Pincus and Krueger (2015), one of Millon's contributions to psychopathology was placing personality on a separate axis from clinical syndromes. In Millon's model, the personality spectra provide the context for understanding an individual, and the dimensions within his model capture the degree to which a myriad of underlying elements (such as those described in Table I) are manifested within each personality type. Based on the type of person and not the type of disease characterized by these spectra, hypotheses are formed regarding which types of people might be more or less susceptible to certain syndromes and comorbid personality pathology (Millon, 2011). Despite commonalities among these personality spectra, Millon was hesitant to specify a dimensional structure for his model (Grossman, 2015; Strack & Millon, 2007), and unlike HiTOP, his model was built to capture a range between normal and pathological functioning within each spectrum.

This difference highlights potential shortcomings of basing a system of psychopathology upon solely atheoretical derivations. The handling of personality within a general consensus model has been criticized by Haefell et al. (2021). They noted that the HiTOP group uses the Big Five to explore pathological traits (DeYoung et al., 2016; O'Connor, 2005), and this is based on the *lexical hypothesis*. The lexical hypothesis posits that commonly used descriptive words can be used to identify personality traits,

and an examination of the correlative structure of these words provides insight into the fundamental structure of personality. Millon's theory, on the other hand, provides a comprehensive, deductive framework for specifying how and why particular personality spectra are hypothesized to reveal essential cognitive, behavioral, temperamental, expressive emotional and interpersonal features. Millon built this theory on principles including having a consistent body of knowledge from which to generate testable hypotheses regarding normal and abnormal personality variants. This theoretical foundation was used to develop assessment instruments capable of revealing patterns of personality and psychopathology patterns considered to be useful in justifying treatment interventions (Millon, 2011).

Haefel et al. (2021) in their critique of taxonomic systems of disorders driven by atheoretical data reduction techniques, such as factor analysis, noted that these approaches bear no more connection to reality than which rotation is used to derive them. An example of this relates the placement of the withdrawal and attention-seeking traits within the DSM-5's alternative personality model. As noted earlier, the DSM-5 alternative model includes 25 traits and five broad domains intended to capture six personality disorders. Despite their conceptual similarity, withdrawal is associated with the detachment domain whereas attention seeking is associated with the antagonism domain (American Psychiatric Association, 2013; Krueger et al., 2012). In the study by Krueger et al. (2012), which explored these traits, it appears this placement was made based on the results of an exploratory factor analysis (EFA) with no plausible interpretation provided. Haefel et al. (2021) argued it is unfortunate that researchers with

the intentions of simplifying and better understanding psychopathology and issues related to comorbidity have largely abandoned and ignored rich integrative perspectives. They argued that the path forward for the DSM should be built upon open concepts and a theoretical foundation that provides explanations for symptoms within disorders rather than a list of symptoms that characterize said disorders (Haefffel et al., 2021).

This focus on establishing a general consensus model that contextualizes individuals is important to help provide a multicultural framework that can be adapted to reflect salient differences among individuals from a variety of backgrounds, cultures, and identities. Voices within the counseling psychology community have highlighted the importance of competent assessment that promotes social justice by reflecting constructs central to individuals being assessed for mental health concerns (Ridley et al., 1998). These practices take into consideration deeply ingrained ways clients might interact with the world in ways reflecting forces such as acculturation and assimilation which effect many. Ridley (1998) noted multicultural assessment needs to conceptualize psychological phenomena "...in terms of divergent attitudes, values, and behaviors arising out of specific cultures." (p. 835) An atheoretical approach, based heavily on a medical model focusing on pathology, may overlook important differences and power differentials within a sociocultural context, and in doing so fail to reflect the lived experience of individuals from diverse backgrounds.

A disorder-focused approach grounded in the medical model has been criticized within mental health practice as "sharply limiting counselors' problem conceptualization, and subsequently the value of interventions counselors choose" (Georges & Tomlinson-

Clarke, 2015, p. 769) Georges and Tomlinson-Clarke (2015) emphasized the importance of integrating aspects of positive psychology into the foundation of counseling psychology, and they argued for the usefulness of expanding the multiaxial system of diagnosis to include salient cultural elements, strengths, and resources. Incorporating these broader concepts into clinical practice is crucial from a social justice perspective, as personality and personality disorders are rooted in cultural contexts and exhibit cultural variability that needs to be reflected in the conceptualization of mental health (Ronningstam et al., 2018).

The use of cross-culturally sensitive models of psychopathology are needed to help address diagnostic biases, particularly those related to gender and race, which occur among personality disorder constructs such as antisocial and histrionic disorders (Garb, 2021). A system that does not contextualize individuals in a holistic fashion may foster a narrow focus on individuals. This narrow focus could contribute to a lack of a personality disorder diagnosis when it might be warranted or to pathologize normative aspects of personality among culturally diverse individuals.

Millon's model provides a broad integrative perspective which focuses on persons instead of disorders and provides a basis for the incorporation of adaptive functioning and specific cultural values and contexts. Millon's model also provides a theoretical framework that treats personality and clinical syndromes as distinct but connected constructs. As dimensional models continue to gain traction, it is important that these models holistically reflect persons in context and are not narrowly applied to clinical symptoms or pathological processes. Given the potential bias reflected in the diagnoses

and expression of personality disorders (Garb, 2021; McGiloway et al., 2010; Ronningstam et al., 2018) having cultural contextual factors integrated into conceptual models is important. Millon's multiaxial system reflects individual elements relating to psychopathology, as well as broader structural components. Millon (2011) dedicates an entire axis to psychosocial stressors which he considered as "infectious agents" (p. 194) that contributes to symptom expression and their need to be understood in the context of the individual. This broader axis can capture many of risk factors that Paris (1997) highlighted stemming from social disenfranchisement.

Of broader trends relating to diagnostic bias, it has been found that gender biases are reflected in the diagnosis of histrionic personality disorder and racial biases, particularly among Black individuals, are reflected in the diagnosis of depression and expression of agitation (Garb, 2021). Millon (2011) provided both the undergirding elements that define histrionic personality and discussed how these elements can manifest differently in men and women. He also discussed social pressures and subjugation faced by women in society and its influence on them. His theory is built on the idea that personality is an adaptive system, and traits must be considered in this context. By framing personality in this fashion, Millon's system aligns in spirit with positive psychology insofar as personality can provide both strengths and weaknesses given an individual's transactions within their environment. Millon also noted that often misaligned antisocial and antagonistic traits reflected adaptability as well, "The normal antisocial is action-oriented, independent thinking, nonconforming, and innovative... Undeterred by difficulties, they possess a knack for turning setbacks into new

opportunities.” (p. 448). Being mindful of this perspective is important in providing multicultural assessment and carefully considering, for example, how one’s attitude towards others influence psychocultural adjustment (Ridley et al., 1998). Ponterotto (2010) noted the usefulness of Millon’s model in understanding adaptive human behavior in an increasingly globalized and culturally diverse world.

Given similarities in personality traits across countries and the variability of traits within countries and ethnic groups (Kajonius & Mac Giolla, 2017; Packman et al., 2005), examination of the degree of invariance in personality models is an important consideration to enhance the appropriate generalization of psychological constructs. To help avoid biases in the diagnosis of personality disorders, Garb (2021) recommended training in cultural diversity and debiasing strategies, as well as using dimensional rating systems to assess personality. When possible, it is important to compare these dimensions across cultural categories to help bridge the gap between the MCMI-III’s rich theoretical background and empirical evidence supporting its use among diverse individuals.

Although Millon’s theories are certainly rich and expansive, any system of understanding psychopathology that hopes to be scientific as well as philosophical, should be backed by empirical support. In addition to Millon’s theoretical offerings, he also developed instruments to attempt to capture essential personality and psychopathology constructs. The MCMI serves as the clinical instrument most closely aligned to his theory of personality and psychopathology (Millon et al., 1997; Millon, 2011). Given that the personality disorder and clinical symptom syndrome scales were designed to reflect his theoretically derived personality spectra and to align with the

current DSM diagnostic system, the MCMI provides a potentially productive vehicle to facilitate exploration of the structure of psychopathology. Millon's theory (2011) presents clinically relevant personality spectra defined in terms of core beliefs about self and others, interpersonal behavioral features, patterns of coping and defense, and characteristic emotional functioning that are assumed to reflect fundamental elements of a broadly conceived model for classification of psychopathology. The model offers a basis for exploring personality and clinical symptom syndrome relationships within a theoretically coherent diathesis–stress model.

Although the MCMI was developed to represent a highly differentiated, theoretically derived system, it requires empirical investigation and reconciliation with data. Millon did not primarily focus on the empirical structures that emerged from measures he devised to operationalize his theoretical constructs, nor did he provide evidence sufficient to substantiate the MCMI as a representation of his model (Mullins-Sweatt & Widiger, 2007; O'Connor et al., 1998; Strack et al., 2001). Choca and Grossman (2015) noted that Millon's theory drifted in a different direction from where the field was heading, and he missed opportunities to draw upon emerging accumulating evidence for a simpler dimensional model to achieve greater model validation. For example, although many relationships among his personality spectra emerged during empirical investigation of his theory-anchored instruments, including several editions of the MCMI, "No underlying factor structure has been specified for his taxonomy or the MCMI" (Strack & Millon, 2007, p. 64). Coupling Millon's theoretical contributions to psychopathology with empirically derived relationships among psychopathology

constructs could advance efforts to untangle some of the complexities that have limited the explanatory value of atheoretical dimensional models.

As the field shifted to emphasize potential dimensional models of psychopathology, some of which attempt to capture interrelations between personality and psychiatric symptoms, Millon's theoretical contributions, seemingly relevant to this endeavor, have largely been ignored. Despite Millon's considerable influence on the field of psychopathology, praise from foundational contributors to the HiTOP model (Pincus & Krueger, 2015), and the potential explanatory salience of his model in interpreting hierarchical structures (Grossman, 2015, p. 437), his work is not mentioned in the influential Kotov et al. (2017) hierarchical synthesis nor in Kotov et al.'s (2010) broad meta-analysis linking personality dimensions to clinical syndromes. This seems to be a missed opportunity as Millon's theories are expansive, he helped shape the current understanding of psychopathology in the DSM (Grossman, 2015; Pincus & Krueger, 2015), and he developed a host of clinical personality and psychopathology assessment instruments.

In reviewing the international evidence for the validity and clinical applications of the MCMI, Rossi and Derksen (2015) state that, "Given the broad array of issues addressed by international studies, we think Millon's influence will certainly stand the test of time in different domains and settings" (p. 584). Thus, it seems desirable, at this point, to draw upon personality constructs from Millon's theory, and captured by his instruments, to harmonize his important contributions with emerging empirical evidence from general consensus models of psychopathology. In the following section,

investigations of the MCMI factor structure are reviewed. Focusing on personality–clinical symptom relationships, opportunities for reconciliation or cross-fertilization with currently influential consensus models (i.e., HiTOP, Big Five) are explored.

MCMI Factor Structure

Studies examining the emergent structure of constructs from Millon’s clinical instrument, the MCMI, using both clinical and nonclinical samples have revealed both consistent patterns of factor structure as well as instrument version and sample specific variability (Alareque et al., 2021; Craig & Bivens, 1998; Cuevas et al., 2008; Dyce et al., 1997; Haddy et al., 2005; Pignolo et al., 2017; Rossi et al., 2007, 2010; Rossi & Derksen, 2015; van der Heijden et al., 2012). Over the decades, the evidence has been clear from various versions of the instrument that a small number of dimensions can capture most of the variance in the MCMI personality scales. Strack and Millon (2007) acknowledged the personality scales of the MCMI may be summarized by several underlying dimensions which they refer to as emotionality versus restraint (neuroticism), introversion versus extraversion, and dominance versus submissiveness (antisociality/disagreeableness vs. dependency).

Early factor analytic investigations on the first version of the MCMI revealed a simple four-factor structure including: negativistic–avoidant, paranoid cognitive and interpersonal, dependent/borderline, and asocial–avoidant personality features (Flynn & McMahon, 1984). Choca, Peterson, and Shanley (1986) found a three-factor solution which they labeled maladjustment–neuroticism, extroverted–acting–out, and psychoticism. Gibertini and Retslaff (1988) argued for four- or five-factor solutions and

reported a general distress factor which they note as having emerged in all previous factor analyses, a social/acting out factor, a suspiciousness factor which included paranoia and psychotic elements, and a bipolar submissive–aggressive factor. Retzlaff and Gibertini (1990) derived three bipolar MCMI personality dimensions which they labeled aloof–social, submissive–aggressive, and labile–restrained. It became apparent that scale-level factor analyses of the personality and symptom scales of the MCMI could be represented in a simpler structure. Indeed, important consistencies emerged in studies involving differing factor analytic methods and diverse clinical samples. Although Millon had not embraced an underlying dimensional model in his theory involving personality prototypes and psychopathology (Strack & Millon, 2007), multivariate researchers identified a presumptive dimensional structure within which his clinical diagnostic instrument might be understood.

Using the MCMI-II, a three-factor structure was identified as most meaningful in a study of 253 male psychiatric inpatients and outpatients (Strack et al., 1992). The first bipolar factor was named introversion versus extraversion with prominent (i.e., those with magnitude greater than 0.4) positive loadings on the Schizoid, Schizotypal, and Avoidant scales, and negative loadings on the Histrionic and Narcissistic scales. The second bipolar factor was named restrained versus emotional (conscientiousness/self-restraint) with positive loadings for the Compulsive and Paranoid scales with negative loadings on Borderline and Self-Defeating scales. Finally, the third bipolar factor was labeled aggressive–assertive versus dependent–acquiescent (antisociality/disagreeableness vs. dependency) with positive loadings on the Aggressive,

Antisocial, and Passive–Aggressive scales, and negative loadings on the Dependent and Self-Defeating scales. These findings were noted to be largely, “consistent with previous research and Millon’s theoretical assertions” (Strack et al., 1992, p. 50).

Using the third version of the MCMI, researchers also found simplified dimensional structures perhaps reflecting patterns of associations among scales designed to reveal Millon’s elaborately differentiated types (Alareque et al., 2021; Craig & Bivens, 1998; Cuevas et al., 2008; Dyce et al., 1997; Haddy et al., 2005; Pignolo et al., 2017; Rossi et al., 2007, 2010). In comparing the structures across studies, some variations emerged, and attention was drawn to methodological differences between studies.

Dyce et al. (1997) raised an important point about item overlapping and nonitem-overlapping scales which has been a focus in several MCMI studies (Cuevas et al., 2008; Haddy et al., 2005; Pignolo et al., 2017; Rossi et al., 2007, 2010). The issue surrounds how items are chosen to constitute MCMI scales. If item-overlapping, or linearly dependent scales are used, each scale contains items which are shared with others. This is contrasted with nonoverlapping, or linearly independent, scales which contain only prototypical items which are unique to each scale. As noted by Rossi et al. (2010), Millon (1997) created these prototypical items to be most central to each personality disorder construct, as well as to closely correspond to DSM personality disorder criteria. Whereas Rossi et al. (2010) argued that factor analyzing overlapping scales is incorrect, other authors have noted that the nonoverlapping scales might provide important information due to their alignment to Millon’s theory (Pignolo et al., 2017). Millon and Davis (1997) indicated that although the nonprototypical (overlapping) items are not central to their

respective scales, they do represent relevant features with theoretical value. Within Millon's polythetic model, there are natural overlapping relationships among the personality spectra that the nonprototypical items are designed to represent. The polythetic nature of the MCMI personality-scale linked constructs have been argued by some to be integral to the theory (Cuevas et al., 2008; Grossman, 2015; Strack & Millon, 2007). It has been argued that prototypical items used for psychodiagnosis might lack validity on their own and combinations of overlapping items have diagnostic utility (Dahl, 1986; Modestin, 1987; Nurnberg et al., 1987, 1991; Widiger et al., 1984). Despite what seems to be an important aspect of Millon's argument regarding the theoretical coherence of this overlap, many studies have found similar factor structures regardless of whether the overlapping scales (scales with shared items) or nonoverlapping scales (scales consisting only of prototypical items) were chosen (Cuevas et al., 2008; Haddy et al., 2005; Pignolo et al., 2017; Rossi et al., 2007).

Related to the methodological considerations of overlapping versus nonoverlapping scales impacting factor structure, Dyce et al. (1997) also examined the choice of the number of factors to extract which can produce differing solutions. They commented that extracting more factors helps produce more personality differentiation. They noted that a four-factor solution achieved the best balance between simplification and complexity, a finding echoed by other investigations using confirmatory factor approaches (Cuevas et al., 2008; Rossi et al., 2010). They highlighted that when examining the factor structure of the MCMI, inconsistent factor solutions can emerge due to the choice of whether to jointly factor analyze personality scales with the clinical

syndrome scales. Of the exploratory studies examining the dimensions of the MCMI-III (Alareque et al., 2021; Craig & Bivens, 1998; Cuevas et al., 2008; Dyce et al., 1997; Haddy et al., 2005; Pignolo et al., 2017; Rossi et al., 2007), some included only the personality scales (Cuevas et al., 2008; Dyce et al., 1997), others only jointly analyzed both the personality and symptom syndrome scales in their factor investigations (Alareque et al., 2021; Craig & Bivens, 1998; Pignolo et al., 2017; Rossi et al., 2007), and Haddy et al. (2005) analyzed factor solutions both separately and jointly. Atheoretical application of factor analysis designed to identify associations between personality disorders and clinical syndromes is of interest; however, these may be considered theoretically distinct entities. Personality constructs are considered more stable and persistent across domains, as well as having normal and pathological expression; clinical syndromes are typically thought to be less stable and their expression reflects clinically meaningful disturbance.

Among MCMI-III factor analytic studies based upon personality scales, there is support for the structure reported by Dyce et al. (1997). Using a sample of 614 college students they examined two-, three-, and four-factor solutions of nonoverlapping personality scales and judged the four-factor solution to be “most meaningful” (p. 568). The first factor appeared unipolar and had substantial loadings with magnitude greater than 0.4 related on Depressive, Dependent, Self-Defeating, Borderline, Avoidant, Passive–Aggressive, Schizotypal, and Paranoid personality scales. The second factor was similarly unipolar with substantial loadings on Narcissistic, Sadistic, Antisocial, Paranoid, Passive–Aggressive, and Schizotypal scales. The third factor appeared bipolar with substantial positive loading on the Schizoid and Avoidant scales and a negative

loading on the Histrionic scale. Finally, the fourth factor also appeared bipolar with antipodes corresponding to a substantial positive loading on the Compulsive scale and substantial negative loading on the Antisocial scale. These dimensions, as noted by Rossi et al. (2010), can neatly map onto the Big Five with the first factor representing broad neuroticism, the second disagreeableness (acting out/antagonism), the third introversion versus extraversion, and the fourth conscientiousness (conformity vs. antisociality) with these linkages also found in a nonclinical sample using a five-factor structure (Aluja et al., 2007). The final factor revealing a high loading on the Compulsive scale and a negative loading for the Antisocial scale might correspond to psychological adjustment (i.e., reflecting a conscientious and agreeable predisposition) given the authors' use of nonclinical college students. Authors raised this possibility when highlighting the high mean endorsements of both the Histrionic and Compulsive scales from their sample. The use of a college sample raises questions regarding the continuity of the structure of personality indices in normal and abnormal samples especially given unique developmental milestones and challenges associated with emerging adulthood.

Cuevas et al. (2008) who examined two-, three-, and four-factor solutions of overlapping and nonoverlapping scales from a sample of 674 Spanish university students, their friends, and their relatives. Using a combination of EFA and CFA, they concluded that a four-factor solution was most viable. However, Cuevas et al. (2008) identified problems with using the overlapping scales in the analysis of the MCMI factor structure due to statistical evidence of poor model fit compared to model fit resulting from the use of nonoverlapping scales. The authors noted a high degree of similarity between

overlapping and nonoverlapping items with respect to the factor structure with almost equal alpha coefficients, no major deviations between their skewness and kurtosis, minimal differences on factor loadings, and a “remarkable” (p. 67) finding that all congruence coefficients between overlapping and nonoverlapping scales in the four-factor solution were above 0.90. Despite these similarities, the authors highlighted overlapping solutions produced less adequate model fit to the data, with the four-factor model based on overlapping items producing less strong fit to the data than the two-factor solution using nonoverlapping items.

The first factor derived in the four-factor solution involving nonoverlapping item MCMI-III personality scales appeared largely unipolar. It exhibited substantial loadings with magnitude greater than 0.4 on the Depressive, Dependent, Avoidant, Borderline, Schizotypal, Masochistic, Passive–Aggressive, and Paranoid scales. The second factor also appeared largely unipolar with substantial positive loadings on the Narcissistic, Sadistic, Paranoid, Antisocial, Passive–Aggressive, and Schizotypal scales. The third factor appeared bipolar with a substantial positive loading on the Compulsive scale, and a substantial negative loading on the Antisocial scale. Finally, the fourth factor was bipolar with antipodes defined by a high positive Schizoid scale loading and a substantial negative Histrionic scale loading. Thus, it appears that the first factor represented a broad neuroticism factor, the second represented an antisociality/disagreeableness versus dependency factor, the third a conscientiousness/self-restraint factor, and the fourth introversion versus extraversion. Again, these factors appear to map onto the Big Five as well as exhibit conformity with the structure proposed in the HiTOP model. For example,

the first broad factor features elements resembling elements of the HiTOP internalizing and detachment spectrum; however, it also includes the dependent personality measure which is not identified in HiTOP. The second factor largely resembles HiTOP's antagonistic externalizing spectrum. The third factor appears more mixed given its blend of both compulsiveness and antisociality. From a Big Five perspective this factor appears to align with a conscientious/conforming versus nonconforming antisociality factor. However, within the HiTOP structure compulsiveness or conformity can be aligned with the Obsessive–Compulsive component from HiTOP's fearful subfactor contrasted against the antagonistic or disinhibited externalizing spectra. The fourth factor supported by Cuevas et al. (2008) appears to mirror the HiTOP detachment spectrum with high positive loadings on schizoid and negative on histrionic. No MCMI factor appears to relate clearly to the HiTOP thought disorder spectrum, identified by Schizotypal, Schizoid, and Paranoid personality disorder features.

Similarities between Cuevas et al.'s (2008) nonoverlapping four-factor solution and Dyce et al.'s (1997) four-factor solution can be computed as each study published their factor loadings. Using Tucker's Congruence Coefficient (Φ) and a modified form (Φ_{Modified}) which can better account for the mismatch in the signs between loadings (Lovik et al., 2020), the degree of factor similarity was computed across studies. Lovik et al. (2020) noted that coefficient values beyond 0.95 can be used to indicate the equivalence between factors. Cuevas et al.'s. (2008) first factor and Dyce et al.'s (1997) first factor showed equivalence ($\Phi = 0.99$, $\Phi_{\text{modified}} = 0.99$), as did the second factors from both studies ($\Phi = 0.99$, $\Phi_{\text{modified}} = 0.99$). It was also found that Cuevas et al.'s (2008) fourth

factor was equivalent to Dyce et al.'s (1997) third factor ($\Phi = 0.94$, $\Phi_{\text{modified}} = 0.96$), and Cuevas et al.'s third factor was close to equivalent with Dyce et al.'s (1997) fourth factor ($\Phi = 0.92$, $\Phi_{\text{modified}} = 0.93$). This provides evidence of substantial comparability of four-factor solutions in the MCMI-III derived in different samples, with Cuevas et al.'s (2008) confirmatory approach supporting Dyce et al.'s (1997) decision to adopt a four-factor solution noting, "The fourth dimension in this model is statistically weak, but it is necessary for providing a satisfactory representation of all PD's" (Cuevas et al., 2008, p. 61).

Rossi, Elklit, and Simonsen (2010) examined whether Dyce's four-factor model derived in a college student sample might fit in a large sample drawn from Danish ($N = 2,030$) and Belgian ($N = 1,210$) psychiatric, forensic, and prison populations. Using a Dutch translation of the MCMI-III and nonoverlapping scales, researchers examined two-, three-, and four-factor solutions which were previously reported by Dyce et al. (1997) to test confirmatory models. The authors defined their factors using all salient loadings (i.e., those with magnitude greater than 0.4 with the exception of the Schizoid scale on the second factor which had a loading of 0.39) from Dyce et al. (1997), and iteratively tested models using modification indices to specify additional factor loadings and correlated errors until a satisfactory fitted model was established.

After examining the confirmatory models, authors concluded that the four-factor model was best supported. The four-factor model found had 10 additional loadings specified from modification indices beyond those derived from Dyce et al. (1997) in their nonclinical sample. Adapted to Rossi et al.'s (2010) mixed psychiatric and forensic

sample, the first factor was modified to include the Sadistic scale. The second factor had the additional loadings of the Borderline, Dependent, and Depressive scales. The third factor was modified to include loadings from the Schizotypal, Paranoid, and Sadistic scales. Finally, the fourth factor was modified to include loadings on the Borderline, Schizotypal, and Passive–Aggressive scales. The authors labeled these four factors as emotional dysregulation versus emotional stability (neuroticism), antagonism versus compliance (antisociality/disagreeableness vs. dependency), introversion versus extraversion, and finally constraint versus impulsivity (conscientiousness/self-restraint). Substantial loadings with magnitude greater than 0.4 included on the first factor Depressive, Self-Defeating, Dependent, Borderline, Avoidant, Passive–Aggressive, and Schizotypal scales. The second factor revealed substantial positive loadings on the Antisocial, Narcissistic, Sadistic, Schizoid, and Paranoid scales. The second factor also included two negative loadings on the Depressive and Dependent scales; however, these loadings were below 0.3. The third factor displayed strong bipolarity, with a substantial positive loading on the Histrionic scale and a negative Schizoid scale. Finally, the fourth factor was marked by a substantial positive loading on the Compulsive scale. All other loadings on the fourth factor were below 0.4 with the highest negative loading on the Antisocial scale. Despite its significant modifications to a clinical and forensic sample, Rossi et al.'s (2010) four-factor model has also been confirmed to fit well in a different study involving a mixed clinical and community-based sample of low-income women from the United States which will be examined further in the next section (Barbot et al., 2012).

Both Cuevas et al. (2008) and Rossi et al. (2010) noted that the four factors can align nicely to other hierarchy models of personality and psychopathology such as those proposed by Widiger and Simonsen (2005), O'Connor (2005), and Watson, Clark, and Harkness (1994). The four-factor solution also reveals similarities with the structure of psychopathology posited by Markon (2010). Although O'Connor (2005) discussed personality disorders from a Big Five perspective to achieve some consensus, Widiger and Simonsen (2005), Watson, Clark, and Harkness (1994), and Markon (2010) discussed a "Big Four" model which might underlie personality disorders. Watson et al. (1994) specified the Big Four space to both exclude the openness to new experience dimension, and closely connect neuroticism with introversion. In this space neuroticism is defined as negative emotionality and extraversion as positive emotionality. Markon (2010) also discussed ways in which his joint model of personality and clinical syndromes differs from the personality focused Big Four model; however, he stated these models can be conceptually integrated. He noted that the broad externalizing factor in his model, which he aligns with disinhibition, can be split into aggressive and nonaggressive factors that parallel with agreeableness and conscientious respectively.

The four-factors that appear to underlie the MCMI-III can also fit into the HiTOP paradigm. The broad, first factor of neuroticism fits with HiTOP's internalizing spectrum, the second factor seemingly related to antisociality/disagreeableness versus dependency fits well with HiTOP's two externalizing spectra, and the introversion versus extraversion factor aligns with HiTOP's detachment spectrum. It is less clear how the weaker fourth

factor potentially relating to conscientiousness/self-restraint might fit into the HiTOP paradigm or relate to other forms of psychopathology.

Proposed Factor Structure

Based upon both the historical derivations of MCMI factor structures, as well as current investigations and confirmations of a four-factor structure in the MCMI-III, it appears that the structure originally derived by Dyce et al. (1997) and modified and confirmed by Rossi et al. (2010) and Barbot et al. (2012) will serve as the most suitable and supported factor structure to use in the current study drawing upon a clinical sample. Not only does this factor structure align with other models of personality and pathology (Markon, 2010; O'Connor, 2005; Watson et al., 1994; Widiger & Simonsen, 2005), it also has conceptual underpinnings found in Millon's theory (Millon, 2011) despite his reluctance to embrace dimensional models of psychopathology.

The first factor in the four-factor model from Rossi et al. (2010) appears largely congruent across many versions of the MCMI and reflects prominent loadings (magnitude greater than 0.4) on the Depressive, Self-Defeating, Dependent, Borderline, Avoidant, Passive–Aggressive, and Schizotypal scales. Within Millon's theory, schizoid, avoidant, depressive, dependent, negativistic (passive–aggressive), and masochistic (self-defeating) have been referred to as introverted/neurotic styles, with schizotypal, borderline, and paranoid being noted as severe variants (Millon, 2011; Strack & Guevara, 1999). This MCMI factor appears to represent the general proclivity to experience psychological distress, or from Millon's theory, a vulnerability to intrapsychic conflict

due to individuals being unable to successfully adapt to environmental stressors (Millon, 2011).

The second factor reflects prominent positive loadings on the Antisocial, Narcissistic, Sadistic, Schizoid, and Paranoid scales. Examining Millon's interpersonal characterizations of these individuals (see Table 1) involves exploitative, irresponsible, and abrasive interactions with others. This factor appears to reflect a self-centered, impulsive, and provocative pattern particularly under condition of challenge or invalidation. The positive loading from Schizoid scale might also indicate an individual who has interpersonal difficulties and problems developing relationships with others.

The third factor has a prominent positive loading on the Schizoid scale, and a negative loading on the Histrionic scale. This appears a bipolar introversion–extraversion dimension. The schizoid personality is characterized by lack of social relationships and an avoidance of intimacy with others. In opposition, the histrionic personality is characterized as thriving on attention from others and a drive to seek fulfillment from interpersonal relationships (Millon, 2011).

Finally, the fourth factor is characterized by a prominent positive loading on the Compulsive scale and a negative loading (-0.39) on the Antisocial scale. Taken together, compulsiveness is a self-restraining force, contrasted against antisocial tendencies which are often described as impulsive (Millon, 2011). It appears that this factor might represent social conformity, conscientiousness and self-restraint versus an impulsive acting out pattern of nonconformity.

Associations Between Clinical Syndromes and Dimensions of Personality

A feature of the MCMI is that it includes both personality scales as well as clinical syndrome scales. Millon noted the importance of understanding clinical syndromes in context of personality stating that, "...a full understanding of Axis I clinical syndromes requires the study of Axis II personalities. Complex clinical syndromes are usually the outgrowth of deeply rooted sensitivities and coping strategies" (Millon, 2011, p. 311). The importance of personality–symptom relationships is clearly recognized in influential contemporary models such as HiTOP that are based on examination of the joint structure of personality and psychopathology (Kotov et al., 2017). However, HiTOP's dimensional examinations of joint structure may blur theoretically distinctive personality–symptom expression relationships and make it difficult to formulate a priori linkages due to the emphasis on statistical technique rather than cohesive theory.

Although Millon did not specify a particular factor structure which might underlie his theory, given a particular factor structure his theory offers much thought on potential associations between these factors and symptom expression unlike contemporary atheoretical models such as HiTOP which utilize statistical "clumping" approaches. Given a broad neuroticism factor which prominent loadings from a majority of scales that could be indicative of psychological distress and intrapsychic conflict, Millon's theory would predict that this broad factor would be linked to common internalizing disorders such as depression, anxiety, and somatic complaints as manifestations of such distress. Individuals endorsing broadly maladaptive traits are likely unable to utilize effective coping mechanisms to avoid or combat a negative self-image, feelings of sadness,

excessive worry about current circumstances, and an amplification or psychosomatic manifestation of distress as bodily symptoms. Additionally, unlike HiTOP, which places thought disorder in its own spectrum largely removed from other internalizing disorders, Millon's theory would predict this broad neuroticism factor would be associated with psychotic symptoms and manifestations as well. Particularly, Millon's theory discusses how other personality styles can decompensate into more severe personality styles such as borderline, paranoid, and schizotypal which in their most pathological forms (i.e., cyclophrenia, paraphrenia, schizophrenia) collapse into an internal world untethered to reality (Millon, 2011). It should then be expected that delusional and psychotic thinking would be associated with this neuroticism factor as well.

The next factor, representing prominent antisociality/disagreeableness versus dependency with contributions from the Antisocial, Sadistic, and Narcissistic scales is likely linked with substance use. Millon's theory discusses these types of individuals as characterized by impulsivity, selfishness, and disregard for society norms and laws (Millon, 2011). Given these proclivities, as well as inflated self-worth and an aversion to showing vulnerability, Millon's theory posits that individuals predisposed to these tendencies would likely be exposed and turn to substances as either maladaptive ways to cope with stress or as ways to accumulate status and material gain (Millon, 2011, p. 460).

Within Millon's theory, an introversion versus extraversion dimension also has some expected associations to clinical syndrome expression particularly towards the introversion pole. Again, unlike HiTOP, which has a detachment spectrum which is separate from internalizing disorders which include social phobia and agoraphobia under

the fear subfactor, the aspect of pathological introversion has anticipated associations with symptom expression. Particularly, it is expected that introversion would be associated with more prominent depressive and anxious symptoms, and that both the schizoid and avoidant aspects would be thought to contribute to this. Millon conceptualized avoidant individuals as conflicted due to the disparity between their desire for relationships and their fear of intimacy and rejection (Millon, 2011). This led him to conceptualize avoidant individuals as both expressively fretful and temperamentally anguished (see Table 1). Whereas avoidant individuals might be characterized as anxiously avoidant, schizoid individuals might be described as depressively avoidant. Millon noted that the underlying temperamental apathy is perhaps the most fundamental element of the schizoid personality, and in extreme terms, “Not only do they report few, if any, affectionate or erotic needs, but they appear unable to experience these major affective states—pleasure, sadness, or anger—to any degree” (Millon, 2011, p. 680). Unlike avoidant individuals who have internal drive for relationships, albeit conflicted, individuals on the schizoid spectrum are thought to lack this intrinsic motivation or drive and display expressive impassivity towards the outside world (Millon, 2011). Not only would depressive and anxious symptoms be expected to spring forth from internal factors, but the very nature of lacking relationships and being isolated from supportive and caring others might exacerbate these symptom manifestations and contribute to their expression separately from broader neuroticism.

The final conscientiousness/self-restraint factor which seems to emerge from the MCMI-III is more difficult to interpret and build hypothesized relationships strictly from

a theoretical standpoint. This difficulty is partly due to what might be related to the properties of the MCMI-III rather than Millon's conceptualizations of psychopathology. As noted by Dyce et al. (1997) the Compulsive scale of the MCMI-III might not be indicative of inherent pathology. Millon considered the compulsive personality to be characterized by rigidity and anxiety surrounding control (Millon, 2011), and as seen in Table 2, is potentially linked to many different neurotic disorders, especially anxiety. Millon (2011) commented, "...compulsives are among the most frequent candidates for generalized anxiety disorders. Every act, thought, or impulse that may digress from the straight and narrow path is subject to the disapproval of an internal conscience or punitive reactions from others" (p. 509). From this perspective, increasing levels of compulsivity would be theorized to link positively with other neurotic or internalizing symptoms. However, if this scale is capturing more positive qualities of conscientiousness, self-restraint, self-efficacy, and an ordered life, then it would be expected to relate to less worry.

Despite the importance of such relationships between personality and clinical syndrome expression in understanding psychopathology, only two MCMI-III studies were identified that examined the dimensional structure of personality scales in association with clinical syndromes without simply including all scales into a joint factor analytic framework (Barbot et al., 2012; Haddy et al., 2005).

Haddy et al. (2005) factor analyzed the MCMI-III records of a large sample of 2,366 individuals presenting for psychiatric treatment. They extracted three factors from the nonoverlapping personality scales and three factors from the clinical syndrome scales.

The authors identify the three personality factors: as internalizing–neuroticism, aggressive–externalizing–acting out, and unrestrained–impulsive versus social conformity–emotional restraint.

The authors referred to the internalizing–neuroticism factor as the “social detachment/introversion versus extraversion” factor. In Millon’s model, this factor appears related to pervasive neuroticism and both intrapsychic and interpersonal avoidance, with notable elevations on many MCMI scales. The second factor captures acting out/disagreeable elements, punctuated by MCMI Antisocial, Sadistic, Narcissistic, Histrionic, and Paranoid scale loadings. The third factor captures what appears to be conscientiousness/self-restraint (social conformity vs. impulsive, antisocial nonconformity) in the form of a strong positive loading on the Antisocial scale and a negative strong negative loading on the Compulsive scale. They also labeled the three factors of the clinical syndromes scales as “depression/anxiety with thought disorder,” “disordered thinking,” and “substance abuse.” Next, they computed factor scores using the derived loadings and correlated personality and symptom factors.

Relating the personality dimensions to the clinical syndrome dimensions, the strongest relationships found were between the internalizing–neuroticism factor and the depression, anxiety, and thought disorder factor ($r = 0.65$). These findings indicate substantial shared variance between internalizing/neuroticism and thought disorder and align with Millon’s view that anxious/depressed emotionality and thought disturbance cut across a number of personality types (Millon, 2011). The second strongest relationship identified by Haddy et al. (2005), was between the aggressive–externalizing–acting out

dimension and disordered thinking ($r = 0.48$). In Millon's scheme, individuals with sadistic and narcissistic features are expected to reveal more vulnerability to delusional syndromes (Millon, 2011). The third strongest relationship was found between the internalizing–neuroticism factor and disordered thinking ($r = 0.40$). The fourth largest relationship was between the impulsive–nonconformity factor and the substance abuse factor ($r = 0.37$).

Although Haddy et al. (2005) made strides in exploring relationships between personality and clinical syndrome factors of the MCMI-III, there remain methodological questions such as the exclusive use of EFA (van Prooijen & van der Kloot, 2001). Of note, no follow-up studies were identified which replicate either the personality or clinical syndrome factors found within Haddy et al.'s (2005) sample. Further, the three-factor personality model identified in this sample reflect substantive differences compared to the broader four-factor model supported in other studies using confirmatory approaches (Cuevas et al., 2008; Rossi et al., 2010). Others have been critical of the use of rotated principal components and factor scores to examine relationships between constructs (Zuccaro, 2010). Despite demonstrations of nearly identical factors emerging in analyses involving base-rate and nonoverlapping scales, relationships between these factors were sometimes markedly different. For example, although there was a moderately strong relationship found between the internalizing/neuroticism factor and disordered thinking factor using the nonoverlapping factors, this relationship disappeared entirely using the nearly identical base-rate factors. There are also difficulties in interpreting the relationships between the personality and clinical syndrome factors given

the correlations between factors were univariate, constructed to be uncorrelated with one another, and some factors shared considerable cross-loadings. Additionally, Haddy et al. (2005) noted a limitation of their study was that the majority of participants in their sample was male (81%). Another prominent characteristic of their sample is that it was drawn primarily from the U.S. Department of Veterans Affairs hospitals and clinics (84%). It is unclear how this might relate to the generalizability of their factor structure to other samples.

Barbot et al. (2012) also examined linkages between the dimensions of personality from the MCMI-III and psychopathology using a sample of 361 women from outpatient treatment facilities and nonclinical community settings which included churches, neighborhood stores, and health care facilities (Luthar & Sexton, 2007). The study examined how dimensions of personality derived from the MCMI-III might change over time, and how this change was related to psychiatric diagnosis patterns. The authors, using Rossi et al.'s (2010) modified model, named the four factors of personality pathology as negative emotionality (neuroticism), antagonism (antisociality/disagreeableness vs. dependency), detachment (introversion vs. extraversion), and disinhibition (conscientiousness/self-restraint). Impressively, Barbot et al. (2012) found the factor structure to be invariant across time. This invariance held with an average of 5 years between timepoints, and the factors demonstrated greater stability relative to the measurements at the individual scale level. This finding also provides justification for the use of the MCMI to assess personality characteristics in a cross-sectional manner, as it appears that the factor structure which emerges is stable across

many years, even in a sample which exhibits significant psychiatric comorbidity in the form of changing clinical diagnoses over time.

Authors used MCMI personality factor scores to examine relationships between personality dimensions and psychiatric diagnoses. Lower scores on all four personality factors distinguished those without any psychiatric diagnosis from the other groups. Higher scores on three of four personality factors (the exception was the introversion vs. extraversion factor) distinguished the substance only group from the no diagnosis group. Further, elevations on all four factors distinguished affective/anxiety and comorbid groups. The comorbid group was associated with distinctively high impulsivity (conscientiousness/self-restraint) score. The authors noted that using the MCMI, “...results in a meaningful structure of pathological personality trait dimensions, which represent four delineated constructs, interpretable independently, and associated soundly with various clinical conditions” (Barbot et al., 2012, p. 181).

Relevant to the Barbot et al. (2012) study, the personality scales of the MCMI are known to have positive skew (Strack & Millon, 2007), possibly violating the assumption of multivariate normal data used in structural equation model (SEM) estimation. Instead of using robust estimators, which can perform well under violations of nonnormality (Curran et al., 1996; Tong et al., 2014), authors in this study used a rank-based inverse normal transformation to make their data normally distributed. Beasley and Erickson (2009) have cautioned about the use of these approaches in more complex statistical models, as these transformations can subtly change the null hypotheses being tested by the statistical procedures. By shifting distributions prior to entering them into

confirmatory models, it is unclear how these results might align with prior research or how generalizable these findings would be to other samples as the transformed distributions would not reflect the distribution of these maladaptive personality features in the overall population. It is also unclear if the no diagnosis category contained individuals with no DSM diagnosis, or just not a substance or mood disorder. The no disorder group comprised the majority of participants at the first (57.6%) and second (74%) timepoints, and the label of “remission” was used for individuals who moved into the neither group at timepoint 2. Using untransformed, continuous measures of psychopathology could further elucidate how personality characteristics might be linked to the more ephemeral clinical syndrome symptomatology.

Summary of Review

Over time it has become clear that the standard categorization of mental illnesses, particularly the categorical treatment of personality disorders, has been fraught with limitations leading to calls for change. In this current state of flux, researchers have attempted to apply dimensional analysis to more clearly understand underlying factors which might better describe both personality and clinical syndrome disorders.

Modern consensus models identify dimensions of psychopathology that have included both personality and clinical symptom features. These atheoretical models have largely ignored traditional explanatory models designed to understand personality–symptom relationships in which clinical symptom syndromes are viewed as reflecting conditions that emerge when stressors impact vulnerable personalities (Millon, 2011). The potential contributions of Millon’s model and dimensional research base examining

MCMI as the clinical diagnostic representation of that model have not been well represented in current emergent dimensionally oriented consensus literature. Although Millon's theory and the MCMI offer a highly differentiated personality centered representation of psychopathology, dimensional analyses of the MCMI suggest a simpler structure that might be harmonized with influential consensus models of psychopathology (i.e., HiTOP). Despite a number of authors exploring a tentative personality consensus structure of the MCMI and labeling these dimensions with terms aligning to broader models of pathology, there is little evidence supporting the associations between these dimensions and clinical syndrome expression.

One of the factors limiting the potential contributions of the MCMI to emerging personality versus symptom syndrome dimensional representations of psychopathology is the way in which most factor analytic investigations of the MCMI have been structured. Although a few studies have attempted to examine how the dimensional structure of the personality scales relates to clinical syndromes, it appears that there has yet to be an explicit analysis using the MCMI to examine the relationships between the underlying personality dimensions and clinical symptom syndrome scales using a confirmatory rather than a strictly exploratory approach.

Rather than continue to rely on techniques that combine personality and clinical syndromes without distinction in dimensional analyses, in this study I applied confirmatory techniques using diverse clinical samples to examine MCMI-based personality dimensions and examined anticipated associations with clinical symptom syndrome indices. Once a structure describing the dimensions of personality was

specified, confirmatory factor models were used to examine theoretically anticipated associations with clinical syndrome symptomatology to further support the interpretation of these personality dimensions and their connections to broader consensus models.

Research Questions

1. Will a four-factor model of personality representing a broad neuroticism factor, an antisociality/disagreeableness factor, an introversion versus extraversion factor, and a conscientiousness/self-restraining factor fit adequately and equally the MCMI-III data from two clinical samples?
2. Will a broad neuroticism factor be associated with depressive, anxious, somatoform, and psychotic symptomatology?
3. Will an antisociality/disagreeableness factor be associated with substance abuse symptomatology?
4. Will an introversion versus extraversion factor be associated with depressive and anxious symptomatology?
5. Will a conscientiousness/self-restraint factor be associated with anxious symptomatology?

Hypotheses

1. A four-factor model of personality based on Rossi et al. (2010) will fit the data adequately. One factor, representing broad neuroticism, will reveal significant loadings on the MCMI-III Depressive, Masochistic, Dependent, Borderline, Avoidant, Negativistic, and Schizotypal scales. A second factor, representing antisociality/disagreeableness, will reflect significant positive loadings from the MCMI-

III Antisocial, Narcissistic, Sadistic, Schizoid, and Paranoid scales. Another factor representing introversion versus extraversion will display a significant positive loading on the MCMI-III Schizoid scale and a negative loading on the Histrionic scale. A final factor representing conscientiousness/self-restraint will reveal a significant loading on the MCMI-III Compulsive scale.

2. The broad neuroticism factor will be significantly positively associated with depressive symptomatology measured by the sum of prototypical items from the MCMI-III Dysthymia and Major Depression scales (while controlling for the introversion versus extraversion factor), anxious symptomatology measured by prototypical items from the MCMI-III Anxiety scale (while controlling for the introversion vs. extraversion factor), somatoform symptomatology measured by prototypical items from the MCMI-III Somatoform scale, and psychotic symptomatology measured by prototypical items from the MCMI-III Delusion Disorder scale.

3. The antisociality/disagreeableness factor will be significantly positively associated with mixed substance abuse symptomatology measured by the sum of prototypical items from the MCMI-III Alcohol Dependence and Drug Dependence scales.

4. The introversion versus extraversion factor (while controlling for the neuroticism factor), will be significantly associated with depressive symptomatology measured by the sum of prototypical items from the MCMI-III Dysthymia and Major Depression scales and anxious symptomatology measured by prototypical items from the MCMI-III Anxiety scale. The relationship is hypothesized to reflect higher levels of introversion being associated with higher levels of anxious and depressive symptomatology.

5. The conscientiousness/self-restraint factor will be significantly associated with anxious symptomatology as measured by prototypical items from the MCMI-III Anxiety scale.

Chapter 3: Method

This investigation drew upon two datasets from pre-intervention evaluations conducted as part of two NIH-funded HIV prevention intervention clinical trials. These de-identified datasets were drawn from pre-intervention NIH-funded HIV prevention trials. The IRB was consulted and a certificate was obtained indicating exemption for the need of IRB approval, and permission to use the data was given by the principal investigator. One sample is referred to as the mixed-gender sample and the other the women-only sample. Studies have been conducted on both the mixed-gender sample (Kalichman et al., 2005; Malow et al., 2012; McMahon et al., 2008; Yocom, 2018) and the women-only sample (Abbamonte et al., 2020; Dévieux et al., 2015; McMahon et al., 2017). Combining these datasets yielded a psychiatric sample drawn from different treatment environments reflecting different types and levels of psychopathology to permit exploration of the generalizability of the four-factor personality structure originally derived in a nonclinical, college sample by Dyce et al. (1997), modified by Rossi et al. (2010) in a clinical and forensic Danish and Belgian samples, and used again by Barbot et al. (2012) in a mixed sample of women drawn from clinical and community settings in the United States. Further, this study tested hypothesized MCMI-III personality factor relationships with continuous measures of psychiatric symptomatology in a psychiatric sample using a structural regression framework expanding upon the categorical diagnostic approach used by Barbot et al. (2012).

Of studies utilizing MCMI-III records from the datasets constituting the current investigation, McMahon et al. (2008, 2017), conducted cluster analysis of MCMI-III

records to derive psychopathology cluster subgroups based on joint clustering of personality and clinical symptom syndrome scales. Yocom (2018) examined confirmatory models for a factor structure of the MCMI-III in the mixed-gender data for use in subsequent mediation models. Yocom (2018) evaluated one- and two-factor models a priori in the study involving selected personality and clinical syndrome scales. Scales were not modified to address item overlap. The factor structure derived after modification and respecification consisted of two factors. The first was a general psychiatric severity factor reflecting contributions from the MCMI-III measures of dysthymia, anxiety, depressive, dependent, and schizotypal features of psychopathology. The second was an externalizing factor reflected the antisocial, drug dependence, and alcohol dependence scale-linked characteristics. The present study was designed to evaluate the dimensional structure of the MCMI utilizing theoretically derived MCMI-III personality disorder scale prototypical items. This contrasts with prior studies adopting MCMI overlapping item scale construction and those involving joint analysis of personality and symptom scales used in the mixed-gender sample (Kalichman et al., 2005; Malow et al., 2012; McMahon et al., 2008; Yocom, 2018) and in the women-only sample (Abbamonte et al., 2020; Dévieux et al., 2015; McMahon et al., 2017). Personality disorder-specific dimensional constructs were examined in association with theoretically anticipated associations with MCMI clinical symptom indicators.

Mixed-Gender Sample

These mixed gender data ($N = 454$) were collected between 1998 and 2002. Participants were recruited from 16 community-based treatment programs serving

individuals with significant mental health issues in Miami-Dade County in Florida.

Individuals expressing interest in the study were provided information about the study and given an opportunity to provide informed consent. After they provided informed consent, they were scheduled for an intake interview. Interviews and assessments were conducted by trained interviewers who were supervised by a licensed psychologist.

Individuals with developmental difficulties, neurological impairments, or active psychosis were excluded. Participants had to be at least 18 years of age, be in residential or outpatient psychiatric or substance abuse treatment in Miami-Dade County, be available to attend all study appointments, speak English as their primary language, and provide contact information in the event that participants could not be reached for follow-up appointments.

Women-Only Sample

This sample ($N = 284$) drew upon data collected among pregnant or postpartum women with severe mental illness receiving residential or outpatient psychiatric or substance abuse treatment in Miami-Dade County from June 2006 to January 2010.

Individuals were recruited from substance abuse programs with three inpatient residential sites yielding the majority. One prenatal medical clinic and four outpatient community settings were also utilized in participant recruitment. Potential participants were given information about the study and an opportunity to provide written informed consent.

Potential participants were assessed for a diagnosis of serious mental illness including schizophrenia, schizoaffective disorder, bipolar disorder, or major depressive disorder, as well as for diagnoses of alcohol or other drug abuse or dependence based upon DSM-IV-

TR criteria. Inclusion criteria for the study included: the participant being at least 18 years of age, able to speak and understand English, and provide contact information in the event that participants could not be reached for follow-up appointments. Potential participants were also assessed for the ability to participate in a HIV risk reduction intervention and were excluded based upon the presence of severe neurological or psychiatric symptoms which would inhibit ability to participate in the HIV intervention or on the basis of a Global Assessment of Functioning score below 40. Trained interviewers approached individuals at various recruitment sites to explain the study and to evaluate subjects' ability to provide informed consent. Data were collected by trained interviewers supervised by a licensed clinical psychologist.

Measures

The MCMI-III (Millon et al., 1997) is a 175-item true/false self-report instrument used to measure both personality disorders and clinical syndrome characteristics based upon Millon's evolutionary theory of personality.

The instrument includes 24 clinical scales. These include 14 personality scales: Schizoid, Avoidant, Depressive, Dependent, Histrionic, Narcissistic, Antisocial, Sadistic, Compulsive, Negativistic (Passive–Aggressive), Masochistic (Self-Defeating), Schizotypal, Borderline, and Paranoid. It also contains 10 scales designed to capture clinical syndrome symptomatology: Anxiety, Somatoform, Bipolar, Dysthymia, Alcohol Dependence, Drug Dependence, Post-Traumatic Stress Disorder, Thought Disorder, Major Depression, and Delusional Disorder. The MCMI-III also contains three modification indices used to measure response attitudes (Disclosure, Desirability,

Debasement) and two validity indices which assess for random responding (Validity and Inconsistency). Based on recommendations from several researchers (Cuevas et al., 2008; Haddy et al., 2005; Rossi et al., 2007, 2010), raw scores derived from responses to the prototypical items from each MCMI-III personality and clinical syndrome disorder scale were used. Prototypical items represent unique items on each scale that attempt to capture the most defining features of each construct. Dichotomous prototypical items were added together to compute the raw scores on each personality and clinical syndrome scale.

Preliminary Analyses Steps

Prior to conducting the analyses, the data were examined for accuracy and to ensure that all coding was accurate and the values entered were valid. Software used was SPSS and R. Descriptive statistics were reported for demographic variables including age, gender, race, education level, and employment status over the past 3 years. MCMI-III personality and clinical syndrome scales based upon theoretically central prototypical items were constructed. MCMI-III records that included more than a single endorsement of items designed to detect random responding were considered invalid and excluded (Millon et al., 1997). Cronbach's alpha was also computed for each of the MCMI-III personality and symptom scales used in the analysis. Item reduction was not used to improve internal consistency in order to maintain consistency with other MCMI factor studies which did not trim items (Barbot et al., 2012; Cuevas et al., 2008; Haddy et al., 2005; Rossi et al., 2010). Despite a range of scale internal consistency reported previously for MCMI-III scales, Little, Lindenberger, and Nesselroade (1999) note that theory should guide the inclusion of indicator variables within confirmatory analyses, and

models were found to be robust even with the inclusion of items with low internal consistency.

Item response theory (IRT) was also used to examine the personality scales of the MCMI-III. Rasch models were fit to prototypical items of each personality scale to determine if the dichotomous items adequately reflect their respective constructs (Boone, 2016). Rasch models are used to examine how dichotomous items relate to a common latent dimension of responding (Andrich & Marais, 2019). They estimate a location parameter for each person responding to the items, as well as a location (i.e., difficulty) parameter for each item. When a person's location is equal to the difficulty of an item, this represents a 50% chance they will endorse the item. Once a Rasch model is fit, one can compute a number of reliability indices, such as the item separation reliability (ISR) index for each scale. The ISR index for a scale is computed as the variance of the difficulty parameters of all items on a scale relative to the standard error of these estimated locations (B. Wright & Stone, 1999). It ranges from 0 to 1, and when based on Rasch-estimates provides a better estimate of reliability compared to using raw scores (B. Wright & Stone, 1999). The ISR index measures the degree to which items can be separated by persons responding to them. Values on the index above 0.9 indicate a scale's adequate ability to reflect the item difficulty hierarchy and demonstrate construct validity (Linacre, 2022). In conjunction with the ISR index, Martin-Löf tests, which are designed to test for unidimensionality in Rasch models, were conducted to determine the appropriateness of this assumption (Futschek, 2014; Verguts & De Boeck, 2000). To control for false discoveries in the 14 tests, *p*-values corrected by the Benjamini-

Hochberg procedure were examined (James et al., 2021, pp. 573–575). If significant departures from unidimensionality were detected, the Outfit index from the Rasch model was examined following recommendations from Boone (2016) to determine if an item did not fit the model well and should have been excluded. If items were excluded, results from the main structural equation models were compared using both the original and modified scales.

Next, multivariate outliers were examined via Mahalanobis distance. After the removal of the multivariate outliers, the distributions of each scale were described by reporting the means, standard deviations, skew, and kurtosis (Tabachnick & Fidell, 2013).

Main Analyses Steps

Confirmatory Factor Analysis

Using the hypothesized factor structure based on Rossi et al.'s (2010) model, the CFA model was specified (see Figure 1) and evaluated for fit. For legibility, spectrum and factor abbreviations are used as follows: Schizoid (Schz), Avoidant (Avoid), Depressive (Depr), Dependent (Depnd), Histrionic (Hist), Narcissistic (Narc), Antisocial (Antis), Sadistic (Sadis), Compulsive (Comp), Negativistic (Negat), Masochistic (Maso), Schizotypal (Schtyp), Borderline (Brln), and Paranoid (Paran), the neuroticism factor (Neuro), the antisociality/disagreeable factor (Ant), the introversion versus extraversion factor (Intro/Extra), and the conscientiousness/self-restraint factor (Consci). This model represents the hypothesized measurement model underlying the MCMI-III. This defines the latent factors undergirding the manifest variables within Millon's measurement model. CFA is the statistical technique that was used to derive a unique factor structure

consistent with previous research. Once a suitable measurement model was identified, it was interpreted within the context of Millon's polythetic theory to attempt to clarify what the underlying dimensions mean.

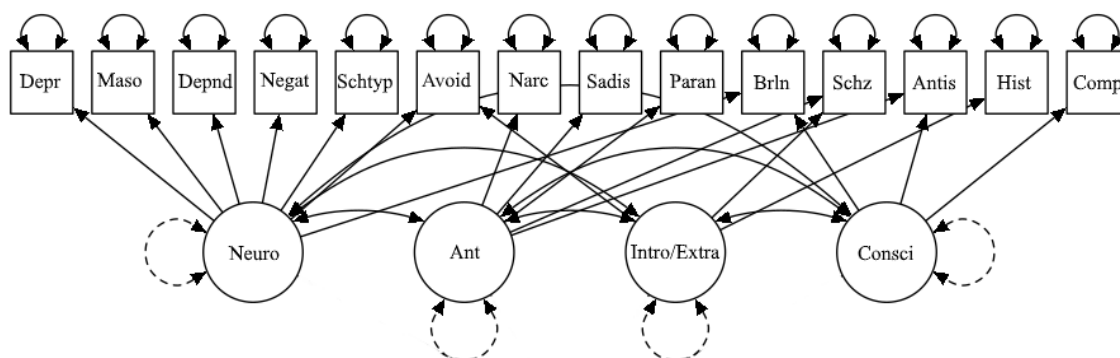


Figure 1. Confirmatory Model.

To avoid issues of empirical under-identification (Kline, 2011), additional loadings were specified for the introversion versus extraversion factor and the conscientiousness/self-restraint factor to ensure that both had at least three loadings which is recommended practice (DiStefano & Hess, 2005; Hair et al., 2010). From Rossi et al.'s (2010) findings, the largest loading for the introversion versus extraversion factor below 0.4 was the Avoidant scale, and for the conscientiousness/self-restraint factor it was the Borderline scale. Following recommendations from Kline (2011), diagnostics were used to modify the model when problems were encountered. EFA was used to explore misspecification. This flexible approach of coupling CFA and EFA has been described as an effective way to help avoid the problem of CFA being overly restrictive by forcing certain associations to be fixed to 0 when attempting to apply a priori factor models to new data (van Prooijen & van der Kloot, 2001). Using an exploratory lens can

provide the grounds for targeted model modification, and it helps avoid the drawbacks of using a strictly exploratory approach in examining the MCMI-III. The EFA can highlight potentially important relationships not found in previous studies and allow for the CFA to find a unique solution that can be interpreted within the context of both past investigations and the current study. Based on skew and kurtosis if nonnormality was prominent, a scaled chi-squared statistic was used to account for nonnormality (Curran et al., 1996; Tong et al., 2014). To help assess the appropriateness of each model, common model fit indices were reported including the comparative fit index (CFI), RMSEA (root-mean-square error of approximation) confidence interval, AIC (Akaike information criteria), BIC (Bayesian information criteria), and model chi-squared (Kline, 2011). Highlighted by results from Chen et al. (2008), and echoed by Hair (2010), the use of absolute cutoffs for model fit is fraught with problems and heavily debated. Instead, consistent with the approach used by Rossi et al. (2010), the goal was to establish an approximately fitting model with an RMSEA ≤ 0.08 and CFI ≥ 0.9 . Once the model was fit, dropping insignificant paths or factors were explored, as well as using modification indices judiciously to arrive at a good approximate factor model (Kline, 2011; Tabachnick & Fidell, 2013). This model was then tested for measurement invariance (e.g., configural, metric, scalar) between samples, gender, and cultural identity using both chi-square different tests and changes in fit indices to determine whether factor comparisons across groups were valid (Hirschfeld & von Brachel, 2014; Milfont & Fischer, 2010; Putnick & Bornstein, 2016). When referring to tests of factor structures across groups, invariance is tested sequentially (Putnick & Bornstein, 2016). The first

step of establishing configural invariance means that the factor structure adequately fits each group broadly with respect to the number of factors and factor loadings. The second step involves metric invariance and tests if factor loadings are equal across groups. Finally, scalar invariance is tested to determine if factors with equal means also have equal means on their manifest variables.

Personality Factor Associations With Clinical Syndrome Symptomatology

Once an approximately fitting measurement model was found for personality factors using confirmatory analysis, structural regression models were specified by regressing each criterion variable reflecting clinical symptomatology from the MCMI-III onto personality factors according to study hypotheses (see Figure 2). The specification of these structural regression paths allows for the examination of potential associations between two theoretically distinctive sets of constructs. SEM allows for latent variables based on a variety of personality constructs to be examined in relation to manifest measures of clinical symptom expression capturing more transitory and unstable expressions of distress. A total of six structural equation models (five main models and one exploratory model) were specified according to hypothesized relationships between latent factors and clinical symptom expression.

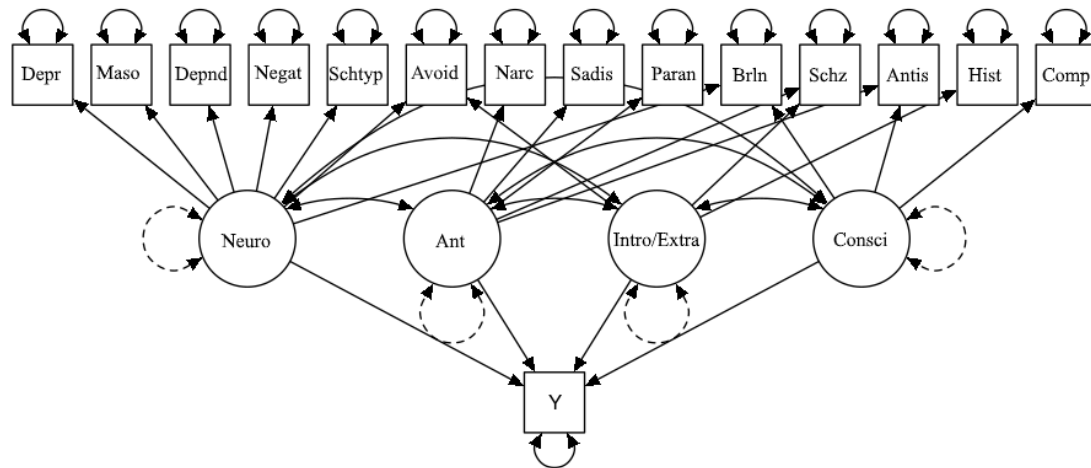


Figure 2. Proposed General Structural Model.

The first model used the sum of the prototypical items from the MCMI-III Dysthymia and Major Depression scales as the criterion variable and both the neuroticism and introversion versus extraversion latent factors as predictor variables. The second model used the prototypical items from the MCMI-III Anxiety scale as the criterion variable and both the latent factors of neuroticism and introversion versus extraversion as predictor variables. The third model used the prototypical items from the MCMI-III Somatoform scale as the criterion variable and the latent neuroticism factor as a predictor variable. The fourth model used the sum of the prototypical items from the MCMI-III Alcohol Dependence and Drug Dependence scales as the criterion variable and the latent antisociality/disagreeable versus dependency latent factor as a predictor variable. The fifth model used the prototypical items from the MCMI-III Delusion Disorder scale as the criterion variable and the latent neuroticism factor as a predictor variable. Finally, an exploratory model was specified using prototypical items from the MCMI-III Anxiety scale as a criterion variable and the latent conscientiousness/self-restraint factor as a

predictor variable. If this path was significant, the latent neuroticism and introversion versus extraversion factors would be added as predictor variables to determine if significance was still retained from the conscientiousness/self-restraint factor. Following results from factor structure respecification, another exploratory model was run using prototypical items from the Delusion Disorder scale as the criterion variable and the conscientious/self-restraint as a predictor alongside the neuroticism factor. Based on power estimates for a conservative, assumed sample size of 600, the model with 15 observed variables and 120 estimated parameters exceeds several conventional power guidelines such as having an $N > 300$, more than 10 cases per variable in the model, and 5 cases per estimated parameter (Kyriazos, 2018).

Chapter 4: Results

Preliminary Analyses

Initial analyses involved creating a combined dataset of MCMI-III records and demographic variables. Out of the overall combined sample, a total of 711 complete or partial MCMI-III records were identified for inclusion. The data were checked for valid responses, and any out of bounds values were set to missing. A total of 18 invalid values were found on MCMI-III items, and one was found for the gender variable. All invalid values were from the mixed-gender sample. In the next step in the screening process, the MCMI Validity scale was computed by adding together all endorsements from items designed to detect invalid responding to the instrument, and cases involving any values exceeding 1 were excluded. After the initial screening, a total of 677 complete or partial MCMI-III records remained for primary analyses. A total of 438 were from the mixed-gender dataset, and 239 from the women-only dataset. The main results from the structural equation models were reported using complete cases on MCMI-III scales which will offer more conservative estimates (Jakobsen et al., 2017), as missingness below 10% is unlikely to introduce any substantial bias (Dong & Peng, 2013). Additionally, structural regression coefficients from the complete-case analysis were compared to estimates using full-information maximum-likelihood estimation with robust standard errors which incorporates all available information and is considered one of the best approaches for handling missing data when available (Dong & Peng, 2013; Jakobsen et al., 2017).

It was found that participants in the combined sample were on average 40.19 years old ($SD = 9.9$; $n = 640$) and reported completing on average 11.44 years of formal education ($SD = 2.47$; $n = 649$). A total of 203 (Valid Percentage = 30.12%) participants identified as male and 471 as female (Valid Percentage = 69.88%). In the mixed-gender sample, the question that assessed race included categories for Hispanic ethnicity and ancestry, and the data are presented as such. This will be discussed further in the limitations section. A total of 372 (Valid Percentage = 57.67%) identified as Black, 173 as White (Valid Percentage = 26.82%), 87 as Hispanic (Valid Percentage = 13.49%), 7 as American Indian or Native Alaskan (Valid Percentage = 1.09%), 4 as multiracial (Valid Percentage = 0.62%), and 2 as Asian or Pacific Islander (Valid Percentage = 0.31%). Among individuals identifying as Hispanic 36 identified their ancestry as Hispanic Cuban (Valid Percentage = 5.58%), 26 as Hispanic Puerto Rican (Valid Percentage = 4.03%), 23 as Hispanic Other (Valid Percentage = 3.57%), and 2 as Hispanic Mexican (Valid Percentage = 0.31%).

Females represented 78.23% ($n = 291$) of Black participants, 63.01% ($n = 109$) of White participants, 37.93% ($n = 33$) of Hispanic participants, 85.71% ($n = 6$) of American Indian or Native Alaskan participants, 100% ($n = 4$) of multiracial participants, and 100% ($n = 2$) of Asian or Pacific Islander participants. Among Hispanic-identifying participants, females represented 41.67% ($n = 15$) of Cuban participants, 26.92% ($n = 7$) of Puerto Rican participants, 47.83% ($n = 11$) of Hispanic Other participants, and 0% ($n = 0$) of Mexican participants.

As a proxy for socioeconomic status, employment over the past 3 years was also examined. The majority of the sample identified as unemployed ($n = 244$; Valid Percentage = 37.48%), with 157 reporting full-time employment (Valid Percentage = 24.12%), 119 reporting being retired or disabled (Valid Percentage = 18.28%), 54 reporting part-time employment with irregular hours (Valid Percentage = 8.14%), 53 reporting part-time employment with regular hours (Valid Percentage = 8.14%), 21 reporting being in a controlled environment (Valid Percentage = 3.23%), and 3 reporting being students (Valid Percentage = 0.46%).

MCMI-III Scale Properties

All 14 personality scales from the MCMI-III were analyzed using Rasch models and Martin-Löf tests for scale unidimensionality. Cronbach's alpha was calculated for each scale using all available cases with the smallest n from the items on each scale presented. Martin-Löf tests were examined using complete-cases on MCMI-III personality scale items. Table 3 displays results of these analyses, as well as adjusted p -values using the Benjamini-Hochberg procedure for controlling the false discovery rate of the 14 consecutive tests.

Table 3*MCMI-III Personality Scale Properties*

Scale (<i>I</i>)	α (<i>minimum n</i>)	$\chi^2(df; n)$	<i>P</i> -value (Adjusted	ISR
			<i>p</i> -value)	Index
Schizoid (<i>I</i> = 7)	.64 (674)	21.55 (11; 672)	.028 (.131)	0.99
Avoidant (<i>I</i> = 8)	.75 (675)	23.19 (15; 675)	.08 (.16)	0.95
Depressive (<i>I</i> = 8)	.81 (676)	24.57 (15; 674)	.056 (.16)	0.98
Dependent (<i>I</i> = 8)	.71 (676)	23.33 (15; 672)	.077 (.16)	0.97
Histrionic (<i>I</i> = 7)	.55 (676)	18.76 (11; 675)	.065 (.16)	0.98
Narcissistic (<i>I</i> = 8)	.59 (669)	30.57 (15; 666)	.01 (.07)	0.95
Antisocial (<i>I</i> = 7)	.63 (675)	11.72 (11; 672)	.384 (.489)	0.98
Sadistic (<i>I</i> = 7)	.66 (675)	11.27 (11; 672)	.421 (.429)	0.98
Compulsive (<i>I</i> = 8)	.59 (668)	8.39 (15; 660)	.907 (.907)	0.97
Negativistic (<i>I</i> = 9)	.72 (675)	24.16 (19; 670)	.19 (.333)	0.97
Masochistic (<i>I</i> = 7)	.73 (667)	35.56 (11; 665)	< .001 (.003)	0.98
Schizotypal (<i>I</i> = 9)	.77 (675)	23.28 (19; 669)	.225 (.35)	0.96
Borderline (<i>I</i> = 9)	.71 (675)	21.63 (19; 669)	.303 (.424)	0.99
Paranoid (<i>I</i> = 9)	.74 (671)	13.82 (19; 664)	.794 (.855)	0.96

Note. *I* refers to the number of items in each scale. ISR refers to Item Separation Reliability

Based on these results, only one scale appeared to violate the assumption of unidimensionality. The Masochism scale on the MCMI-III is composed of seven

prototypical items (i.e., Items 19, 43, 70, 90, 104, 122, 161). Examining item fit statistics from the Rasch model did not reveal any mean-square Outfit values beyond 1.3 as recommended by Boone for a suitable cut-off of problematic items (Boone, 2016). Items 19 (Mean-square Outfit = 1.195), 43 (Mean-square Outfit = 1.059), 70 (Mean-square Outfit = 0.912), 90 (Mean-square Outfit = 0.862), 104 (Mean-square Outfit = 0.708), 122 (Mean-square Outfit = 1.113), and 161 (Mean-square Outfit = 0.889) all appeared reasonably worded to reflect self-defeating and self-undermining behaviors and attitudes. The Rasch item-analysis did reveal that the most discrepant item was 19, worded as “I seem to choose friends who end up mistreating me.” This item being discrepant might be attributed to both measuring a property of masochism as well as reflecting the realities of abusive relationships which might be commonly experienced by the economically disadvantaged women in the study. Recomputing the scale without this item and examining all adjusted p -values revealed no significant evidence of multidimensionality from any personality scale at an α of .05. Internal consistencies were also similar to those reported in other MCMI-III studies (Cuevas et al., 2008; Dyce et al., 1997; Rossi et al., 2010). The unidimensionality tests and ISR indices suggest that although items appear to adequately measure the personality constructs intended, the lower alpha levels suggest that perhaps the scales are too short to provide stable internal-consistency measures due to floor and ceiling effects (Andrich & Marais, 2019). This possibility of a smaller item pool from the nonoverlapping items was raised by Dyce et al. (1997) and could explain the observed variability of alpha levels across a number of samples (Barbot et al., 2012; Dyce et al., 1997; Rossi et al., 2010). The internal consistency of prototypical items in

measuring their respect constructs, albeit with some challenges related to person reliability, presents interesting avenues for future research involving application of IRT to empirically modify and perhaps refine these scales.

Internal consistency was also computed for each clinical syndrome scale used as outcome variables in this study. The Anxiety scale ($\alpha = .7$; *minimum* $n = 675$; $I = 6$), Somatoform scale ($\alpha = .72$; *minimum* $n = 671$; $I = 5$), Dysthymia scale ($\alpha = .73$; *minimum* $n = 676$; $I = 6$), Alcohol Dependence scale ($\alpha = .73$; *minimum* $n = 675$; $I = 6$), Drug Dependence scale ($\alpha = .79$; *minimum* $n = 675$; $I = 6$), Major Depression scale ($\alpha = .74$; *minimum* $n = 671$; $I = 6$), and Delusional Disorder scale ($\alpha = .74$; *minimum* $n = 674$; $I = 4$) all appeared to have adequate internal consistency. The combined Dysthymia and Major Depression scale ($\alpha = .85$; *minimum* $n = 671$) as well as the combined Alcohol and Drug scale ($\alpha = .81$; *minimum* $n = 675$) also demonstrated favorable internal consistency.

Raw scale scores were computed, and then examined for multivariate outliers using Mahalanobis distance (Tabachnick & Fidell, 2013). Using a reference α of .001 and 21 degrees of freedom for the 14 personality scales and 7 clinical syndrome scales, only one observation was flagged as a multivariate outlier and removed. Table 4 displays descriptive statistics for each MCMI-III scale. The combined depression scale had a mean of 5.79 ($SD = 3.55$; $n = 666$; $Skew = -0.01$; $Kurtosis = -1.27$) and the combined Drug Use scale had a mean of 7.07 ($SD = 3.15$; $n = 668$; $Skew = -0.3$; $Kurtosis = -0.74$).

Table 4*MCMI-III Scale Descriptives*

Scale	Mean (<i>SD</i> ; <i>n</i>)	Range	Skew	Kurtosis
Schizoid	3.97 (1.88; 671)	7	-0.26	-0.81
Avoidant	3.98 (2.38; 674)	8	0.03	-1.11
Depressive	4.82 (2.52; 673)	8	-0.39	-1.03
Dependent	4.24 (2.26; 671)	8	-0.12	-0.96
Histrionic	4.41 (1.7; 674)	7	-0.51	-0.32
Narcissistic	3.87 (2.01; 665)	8	0.10	-0.82
Antisocial	4.15 (1.86; 671)	7	-0.25	-0.81
Sadistic	3.2 (1.95; 671)	7	0.23	-0.86
Compulsive	5.65 (1.81; 659)	8	-0.65	-0.12
Negativistic	4.76 (2.45; 669)	9	-0.08	-0.98
Masochistic	3.23 (2.13; 664)	7	0.13	-1.12
Schizotypal	4.53 (2.65; 668)	9	-0.01	-1.08
Borderline	4.86 (2.34; 668)	9	-0.07	-0.89
Paranoid	5.06 (2.54; 663)	9	-0.28	-0.93
Anxiety	3.23 (1.82; 671)	6	-0.17	-1.02
Somatoform	2.28 (1.64; 669)	5	0.05	-1.20
Dysthymia	3.21 (1.90; 674)	6	-0.10	-1.22
Alcohol Dependence	2.69 (1.91; 672)	6	0.25	-1.12
Drug Dependence	4.38 (1.85; 672)	6	-0.99	-0.15

Scale	Mean (<i>SD</i> ; <i>n</i>)	Range	Skew	Kurtosis
Major Depression	2.58 (1.91; 666)	6	0.15	-1.22
Delusional Disorder	1.44 (1.42; 673)	4	0.55	-1.05

Note. All scale minimums are 0.

Factor Analysis

The hypothesized confirmatory factor model was specified and estimated via maximum-likelihood estimation due to MCMI-III personality scales falling well within guidelines for appropriate skew and kurtosis (Curran et al., 1996). The initial model did not converge, and analyzing partial model output, a Heywood case was found on the fourth factor with loadings on the Compulsive, Antisocial, and Borderline scales. Due to the large sample, removal of multivariate outliers, and the model being theoretically identified, the most likely issue was judged to be model misspecification (Kline, 2011, p. 158). To determine where the misspecification might have occurred, an EFA was conducted (Tabachnick & Fidell, 2013; Watkins, 2018). For the factor analysis, complete cases ($n = 618$) on the MCMI-III scales were used. Statistical tests (e.g., Fisher's exact tests and ANOVAs) revealed that complete cases and incomplete cases did not differ significantly on any demographic or MCMI-III personality scale. A Fisher's exact test did reveal that datasets were different in proportions of missingness ($p = .0316$); however, this difference did not remain when accounting for all miscoded values ($n = 18$) on the MCMI-III which were all found in the mixed-gender dataset.

Before factor extraction Kaiser-Meyer-Olkin (KMO) factor adequacy was examined (KMO = 0.93) and found to be "marvelous" (Watkins, 2018). This indicated a

substantial amount of unique factor variance within the MCMI-III personality scales.

Four factors were extracted using the principal axis factoring method due to its common use and lack of distributional assumptions (Tabachnick & Fidell, 2013; Watkins, 2018). A direct oblimin rotation was used to allow for factor correlation, if present. Tables 5 and 6 display the correlation matrices for the data, and Table 7 presents the exploratory factor solution.

Table 5*Personality Scales Correlation Matrix*

	Schz	Avoid	Depr	Depnd	Hist	Narc	Antis	Sadis	Comp	Negat	Maso	Schtyp	Brln	Paran
Schz	1.00													
Avoid	0.53	1.00												
Depr	0.52	0.70	1.00											
Depnd	0.39	0.67	0.65	1.00										
Hist	-0.12	-0.09	-0.05	0.13	1.00									
Narc	0.30	0.34	0.30	0.34	0.31	1.00								
Antis	0.28	0.33	0.40	0.39	0.25	0.38	1.00							
Sadis	0.38	0.44	0.43	0.37	0.19	0.50	0.52	1.00						
Comp	0.13	0.03	0.00	0.10	0.30	0.26	-0.01	0.13	1.00					
Negat	0.49	0.64	0.61	0.58	0.11	0.48	0.48	0.64	0.06	1.00				
Maso	0.45	0.67	0.70	0.61	0.01	0.33	0.46	0.46	-0.04	0.59	1.00			
Schtyp	0.58	0.66	0.62	0.60	0.02	0.47	0.36	0.50	0.11	0.66	0.58	1.00		
Brln	0.49	0.64	0.73	0.62	0.05	0.37	0.51	0.54	-0.02	0.66	0.66	0.66	1.00	
Paran	0.50	0.59	0.55	0.51	0.13	0.52	0.39	0.57	0.23	0.67	0.50	0.70	0.56	1.00

Note. $n = 618$

Table 6*Clinical Syndrome Correlation Matrix*

	Anxiety	Somatoform	Dysthymia	Alcohol	Drug	Major	Delusional
				Dependence	Dependence	Depression	Disorder
Anxiety	1.00						
Somatoform	0.54	1.00					
Dysthymia	0.65	0.62	1.00				
Alcohol	0.32	0.12	0.29	1.00			
Dependence							
Drug	0.24	0.07	0.21	0.41	1.00		
Dependence							
Major	0.63	0.68	0.74	0.25	0.08	1.00	
Depression							
Delusional	0.48	0.40	0.44	0.17	0.13	0.49	1.00
Disorder							

Note. $n = 654$

Table 7*Exploratory Factor Analysis Solution*

Scale	Factor 1	Factor 2	Factor 3	Factor 4
Schizoid	.32	.26	-.23	.26
Avoidant	.76	.04	-.14	.13
Depressive	.84	.02	-.08	-.03
Dependent	.90	-.15	.19	.05
Histrionic	.01	.09	.80	.03
Narcissistic	.02	.51	.23	.25
Antisocial	.18	.56	.19	-.28
Sadistic	-.03	.82	.04	.02
Compulsive	-.06	-.01	.31	.50
Negativistic	.36	.53	-.03	.07
Masochistic	.73	.14	-.02	-.13
Schizotypal	.49	.30	-.11	.28
Borderline	.63	.30	-.03	-.12
Paranoid	.26	.47	-.01	.36

Note. Correlations between factors are (F1, F2) = .67, (F1, F3) = -.08 (F1, F4) = .23, (F2, F3) = .13, (F2, F4) = .24, and (F3, F4) = .05. Salient loadings above 0.4 are highlighted in bold.

When examining the fourth factor, it was found that the Borderline scale only weakly loaded onto it, and the highest loading after the Compulsive scale was the

Paranoid scale. The model was respecified replacing the Borderline scale loading on the fourth factor with the Paranoid scale. Another invalid solution was found, with the covariance matrix of the latent variables not being positive definite. When inspecting model output, it was found that the variance for the fourth factor was not significant. This indicated that there was likely empirical under-identification as the fourth factor shared two of three loadings with the second factor. To help achieve factor distinctiveness, the Paranoid scale was moved from the second factor to the first factor. After this second respecification, the model converged to a valid solution. Dropping the paranoid loading from the first factor resulted in a nonconvergent model.

Model and Parameter Estimates

The baseline model demonstrated mixed fit ($n = 618$; $\chi^2(67) = 489.14$, $p < .001$; RMSEA = .101, 90% RMSEA CI [.093 .109], CFI = .916, AIC = 33279.05, BIC = 33447.25), and a judicious application of modification indices was used to arrive at an adequately fitting model. Modifications were added sequentially until all fit criteria reached appropriate values. The first modification consisted of allowing the Negativistic scale to cross-load onto the second factor. This seemed sensible as a negative, contrarian pattern is likely associated with antisociality and disagreeableness. The next modification was allowing the Schizotypal scale to cross-load onto the fourth factor. Given the respecification of paranoid onto the fourth factor, adding another more severe style appears consistent. The final modification suggested before reaching the target fit was allowing a correlation between the histrionic and compulsive disturbances. This again seemed justifiable as it may indicate an exogenous source of error shared by those two

scales, which might reflect the scales measuring some level of adaptive and healthy functioning alongside pathological functioning.

After these three modifications, the model was found to reach target fit ($n = 618$; $\chi^2(64) = 283.33, p < .001$; RMSEA = .074, 90% RMSEA CI [.066 .083], CFI = .956, AIC = 33079.23, BIC = 33260.72). The first factor had a variance of 4.53 ($SE = 0.35$; $p < .001$), the second 2.48 ($SE = .4$; $p < .001$), the third 1.6 ($SE = 0.32$; $p < .001$), and the fourth 0.51 ($SE = 0.12$; $p < .001$). The first factor was found to be significantly correlated with the second factor (*Covariance* = 2.31, $SE = 0.25$, $r = .69$, $p < .001$), but not the third (*Covariance* = -0.04, $SE = 0.18$, $r = -.02$, $p = .814$) or fourth factor (*Covariance* = 0.16, $SE = 0.15$, $r = .11$, $p = .275$). The second factor was found to be significantly correlated with the third (*Covariance* = -1.07, $SE = 0.23$, $r = -.54$, $p < .001$) and fourth factors (*Covariance* = 0.64, $SE = 0.14$, $r = .57$, $p < .001$). The third factor was found to be significantly correlated with the fourth factor (*Covariance* = -0.2, $SE = 0.08$, $r = -.22$, $p = .014$). The histrionic and compulsive disturbances were also found to be significantly correlated (*Covariance* = 0.77, $SE = 0.11$, $r = .34$, $p < .001$). Table 8 lists all factor loadings.

Table 8*Measurement Model Factor Loadings*

Scale	Factor 1	Factor 2	Factor 3	Factor 4
Schizoid	-	0.85	0.68	-
Avoidant	0.83	-	0.14	-
Depressive	0.85	-	-	-
Dependent	0.76	-	-	-
Histrionic	-	-	-0.60	-
Narcissistic	-	0.67	-	-
Antisocial	-	0.85	-	-0.41
Sadistic	-	0.77	-	-
Compulsive	-	-	-	0.40
Negativistic	0.46	0.45	-	-
Masochistic	0.80	-	-	-
Schizotypal	0.73	-	-	0.33
Borderline	0.83	-	-	-
Paranoid	0.62	-	-	0.53

Note. All loadings are fully standardized (STD_{yx})

It should be noted that some substantial cross-loadings are exhibited in this factor structure involving the Schizoid, Negativistic, and Paranoid scales. These cross-loadings are to be expected in a polythetic model. Millon (2011) devoted considerable attention to discussing similarities and covariations among his personality spectra. Although some

statistical techniques are designed to minimize these cross-loadings, Tabachnick and Fidell (2013) noted the richness that emerges from allowing these cross-loadings and considering factor correlations. Due to latent factors in SEM being composed of shared variance between items (Kline, 2011), it is important to interpret cross-loadings by examining them in tandem with the other scales that load onto their respective latent variables. For example, the Negativistic scale on the first (neuroticism) factor might represent negative affect and erratic emotional disposition, and its relationship to the second (antisociality) factor might represent its contrarian and irritable interpersonal style. More detail about the interpretation of these factors is provided in the discussion section.

The first factor appears to represent broad neuroticism and had significant loadings on the MCMI-III Depressive (*Loading* = 1, *SE* = 0), Masochistic (*Loading* = 0.8, *SE* = 0.03, $p < .001$), Dependent (*Loading* = 0.81, *SE* = 0.04, $p < .001$), Borderline (*Loading* = 0.91, *SE* = 0.04, $p < .001$), Avoidant (*Loading* = 0.93, *SE* = 0.04, $p < .001$), Negativistic (*Loading* = 0.53, *SE* = 0.05, $p < .001$), Schizotypal (*Loading* = 0.91, *SE* = 0.05, $p < .001$), and Paranoid scales (*Loading* = 0.74, *SE* = 0.06, $p < .001$).

The second factor appears to represent antisociality/disagreeableness and reflected significant positive loadings from the MCMI-III Antisocial (*Loading* = 1, *SE* = 0), Narcissistic (*Loading* = 0.86, *SE* = 0.08, $p < .001$), Sadistic (*Loading* = 0.96, *SE* = 0.08, $p < .001$), Schizoid (*Loading* = 1.01, *SE* = 0.1, $p < .001$), and Negativistic (*Loading* = 0.7, *SE* = 0.09, $p < .001$) scales.

The third factor appears to represent introversion versus extraversion and displayed significant positive loadings on the MCMI-III Schizoid ($Loading = 1, SE = 0$) and Avoidant scales ($Loading = 0.26, SE = 0.07, p < .001$) and a negative loading on the Histrionic scale ($Loading = -0.82, SE = 0.12, p < .001$).

A final factor appears to represent conscientiousness/self-restraint and revealed significant positive loadings on the MCMI-III Compulsive ($Loading = 1, SE = 0$), Paranoid ($Loading = 1.88, SE = 0.27, p < .001$), and Schizotypal ($Loading = 1.21, SE = 0.19, p < .001$) scales, and a significant negative loading on the Antisocial ($Loading = -1.06, SE = 0.21, p < .001$) scale.

Disturbances, which represent exogenous variance unrelated to model factors, were all found to be significant for each scale as follows: depressive ($Disturbance = 1.82, SE = 0.13, p < .001$), masochistic ($Disturbance = 1.63, SE = 0.11, p < .001$), dependent ($Disturbance = 2.13, SE = 0.14, p < .001$), borderline ($Disturbance = 1.65, SE = 0.11, p < .001$), avoidant ($Disturbance = 1.65, SE = 0.12, p < .001$), negativistic ($Disturbance = 1.85, SE = 0.13, p < .001$), schizotypal ($Disturbance = 2.12, SE = 0.15, p < .001$), paranoid ($Disturbance = 1.64, SE = 0.19, p < .001$), antisocial ($Disturbance = 1.74, SE = 0.14, p < .001$), narcissistic ($Disturbance = 2.19, SE = 0.15, p < .001$), sadistic ($Disturbance = 1.54, SE = 0.12, p < .001$), schizoid ($Disturbance = 1.54, SE = 0.16, p < .001$), histrionic ($Disturbance = 1.88, SE = 0.17, p < .001$), and compulsive ($Disturbance = 2.66, SE = 0.17, p < .001$). Figure 3 shows the final measurement model with standardized loadings and disturbances.

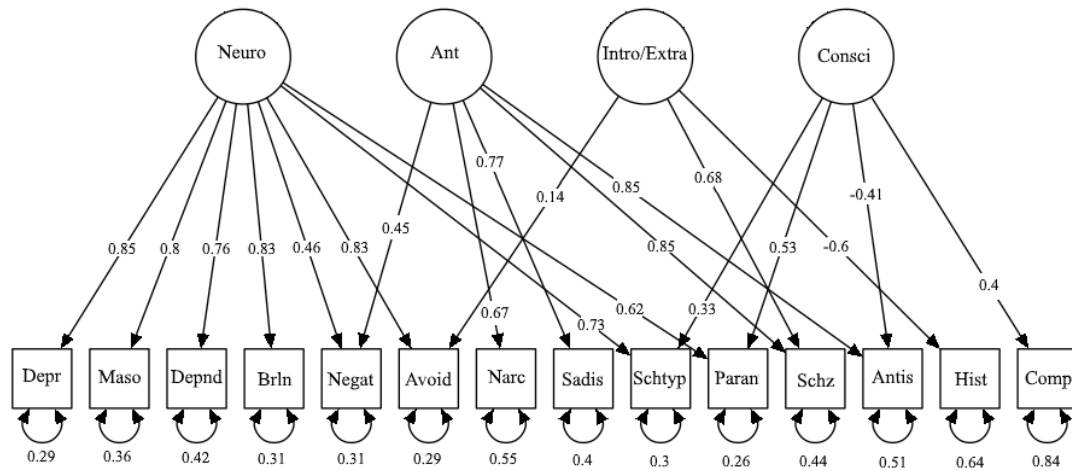


Figure 3. Standardized Factor Loadings and Disturbances.

Results did not appreciably change using robust standard errors and full-information maximum likelihood estimation ($n = 676$; $\chi^2_{\text{YB}}(64) = 290.26$, $p < .001$; Robust RMSEA = .073, 90% Robust RMSEA CI [.064 .081], Robust CFI = .958, AIC = 35852.46, BIC = 36100.85), with the exception that the correlation between the third and fourth factors was no longer significant.

Additionally using the modified Masochism scale with item 19 removed did not result in any appreciable difference in the model ($n = 626$; $\chi^2(64) = 299.15$, $p < .001$; RMSEA = .077, 90% RMSEA CI [.068 .085], CFI = .953, AIC = 33411.12, BIC = 33593.13), and the fit was slightly worse. Results did not appreciably change using robust standard errors and full-information maximum likelihood estimation ($n = 676$; $\chi^2_{\text{YB}}(64) = 299.95$, $p < .001$; Robust RMSEA = .074, 90% Robust RMSEA CI [.066 .083], Robust CFI = .956, AIC = 35761.51, BIC = 36009.9), with the exception that correlation between the third and fourth factor was no longer significant.

Invariance Testing

To test for invariance in the MCMI-III personality factor structure between the two datasets, first a configural multigroup model was specified with the model being estimated in both groups. Results revealed that the configural model displayed adequate fit ($n = 618$; $\chi^2(128) = 383.15$, $p < .001$; RMSEA = .08, 90% RMSEA CI [.071 .09], CFI = .949, AIC = 33082.48, BIC = 33569.4). The next step in the invariance testing was imposing metric constraints on the loadings between the samples and refitting the model. The metrically constrained model also fit the data adequately ($\chi^2(144) = 403.6$, $p < .001$; RMSEA = .076, 90% RMSEA CI [.068 .085], CFI = .948, AIC = 33070.94, BIC = 33487.03). A likelihood-ratio test revealed no significant difference in model fit between the configural model and the metrically invariant model ($\chi^2(16) = 20.46$, $p = .2$; $\Delta\text{CFI} = .001$). Finally, scalar invariance was tested by constraining scale intercepts to be equal between groups. The scalar invariance model also fit the data adequately ($\chi^2(154) = 437.81$, $p < .001$; RMSEA = .077, 90% RMSEA CI [.069 .086], CFI = .943, AIC = 33085.15, BIC = 33456.97). Although the likelihood-ratio test was significant, indicating significantly worse fit in the scalar invariant model ($\chi^2(10) = 34.21$, $p < .001$; $\Delta\text{CFI} = .005$), the use of chi-squared tests has been criticized for being overly sensitive (Hirschfeld & von Brachel, 2014; Milfont & Fischer, 2010; Putnick & Bornstein, 2016). Following conventions of a ΔCFI less than .01 and ΔRMSEA less than .01, especially for scalar invariance (Putnick & Bornstein, 2016), it appears that scalar invariance was supported across the datasets as well. Despite evidence for scalar invariance holding across time for the two samples, this may not necessarily be attributed to chronological

equivalency. It is possible that outside effects, such as the influence on participants from being in mental health treatment or being from the same geographic area are reflected in the similar of factor structures across time between the samples.

As additional tests of invariance, the model was compared across male and female participants, as well as White and Black, Indigenous, and people of color (BIPOC) participants. Likely due to reductions in the sizes of various compared subgroups and the complexity of the model, joint multigroup models could not be fit for either gender or cultural identity while estimating the model mean structure. However, configural and metric invariance could be examined for each (Hirschfeld & von Brachel, 2014; Milfont & Fischer, 2010).

The configural model involving a comparison between genders was found to fit adequately ($n = 618$; $\chi^2(128) = 350.48$, $p < .001$; RMSEA = .075, 90% RMSEA CI [.066 .084], CFI = .956, AIC = 33049.66, BIC = 33412.64). The next step in the invariance testing involved imposing metric constraints on the loadings between the groups and refitting the model. The metrically constrained model also fit the data adequately ($\chi^2(144) = 372.1$, $p < .001$; RMSEA = .072, 90% RMSEA CI [.063 .081], CFI = .955, AIC = 33039.28, BIC = 33331.43). A likelihood-ratio test revealed no significant difference in model fit between the configural model and the metrically invariant model ($\chi^2(16) = 21.62$, $p = .156$; $\Delta\text{CFI} = .001$). Despite the apparent evidence for metric invariance in personality structure between genders, this comparison between genders is nested within time. Due to males being from one sample and females being from both samples, these invariance tests cannot separate out effects that might be attributed to

gender similarities in personality versus potential chronological similarities between the samples.

The configural model involving a comparison between White and BIPOC participants was found to fit adequately ($n = 590$; $\chi^2(128) = 344.23$, $p < .001$; RMSEA = .076, 90% RMSEA CI [.066 .085], CFI = .955, AIC = 31454.59, BIC = 31813.76). The next step in the invariance testing involved imposing metric constraints on the loadings between the groups and refitting the model. The metrically constrained model also fit the data adequately ($\chi^2(144) = 360.57$, $p < .001$; RMSEA = .071, 90% RMSEA CI [.062 .081], CFI = .955, AIC = 31438.92, BIC = 31728.01). A likelihood-ratio test revealed no significant difference in model fit between the configural model and the metrically invariant model ($\chi^2(16) = 16.33$, $p = .43$; $\Delta\text{CFI} < .001$). Results of the invariance testing did not appreciably change when excluding Hispanic-identifying individuals from the mixed-gender dataset ($\chi^2(16) = 16$, $p = .453$; $\Delta\text{CFI} < .001$).

Structural Equation Models

Personality Factors and Depressive Symptoms

The first model included the four-factor structure obtained in the confirmatory analyses as well a variable measuring depressive symptoms which was the sum of the prototypical items of the MCMI-III Major Depression and Dysthymia scales. This criterion variable was regressed onto the first neuroticism factor and the third introversion factor. The model was fit ($n = 617$; $\chi^2(76) = 372.16$, $p < .001$; RMSEA = .079, 90% RMSEA CI [.072 .088], CFI = .948, AIC = 35737.12, BIC = 35931.82), and found that all measurement model parameters were significant except the covariances between the first

and third and first and fourth factors. Examination of structural regression coefficients revealed that broad neuroticism ($b = 1.37$, $SE = 0.06$, $STD_{yx} = 0.82$, $p < .001$) and introversion ($b = 0.53$, $SE = 0.1$, $STD_{yx} = 0.2$, $p < .001$) were significantly associated with overall depressive symptomatology.

Results were consistent compared to the full-information maximum likelihood estimation model ($n = 676$; $\chi^2_{(76)} = 386.55$, $p < .001$; Robust RMSEA = .078, 90% Robust RMSEA CI [.071 .086], Robust CFI = .949, AIC = 38776.32, BIC = 39042.78) with robust standard errors. In this model, again, it was found that both broad neuroticism ($b = 1.35$, $SE = 0.05$, $STD_{yx} = 0.82$, $p < .001$) and introversion ($b = 0.53$, $SE = 0.09$, $STD_{yx} = 0.2$, $p < .001$) were significantly associated with overall depressive symptomatology.

Personality Factors and Anxiety Symptoms

The second model included the four-factor structure obtained in the confirmatory analyses as well as a variable measuring anxious symptoms. This criterion variable was regressed onto the first neuroticism factor and the third introversion factor. The model was fit ($n = 616$; $\chi^2_{(76)} = 316.78$, $p < .001$; RMSEA = .072, 90% RMSEA CI [.064 .08], CFI = .956, AIC = 34970.6, BIC = 35165.23), and it was found that all measurement model parameters were significant except the covariances between the first and third, and first and fourth factors. The structural regression coefficients revealed that although broad neuroticism ($b = 0.66$, $SE = 0.03$, $STD_{yx} = 0.77$, $p < .001$) was significantly linked with anxious symptomatology, introversion ($b = 0.03$, $SE = 0.05$, $STD_{yx} = 0.02$, $p = .5$) was not.

Results were consistent with those of the full-information maximum likelihood estimation model ($n = 676$; $\chi^2_{\text{YB}}(76) = 322.63$, $p < .001$; Robust RMSEA = .07, 90% Robust RMSEA CI [.062 .078], Robust CFI = .958, AIC = 38018.73, BIC = 38285.18) with robust standard errors. In this model, again, it was found that broad neuroticism ($b = 0.66$, $SE = 0.02$, $STD_{yx} = 0.78$, $p < .001$) was significantly linked with anxious symptomatology although introversion ($b = 0.03$, $SE = 0.06$, $STD_{yx} = 0.02$, $p = .617$) was not. The covariance between the third and fourth factor was not found to be significant.

Personality Factors and Somatoform Symptoms

The third model included the four-factor structure obtained in the confirmatory analyses as well as a variable measuring somatoform symptoms. This criterion variable was regressed onto the first neuroticism factor. The model was fit ($n = 618$; $\chi^2(77) = 349.7$, $p < .001$; RMSEA = .076, 90% RMSEA CI [.068 .084], CFI = .948, AIC = 35225.05, BIC = 35415.39), and it was found that all measurement model parameters were significant except the covariances between the first and third, and first and fourth factors. Examining the structural regression coefficients revealed that broad neuroticism ($b = 0.44$, $SE = 0.03$, $STD_{yx} = 0.57$, $p < .001$) was significantly associated with somatoform symptomatology.

Results were consistent with those observed in the full-information maximum likelihood estimation model ($n = 676$; $\chi^2_{\text{YB}}(77) = 358.61$, $p < .001$; Robust RMSEA = .074, 90% Robust RMSEA CI [.066 .082], Robust CFI = .95, AIC = 38169.05, BIC = 38430.99) with robust standard errors. In this model, again, it was found that broad

neuroticism ($b = 0.45$, $SE = 0.02$, $STD_{yx} = 0.58$, $p < .001$) was significantly linked with somatoform symptomatology.

Personality Factors and Substance Use Symptoms

The fourth model included the four-factor structure obtained in the confirmatory analyses as well as a variable measuring combined substance dependence symptoms which was the sum of the prototypical items of the MCMI-III Alcohol Dependence and Drug Dependence scales. This criterion variable was regressed onto the second antisociality/disagreeableness factor. The model was fit ($n = 614$; $\chi^2(77) = 466.4$, $p < .001$; RMSEA = .091, 90% RMSEA CI [.083 .099], CFI = .926, AIC = 35906.11, BIC = 36096.17), and it was found that all measurement model parameters were significant except the covariances between the first and third, and first and fourth factors. Examination of structural regression coefficients revealed that antisociality/disagreeableness ($b = 0.85$, $SE = 0.1$, $STD_{yx} = 0.43$, $p < .001$) was significantly associated with substance dependence symptomatology.

Results were consistent with those obtained in the full-information maximum likelihood estimation model ($n = 676$; $\chi^2_{\text{FB}}(77) = 475.12$, $p < .001$; Robust RMSEA = .088, 90% Robust RMSEA CI [.08 .095], Robust CFI = .929, AIC = 39173.69, BIC = 39435.63) with robust standard errors. In this model, again, it was found that antisociality/disagreeableness ($b = 0.86$, $SE = 0.11$, $STD_{yx} = 0.44$, $p < .001$) was significantly linked with substance dependence symptomatology. The covariance between the third and fourth factor was not found to be significant.

Personality Factors and Delusional Symptoms

The fifth model included the four-factor structure obtained in the confirmatory analyses as well as a variable measuring delusional/psychotic symptoms. This criterion variable was regressed onto the first broad neuroticism factor. The model was fit ($n = 618$; $\chi^2(77) = 425.66$, $p < .001$; RMSEA = .086, 90% RMSEA CI [.078 .094], CFI = .935, AIC = 34997.79, BIC = 35188.13), and it was found that all measurement model parameters were significant except the covariances between the first and third, and first and fourth factors. The structural regression coefficients indicated that broad neuroticism ($b = 0.41$, $SE = 0.03$, $STD_{yx} = 0.61$, $p < .001$) was significantly associated with delusional symptomatology.

Results were consistent with the full-information maximum likelihood estimation model ($n = 676$; $\chi^2_{YB}(77) = 429.35$, $p < .001$; Robust RMSEA = .083, 90% Robust RMSEA CI [.075 .091], Robust CFI = .939, AIC = 37948.91, BIC = 38210.85) with robust standard errors. In this model, again, it was found that broad neuroticism ($b = 0.41$, $SE = 0.02$, $STD_{yx} = 0.61$, $p < .001$) was a significant predictor of delusional symptomatology. The covariance between the third and fourth factor was not found to be significant.

Exploratory Models

To better understand the fourth factor and how it might align with Millon's idea of compulsiveness being connected with anxiety, the anxiety criterion variable was regressed onto the fourth factor. However, this model did not converge. Respecification was pursued by including the first broad neuroticism factor as a structural regressor. This

respecified model was fit ($n = 616$; $\chi^2(76) = 315.11$, $p < .001$; RMSEA = .071, 90% RMSEA CI [.063 .08], CFI = .957, AIC = 34968.94, BIC = 35163.56), and it was found that all measurement model parameters were significant except the covariances between the first and third, and first and fourth factors. Examination of the structural regression coefficients revealed that although broad neuroticism ($b = 0.65$, $SE = 0.03$, $STD_{yx} = 0.76$, $p < .001$) was a significant predictor of anxious symptomatology, the fourth factor ($b = 0.13$, $SE = 0.09$, $STD_{yx} = 0.05$, $p = .15$) was not. The full-information maximum likelihood model with robust standard errors did not converge.

As a follow-up to this, given the presence of the paranoid and schizotypal loadings on the fourth factor after respecification, this factor's potential association to delusional symptoms was investigated. Model fit was examined with the primary four-factor structure obtained in the confirmatory analyses as well as a variable measuring delusional symptoms. This criterion variable was regressed onto the first broad neuroticism factor and the fourth factor. The model was fit ($n = 618$; $\chi^2(76) = 346.17$, $p < .001$; RMSEA = .076, 90% RMSEA CI [.068 .084], CFI = .95, AIC = 34920.31, BIC = 35115.07), and it was found that all measurement model parameters were significant except the covariances between the first and third, and first and fourth factors. Examination of the structural regression coefficients revealed that broad neuroticism ($b = 0.34$, $SE = 0.03$, $STD_{yx} = 0.52$, $p < .001$) and the fourth factor ($b = 0.85$, $SE = 0.14$, $STD_{yx} = 0.39$, $p < .001$) were significantly associated with delusional symptomatology. As the fifth model, examining the connection between broad neuroticism and delusional symptoms is nested within this model, they can be compared using a likelihood-ratio test.

It was found that adding the fourth factor as a predictor of delusional symptoms significantly improved the model ($\chi^2(1) = 79.49, p < .001$) over and above the model with only the broad neuroticism factor included.

Results were consistent with the full-information maximum likelihood estimation model ($n = 676$; $\chi^2_{YB}(76) = 358.57, p < .001$; Robust RMSEA = .074, 90% Robust RMSEA CI [.067 .082], Robust CFI = .951, AIC = 37874.18, BIC = 38140.64) with robust standard errors. In this model, again, it was found that both broad neuroticism ($b = 0.35, SE = 0.05, STD_{yx} = 0.53, p < .001$) and the fourth factor ($b = 0.8, SE = 0.2, STD_{yx} = 0.37, p < .001$) were significant predictors of delusional symptomatology. In this model, the covariance between the third and fourth factor was found to be not significant. A scaling-corrected likelihood-ratio test between both robust models also found the addition of the fourth factor as a predictor of delusional symptoms was an improvement ($\chi^2(1) = 37.26, p < .001$).

Chapter 5: Discussion

Study Overview

Despite advances in general consensus models designed to enhance understanding of interrelationships among psychiatric conditions and expressions of psychopathology, important criticisms have focused on their strict empirically derived dimensional emphasis and on the absence of a guiding theoretical foundation (Haefffel et al., 2021). Emerging dimensional models have not clearly articulated differences among constructs assumed to reveal stable and pervasive patterns of thinking, feeling, and behaving formerly categorized distinctly as personality disorders and those characterized as symptom syndromes defined as less stable and more circumscribed in influence. Theodore Millon's model reflects considerable emphasis on symptom syndromes as reflecting disturbances triggered when stressors impact vulnerable personalities (Choca & Grossman, 2015; Millon, 2011; Pincus & Krueger, 2015). Personality disorders are viewed, in an organizing hierarchical structure, as vulnerability factors for the development of other disorders (Belsky & Pluess, 2009).

This study examines latent factors, derived from Millon's differentiated model of personality disorders, in a diverse clinical sample. The hypothesized personality structure was guided, in part, by theory and findings from previous studies as were anticipated relationships between personality and clinical symptom expression.

Latent factors of personality and psychiatric symptom indicators were based on the MCMI-III. A total of 676 participants were drawn from two distinct clinical samples: the first a mixed-gender sample consisting of individuals exhibiting mental illness from

community-based mental health treatment programs; the second, pregnant and post-partum substance using women with mental illness. Data were cleaned, descriptive statistics were reported. Rasch models were examined for each of the 14 MCMI-III personality scales to test for unidimensionality prior to factor analytic derivation. Using these personality scales, a modified confirmatory factor model was fit using a consensus structure derived from previous literature.

Using the derived factor structure, invariance testing of this structure was conducted between the two samples from which data were combined, between males and females, and between White and BIPOC participants. The strongest invariance was observed between the two samples, with support for scalar invariance. Only configural and metric invariance could be tested for gender and White and BIPOC participants. The factor structure appeared to be metrically invariant between genders and White and BIPOC participants. This suggests that the factors underlying the data and loadings on these factors between men and women and between White and BIPOC participants were equivalent.

Following tests of invariance, the identified latent personality factors were used to examine hypothesized associations with clinical symptom indices. It was found that the broad neuroticism factor was significantly and positively associated with depressive (controlling for introversion), anxious (controlling for introversion), somatoform, and psychotic symptomatology. It was also found that the antisociality/disagreeableness factor was significantly and positively related to substance dependence symptomatology. Study results revealed the introversion factor was positively associated with depressive

but not anxious symptomatology after controlling for neuroticism in separate analyses. Additional exploratory models revealed that a fourth factor reflecting conscientiousness/self-restraint was significantly associated with psychotic symptomatology even when controlling for broad neuroticism. Results were consistent between both complete-case models and robust, full-information models.

Discussion of Findings

MCMI Factor Structure

Although the MCMI-III personality factor structure derived in the current investigation was not consistent with those previously reported, it appeared that an interpretable and meaningful factor structure emerged from the MCMI-III similar to those found previously in Barbot et al.'s (2012) mixed community and clinical sample of women in the United States, Rossi et al.'s (2010) clinical and forensic sample using a Dutch translation of the MCMI-III, and Dyce et al.'s (1997) findings based on nonclinical university students in the United States. Personality scales were found to be largely unidimensional, representing consistent constructs from Millon's theory as measured by MCMI personality scale prototypical items. From these scales, error variance could be removed and common variance identified as representing four factors. This factor structure appeared to be scalar invariant across both samples from this study.

The first hypothesis stated there would be a factor, representing broad neuroticism, with significant loadings on the MCMI-III Depressive, Masochistic, Dependent, Borderline, Avoidant, Negativistic, and Schizotypal scales. Broadly supporting this hypothesis, the first factor was indicated by significant loadings on the

Depressive, Masochistic, Dependent, Borderline, Avoidant, Passive–Aggressive, and Schizotypal scales. This factor also had a significant loading on the Paranoid scale after modification. Largely consistent with both Dyce et al. (1997) and Rossi et al. (2010), this first factor appears clearly to reflect broad neuroticism or internalizing psychopathology with significant loadings on a series of MCMI-III personality scales. This factor shared all significant loadings with those found by Rossi et al. (2010), excluding the small Sadistic scale loading which authors added as a modification, and this factor also shared all salient loadings identified in Dyce et al. (1997).

The first hypothesis also anticipated the emergence of a factor reflecting antisociality/disagreeableness that would reveal significant positive loadings from the MCMI-III Antisocial, Narcissistic, Sadistic, Schizoid, and Paranoid scales. This study found substantial support for such a factor which was characterized by significant positive loadings on the MCMI-III Antisocial, Narcissistic, Sadistic, and Schizoid scales; however, the Paranoid scale in this model was not associated with this second factor. In addition, modification indices suggested the addition of the Negativistic scale to this factor consistent with findings from both Rossi et al. (2010) and Dyce et al. (1997). It appears that the second factor broadly represents disagreeable or antisocial proclivities marked by grandiosity, a retaliatory and contrary interpersonal style, and guardedness against outside threats. Unlike Rossi et al. (2010) and Dyce et al.'s findings (1997), but consistent with findings from Barbot et al. (2012), the Schizoid scale played a large role in defining this factor. Psychometric investigations of schizoid and antisocial personality disorders have found a substantial correlation between the two constructs which authors

attribute to shared features including emotional detachment, coldness, and low empathy (Căndel & Constantin, 1999).

In addition to a broad neuroticism factor and an antisociality/disagreeableness factor, the first hypothesis also anticipated an introversion versus extraversion factor featuring a significant positive loading on the MCMI-III Schizoid scale and a negative loading on the Histrionic scale. Current study results revealed a factor with significant positive loadings on the Schizoid and Avoidant scales, and a prominent, negative loading on the Histrionic scale. This factor closely paralleled findings from Dyce et al. (1997) as well as from Rossi et al. (2010). It appears that this factor represents an introverted and detached style of relating to others versus an outgoing and social engagement seeking style of extraversion.

Finally, the first hypothesis posited a conscientiousness/self-restraint factor with a significant loading on the MCMI-III Compulsive scale. Due to problems with this factor's initial specification, an exploratory factor modification approach was adopted. After modification, a fourth factor was identified that was characterized by significant positive loadings from the Compulsive and Paranoid scales and a negative loading from the Antisocial scale. Although the Borderline scale was hypothesized to load meaningfully on the fourth factor, it was replaced with the Paranoid scale to achieve acceptable factor specification. This model redefinition led to a structure inconsistent with that identified in Dyce et al. (1997) and Rossi et al. (2010), as in those studies the Borderline scale was more prominently represented than the Paranoid scale. Haddy et al. (2005) also identified a personality scale factor labeled "low versus high emotional

constraint” with salient positive loadings on the Antisocial and Borderline scales and a salient negative loading on the Compulsive scale.

A benefit of SEM in addition to enabling specification of a priori factor structures, is the ability to examine the covariances between these factors. In the current investigation significant positive and negative correlations were found between identified factors. Barbot et al. (2012) also reported substantial positive and negative correlations among factors except between the neuroticism factor and both the introversion versus extraversion and conscientiousness/self-restraint factors. It is possible to examine interrelationships among factors and provide some context to their meaning.

It was found that the broad neuroticism factor was significantly correlated ($r = .69$) with the second disagreeable antagonism factor. This is consistent with previous findings of linkages between internalizing symptoms and externalizing symptoms. It has been suggested that elements of disinhibition which underlie antisociality have been found to predict internalizing distress (Latzman et al., 2019). Especially relating to antisociality, it is important to note that despite outward demonstrations of imperiousness and strength there can be substantial experience of vulnerability, distress and compensatory coping underlying these outward appearances (Millon, 2011). The antisociality/disagreeableness factor was also significantly positively correlated with the fourth factor ($r = 0.57$), a surprising finding given the fourth factor was characterized by high Compulsive scale loadings and low Antisocial scale loadings. This reveals that higher levels of antisociality were associated with increased levels of self-control or constraint. The antisociality/disagreeableness factor was also significantly negatively

correlated with the introversion versus extraversion factor ($r = -.54$). Millon (2011) notes that the basic antisocial spectrum should covary particularly with the histrionic spectrum. Although individuals expressing antisociality/disagreeableness might be characterized as disagreeable, impulsive, vindictive, guarded, and contrarian, they may also see themselves as interpersonally active, exciting, flirtatious, and self-confident. The final correlation of note was between the introversion versus extraversion and conscientiousness/self-restraint factor, with a significant negative correlation ($r = -.22$) suggesting linkage between extraversion and conscientiousness/self-restraint.

Personality Factor and Clinical Syndrome Relationships

Millon's model regarding personality and psychopathology provided substantial guidance regarding specification of hypotheses regarding relationships between personality disorder types and clinical symptom syndrome expression. Further, even though there were observed differences between the current study's MCMI-III personality dimensional structure and those previously reported (Barbot et al., 2012; Dyce et al., 1997; Haddy et al., 2005; Rossi et al., 2010), the substantial apparent consistency allows for examination of patterns of convergence and divergence in findings relevant to personality factor and clinical symptom relationships. The second study hypothesis stated that the broad neuroticism factor would be significantly and positively associated with depressive, anxious, somatoform, and psychotic symptomatology. The structural paths between the neuroticism factor and clinical symptom indices gauging depression, anxiety, somatoform disorder, and delusional disorder revealed support for the second hypothesis. The neuroticism factor was significantly and positively associated

with all these symptom indices, and these relationships held after controlling for the introversion factor when examining depressive and anxious symptoms. These results serve to support findings reported by Haddy et al. (2005).

In Haddy et al.'s (2005) study drawing upon a large sample of male military veterans, a three-factor structure was identified using the MCMI-III personality scales. In Haddy et al. (2005), the first personality factor had substantial (≥ 0.4) positive loadings on the Avoidant, Depressive, Schizotypal, Masochistic, Schizoid, Negativistic, Borderline, Paranoid, and Dependent scales and a substantial negative loading on the Histrionic scale. This factor blends neuroticism and introversion into one broad factor which authors labeled as social detachment/introversion versus extraversion. Haddy et al. then correlated factor scores with a clinical symptom syndrome factor they labeled depression/anxiety with thought disorder. This MCMI-III-based symptom factor was characterized by prominent loadings on the Major Depression, Dysthymia, Somatoform, Anxiety, Thought Disorder, and PTSD clinical syndrome scales. In the current investigation, distinct neuroticism and introversion/extraversion factors were specified. Associations between the neuroticism factor and a broad range of clinical symptom indicators were identified. These neuroticism-symptom relationships did not depend upon the contribution of introversion/extraversion elements which was identified in a separate factor. The emergence of this broad neuroticism personality factor from the Millon's theory-derived MCMI-III represents a useful bridge to general consensus models, such as HiTOP. By examining the interrelationships among Millon's constructs enable better

understanding the potential connections among spectra such as internalizing, somatoform, and thought disorder identified in both models.

The third hypothesis, which posited a significant positive association between the antisociality/disagreeableness factor and mixed substance abuse symptomatology was supported in the current study. This is consistent with the Haddy et al. (2005)-identified linkage between the MCMI-III “hostile dominance” oriented personality and substance abuse symptom factors. In Haddy et al. (2005), the hostile dominance personality factor was characterized by substantial MCMI-III scale loadings on the Narcissistic, Histrionic, Sadistic, Antisocial, and Paranoid scales. The MCMI-III-based substance abuse factor included substantial loadings only on the Alcohol and Substance Dependence scales. In contrast to Haddy et al.’s (2005) clinical sample, Markon (2010) used a large, general, epidemiological sample and a variety of clinical measures and found support for a broad externalizing factor characterized by loadings on antisociality, attention seeking, emotional lability, hostility as well as drug and alcohol problems.

It is no surprise that a model undergirding Millon’s clinical instrument would generate results in accordance with others examining a relationship between substance use and antisociality/disagreeableness. However, Millon’s theoretical perspective offers additional context and framing not often found in other broad consensus approaches. For example, in the HiTOP model, substance abuse is placed in the disinhibited externalizing spectrum and in Markon’s model alongside a number of deficits or maladjustments. In attempting to find more biologically or neurologically grounded causes for substance use disorders it may be tempting to adopt a reductionistic approach and frame constructs

within a deficits-based model. However, one of the benefits of Millon's model of personality and psychopathology is that it speaks to the contribution of biological factors, but also addresses maladaptive patterns of thinking, behaving, and emotional responding that create vulnerabilities to stressor-induced emergence of clinical symptom syndromes. Insofar as substance use disorders might be indicative of deficits in inhibitory pathways or reflect attitudes about contempt for social norms, Millon (2011) reminds us that linkages between antisociality and substance syndromes are likely complex: "In great measure, this covariation can be attributed to criterion overlap, common economic influences, and social dynamics, rather than to biological vulnerabilities or intrapsychic susceptibilities that are distinct to any specific personality" (p. 460).

The fourth hypothesis was that the introversion versus extraversion factor, controlling for the neuroticism factor, would be significantly associated with depressive and anxious symptomatology. Support for this hypothesis was mixed, with introversion revealing significant positive linkage with depressive symptoms but not with anxious symptoms. As noted previously, Haddy et al. (2005) found a significant relationship between a broad MCMI-III social detachment/introversion versus extraversion personality factor and a broad clinical syndrome factor labeled depression/anxiety with thought disorder. This symptom factor had substantial loadings on depression scales. The lack of apparent consistency between current study findings and those of Haddy et al. (2005) regarding introversion's link with anxiety may be related to variations in sample characteristics and differences in MCMI-III scales defining both personality and symptom factors included in analyses. The Haddy et al. (2005) investigation identified a

very broad introversion/neuroticism personality factor and a factor-analytically derived symptom distress factor reflecting both anxious and depressed symptomology. In the current investigation, neuroticism and introversion were identified as separate personality factors. Further, separate indices gauging anxiety and depression were utilized. It was unclear from Haddy et al. (2005) whether their broad neuroticism factor reflected more elements of social isolation or broad internal distress, but findings from both Haddy and the current study suggest that both elements are associated with depressive symptoms. These findings are also consistent with those of Markon (2010) in that a pathological introversion factor, reflecting social anxiety, unassertiveness, and dependence, was related strongly to a broad internalizing factor which included depression as well as anxiety.

The fifth hypothesis, which posited that a conscientiousness/self-restraint factor would be significantly associated with anxious symptomatology, was not supported. A model using the fourth factor to predict anxious symptoms by itself would not converge. After the addition of the first factor as a regressor, the fourth factor was not related to anxious symptomatology. This did not support Millon's description of the compulsive spectrum being closely related to anxiety (Millon, 2011). Interpretations of this fourth factor, however, must be done with care given its problematic initial specification and modifications to fit the data. Although this factor's primary antipodal loadings on the Compulsive and Antisocial scales are consistent with factors found in previous studies (Dyce et al., 1997; Haddy et al., 2005; Rossi et al., 2010), the replacement of the borderline loading with the paranoid loading in the current investigation differs in model

modification procedures and in the derived factor structure. With methodological caveats in mind, it is possible that this factor represents a dimension of psychoticism that has been included as a distinctive personality domain in alternative models of personality (Krueger et al., 2012), and it could point to potential linkages between compulsiveness, self-control, and psychotic symptoms (Begemann et al., 2020; Kimhy et al., 2020; Raveendranathan et al., 2012).

Study Strengths

Strengths of this study include its diverse sample with respect to both psychopathology and cultural diversity, the use of a CFA approach in conjunction with Rasch models for assessing scale unidimensionality, and the separation of personality and clinical syndromes scales of the MCMI-III in analyses examining relationships between these two constructs. The combined clinical sample included individuals from both substance abuse and mental health treatment settings to represent individuals presenting a variety of mental health conditions. The majority in the sample identified as black and female from lower socioeconomic backgrounds. Given the gap between the promise of Millon's model with respect to cultural diversity and the empirical knowledge about the performance of the MCMI-III in these diverse groups, being able to examine potential differences among individuals of various identities is important in the promotion of culturally informed clinical evaluation. These comparisons help give context to study findings and highlight the potential scope of generalizability. Previous studies relating MCMI-III factor structure to general consensus models have used nonclinical, almost exclusively white, university student participants (Dyce et al., 1997), or participants from

both community and clinical populations (Barbot et al., 2012). Another research group, drawing upon participants from clinical and forensic settings, used a Dutch translation of the MCMI-III and did not report on the racial/ethnic characteristics of their total sample (Rossi et al., 2010), but did note a large subset of the sample used in a previous study were identified as non-Latino White (Rossi et al., 2007). The diverse clinical sample in the current study allowed for the preliminary investigation of invariance testing between men and women and between White and BIPOC participants. Furthermore, drawing exclusively upon substance abuse and mental health treatment settings in the current study enabled identification of a clinically meaningful MCMI personality disorder factor structure in association with clinical symptom expression. This study also shows that general MCMI-III based factors of personality, derived in diverse clinical samples, substantially paralleled models of psychopathology derived from mainstream empirical investigations (Fowler et al., 2022; Kotov et al., 2010; Krueger et al., 2012).

Another strength of this study was its use of structural equation modeling and CFA approaches in examining the personality factor structure of the MCMI-III and relationships among those factors and psychiatric symptoms. Previous investigations of the MCMI-III personality disorder factor structure and clinical symptoms have used a variety of exploratory factor approaches (Haddy et al., 2005). In investigating variations among cultural subgroups in measurement properties of the MCMI-III, others have relied upon factor models combining both personality and clinical syndrome scales in a single exploratory analysis (Alareqe et al., 2021; Pignolo et al., 2017; Rossi et al., 2007). Using a confirmatory approach avoids complications which can arise from factor rotation

choices or the use of factor versus principal component extraction. A confirmatory approach also offers the benefits of allowing a priori model specification, the assessment of model fit, significance tests for loadings and other model components, and testing suggested modifications to the model (Kline, 2011). Confirmatory analysis also provides a general framework which allows for the estimation of robust standard errors and for incorporating all available information into a maximum-likelihood approach. In addition to this confirmatory approach in the current investigation, MCMI-III personality scales were examined using Rasch models and tests for unidimensionality to help provide support for including homogeneous and sensible constructs into the measurement model for factor estimation.

Study Limitations

In conjunction with strengths, there are also several study limitations. These include the exclusive reliance on the self-report-based MCMI-III for measurement of both personality and psychiatric symptom expression, the utilization of exploratory techniques in the derivation of the latent factors, the potential unexplored differences in factor structure and meaning related to racial and ethnic identity, and issues surrounding the generalizability of these results.

It is also important to recognize that limiting factor analyses of MCMI-III personality disorder scales to the subset of prototypical items which are considered to best define each prototype is inconsistent with the measurement model adopted by Millon in the original scale construction process. A potential problem with restricting scales to prototypical items is that some original MCMI-III scales have internal consistencies

which reflect configurations of endorsements capturing diverse meanings associated with complexly interrelated personality features shared with other personality disorders. For example, items defining dependent personality disorder scale could reflect submissiveness and/or a fear of abandonment, which are also of importance to the avoidant personality. Although both elements relate to an archetypal dependent personality spectrum, they capture different aspects of it and potentially different patterns of thoughts and behaviors that comingle with other prototypical personality patterns. Additionally, as noted by Grossman (2017), unlike the MCMI-III which underwent external-criterion validation with outside psychological instruments and clinician judgments of patients, this current study focused only on the internal structure of the instrument. Although these MCMI-III internal structural relationships are important, such analyses do not fully align with Millon's emphasis on establishing differential diagnostic criterion validity.

Relevant to diagnostic validity is that certain scales, designed to assess pathological personality functioning appear to gauge varying degrees of adaptive and pathological personality functioning. Even within the structural equation models, which can separate error variance from model indicators, modifications were made correlating the errors between the Histrionic and Compulsive scales. This indicates that there was an exogenous source of common error which could help explain findings from Dyce et al. (1997) surrounding high endorsements of these scales in a nonclinical sample, as well as from McMahon, Abbamonte, and Dévieux (2017) which showed the highest elevations on these scales in the low psychopathology cluster. Although Millon's theory reflects the

potential adaptive or pathological nature of any personality spectra, the MCMI-III Histrionic and Compulsive scales might be capturing more adaptive functioning with increasing endorsements on prototypical items. This is obviously problematic for scales designed to identify pathological personality styles.

Another limitation of this study was the use of exploratory techniques to respecify the original, hypothesized factor structure. The initial model, based on factor analytic findings from past research by Dyce et al. (1997) and Rossi et al. (2010), did not converge to a valid solution. Despite the relatively limited respecification required for convergence, inconsistencies in factor structure could reflect differences in sample characteristics compared with previous research, such as the limited geographic region from which the samples were collected and potential influences of ethnic and cultural factors given that the majority in the current sample identified as Black and female. The major variation in comparison with previous models involved the nature of the fourth factor (i.e., compulsiveness) with the Borderline scale limiting model fit and the Paranoid scale serving as a stronger indicator. With the goal of establishing a general consensus model for the factor structure of the MCMI-III, it would be ideal for the same model to be fit across multiple different samples, as modification may change the interpretation of latent factors between studies. Model modification also introduces additional subjectivity and potential bias into the specification and interpretation of latent factors (Gunderson, 2021).

It should also be noted that the factor models could not be tested for scalar invariance between gender and cultural identity. Although evidence of scalar invariance

could be demonstrated between the constituent samples of this study, full multigroup models with mean structures could not be established between either gender or cultural identity. Without establishing scalar invariance, direct comparisons between groups are not warranted, and the nature of potential differences cannot be clarified (Milfont & Fischer, 2010). Even though factors appeared metrically invariant between genders and cultural identity, external elements related to cultural differences and interactions could still manifest within these personality factors. Specifically, given the importance of psychosocial factors within Millon's model, broader socioeconomic and sociocultural factors could influence these latent factors which the MCMI-III is not sensitive to measuring or differentiating between. Subsequent research clarifying these possible sources of variance might add additional context to their interpretation and meaning (Church, 2009). An additional limitation in the comparison of White and BIPOC participants relates to how Hispanic ethnicity and ancestry were assessed as racial categories in the mixed-gender sample compared to the women-only sample where Hispanic ethnicity was assessed separately from race. Of the 87 individuals indicating a Hispanic identity, it is possible that White racial identity was conflated to some degree in the assessment.

Finally, a limitation of this study relates to the generalizability of findings. There could be biases present in the sample which make either the factor structure obtained or relationships between personality factor and clinical syndrome expression limited in generalization to groups outside this study. Such biases could reflect unique cultural, demographic, and psychiatric features of this study's combined sample which are more

diverse and varied than those found in previous personality factor structure studies. Given previously found differences between Black and White individuals with respect to MCMI-II scales reflecting paranoia and thought disorder (Munley et al., 1998), the nature of the fourth factor may reflect unique experiences of Black individuals, who comprised the majority of the sample. Scale elevations and the nature of factors, particularly the fourth, could reflect appropriate and adaptive levels of mistrust towards potential dangers from their environment and unique manifestations of distress stemming from hazard appraisals.

Study Implications

Given increasing emphasis on empirically derived, hierarchical models of psychopathology (Insel et al., 2010; Kotov et al., 2017) there are important opportunities to address shortcomings in the current system based on the DSM (American Psychiatric Association, 2013). In such times of redefinition and transformation, it is important to lay a solid foundation which balances theoretical richness and empirical integration (Haefffel et al., 2021). Although the HiTOP consortium has made strides in the advancement of an integrated psychopathology research program, there are shortcomings in such an explicitly empirically based system (Haefffel et al., 2021). Despite HiTOP's promise, its approach lacks substantial theoretical foundation. As an illustration, Millon's influential theory of personality and psychopathology and theory-anchored instruments have not been integrated with the HiTOP program.

Millon made substantial contributions to the DSM system for the classification of psychopathological, particularly personality disorders (Pincus & Krueger, 2015). His

theory-anchored instruments are frequently used in diverse domestic and international clinical settings and in research endeavors (Rossi & Derksen, 2015). Instead of viewing psychological traits as simply the long-term average of symptom expression and splitting off potentially valuable cultural differences and values into separate constructs (DeYoung et al., 2020), Millon's framework provides a rich integrative system to conceptualize clinically meaningful personality presentations, as well as a system amenable to modification and advancement. It also provides a framework for theoretical deductions in understanding the connection between a variety of domains of human functioning, values, and the presentation of psychopathology in terms of clinical symptom syndromes. This research demonstrates that the MCMI-III and Millon's theory still have a place within the realm of understanding and assessing psychopathology. By highlighting the consistent emergence of broader personality factors, hopefully this encourages practitioners to use the MCMI-III in more culturally appropriate and integrative ways (Ridley et al., 1998). For clinicians, it is important to understand the broad applicability of personality factors across many areas of life. It is also important for clinicians to understand the potential narrowness and limitations of specific personality scales when working with culturally diverse clients. Millon's rich theoretical system of understanding individual personality presentation in light of social developmental experiences and defining cultural context helps promote a holistic understanding of individuals and clinically integrated psychological assessment.

This study shows that a general consensus model of personality traits can be captured from factor-analytically-derived personality disorder scales from MCMI-III. A

hypothesized four-factor structure emerged in this study's diverse sample and latent personality factors were differentially associated with important and meaningful clinical symptomatology. The prototypical items from the personality disorder scales of the MCMI-III appeared to largely measure unidimensional constructs. As general consensus models continue to gain popularity and researchers attempt to develop instruments to measure their broad domains, it is encouraged that researchers would do well to utilize instruments anchored to theoretical grounds such as the MCMI. It offers considerable breadth in the constructs it measures, provides distinctions between personality and clinical syndrome expression, is anchored to expansive theory, and aligns with the current orthodox system of diagnosis. Continued alignment of the instrument with empirical findings hopefully can prove to be a fruitful endeavor with both research and clinical utility. Additionally, although there was some support for metric invariance of the factor structure between genders and White and BIPOC participants, scalar invariance could not be established. The investigation of scalar invariance among these latent factors warrants further study, especially given the importance of understanding adaptive personality within the context of an increasingly global and heterogeneous society (Ponterotto, 2010).

Suggestions for Future Research

Past research on the dimensional structure of the MCMI-III has emphasized exploratory factoring approaches (Alareque et al., 2021; Craig & Bivens, 1998; Dyce et al., 1997; Haddy et al., 2005; Pignolo et al., 2017; Rossi et al., 2007). Moving forward, EFA should be used in conjunction with confirmatory models (van Prooijen & van der

Kloot, 2001). As hierarchical models of psychopathology mature and general consensus models emerge from theoretical and empirical synthesis, research efforts should test a priori models and consider modifications from this base. Additionally, it is recommended that personality items and clinical symptom syndrome items be thoughtfully modeled so that either latent factors or associations between these constructs remain discernible for both theoretical interpretation and clinical praxis. It is also recommended that researchers consider use of oblique rotations over orthogonal rotations due to significant factor intercorrelations found in this study and Barbot et al. (2012). Based on the considerable correlations among latent personality factors, future research should test alternative factor models that include tests for higher-order factors (Bornovalova et al., 2020). This can allow researchers to continue to examine the consistency between empirically supported findings and their applicability to theoretical general consensus models that are based on hierarchical ordering.

Furthermore, as researchers and clinicians use personality factors to predict clinical outcomes (Constantinou et al., 2020; Fowler et al., 2022; Kotov et al., 2010) it is recommended that they choose instruments which are not only empirically supported but offer underlying theory, which may provide context to both research findings and clinical decision making. To this end, it is recommended that the MCMI be considered in these domains to help further elucidate the connections between personality and symptom expression. A wider use of complementary instruments may help to provide convergent validity for models of psychopathology or broader personality models such as the Big Four (Markon, 2010; Markon et al., 2005; Watson et al., 1994; Widiger & Simonsen,

2005) and further clarify the nature of spectra within the HiTOP model. These efforts should allow for clarifying integration of various perspectives on personality functioning ranging from normal to pathological. Using a general consensus model derived from the MCMI and connecting it to comparable structures found in emerging models and measures (i.e., HiTOP, Big Four) should enable greater understanding of the construct validity and clinical utility of these converging models.

In addition to the use of the MCMI to further research on general consensus models, it is also recommended that researchers continue to apply modern IRT techniques and methodology to the instrument. Another way to promote the empirical support of the MCMI is to norm the scales on diverse clinical samples and use Rasch models to investigate adjusting weights based on the difficulty of items within diverse populations. As noted by Choca and Grossman (2015) the MCMI has evolved considerably in how different items have been weighted in attempting to score each scale from a theoretical standpoint. Modern applications of IRT can help researchers weight items which respect the polythetic construction of the MCMI-III, and also encourage that more potentially indicative items of each personality construct are adequately captured by their dichotomous nature.

In conjunction with building a general consensus model of personality and psychopathology from the MCMI, it is important that representation from diverse communities is ensured and factor invariance is tested among groups. As noted by McGiloway et al. (2010) relating to personality disorders, “There is almost no aetiological and treatment research on more refined cultural and ethnic categories,

leaving unexplained the reasons for differences across broad racial groups” (p. 13). Multiculturally sensitive psychological assessment is needed (Ridley et al., 1998), and psychologists are called to strike a balance between theories which reflect universal human principles as well as nuanced and important differences between individuals and across cultures. Future studies are encouraged utilize culturally appropriate instruments alongside the MCMI-III to examine external alignment of the MCMI-III latent factors with other constructs and provide the broad-based context that Ridley (1998) highlighted as a critical element in multicultural assessment practices. Examination of cross-culturally validated latent personality factors could help contextualize universal aspects of human functioning and provide a framework for examining salient differences in patterns of thinking, behavior, and emotional functioning behaviors (Church, 2009). Although the MCMI is internationally used (Rossi & Derksen, 2015), future research might be planned utilizing MCMI-based general consensus models within confirmatory frameworks to determine where important group differences might exist and the context in which these differences should be understood. As new dimensional models of psychopathology emerge from research, it is important that counseling psychology continues to have a voice in advocating for expansive dimensions. These dimensions should capture psychopathology and be able to reflect adaptive features of being and relating to the world that speak both to broad human universality and culturally specific values and norms.

Finally, future research examining a general consensus factor structure for the MCMI should explore the nature of the fourth factor which appears to tap the opposing

qualities of conscientiousness/compulsivity versus impulsivity/irresponsibility and antisociality. The finding in the current investigation that this factor was incrementally associated with psychotic/delusional symptoms beyond the first broad neuroticism factor may point to mechanisms or personality domains beyond those found by other investigations (Dyce et al., 1997; Rossi et al., 2010). This finding may also point to additional relations and mechanisms not included in the HiTOP model, such as thought disorder which is specified to overlap with internalizing disorders only.

In conclusion, it is hoped that this study provides inspiration to future researchers utilizing Millon's theory and clinical instrument to explore the nature of psychopathology and build hierarchical and dimensional consensus models across cultures. It is hoped that this endeavor is viewed in the spirit of attempting to harmonize currently influential and empirically focused dimensional models of psychopathology (i.e., HiTOP, Big Four) with Millon's elaborately differentiated model and related measures of personality and psychopathology. Those committed to these distinct, but potentially complementary, approaches might productively work together to provide context for researchers to enjoy the flexibility of generating new ideas and ensuring that the field of psychopathology continues to flourish both by rich theoretical contributions and by commitment to rigorous empirical research.

References

- Abbamonte, J. M., McMahon, R. C., Stanforth, E. T., Rosenberg, R., Jean-Gilles, M., & Dévieux, J. G. (2020). Social support, relationship power, and knowledge of HIV+ serostatus in sexual risk behavior among women in psychiatric treatment. *Journal of Clinical Psychology in Medical Settings*, 28(1), 191–199. <https://doi.org/10.1007/s10880-020-09701-z>
- Alareqe, N. A., Roslan, S., Nordin, M. S., Ahmad, N. A., & Taresh, S. M. (2021). Psychometric properties of the Millon Clinical Multiaxial Inventory–III in an Arabic clinical sample compared with American, Italian, and Dutch cultures. *Frontiers in Psychology*, 12, 3216. <https://doi.org/10.3389/fpsyg.2021.562619>
- Allegrini, A. G., Cheesman, R., Rimfeld, K., Selzam, S., Pingault, J.-B., Eley, T. C., & Plomin, R. (2020). The p factor: Genetic analyses support a general dimension of psychopathology in childhood and adolescence. *Journal of Child Psychology and Psychiatry*, 61(1), 30–39. <https://doi.org/10.1111/jcpp.13113>
- Allsopp, K., Read, J., Corcoran, R., & Kinderman, P. (2019). Heterogeneity in psychiatric diagnostic classification. *Psychiatry Research*, 279, 15–22. <https://doi.org/10.1016/j.psychres.2019.07.005>
- Aluja, A., García, L. F., Cuevas, L., & García, O. (2007). The MCMI-III personality disorders scores predicted by the NEO-FFI-R and the ZKPQ-50-CC : A comparative study. *Journal of Personality Disorders*, 21(1), 58–71. <https://doi.org/10.1521/pedi.2007.21.1.58>
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Author.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Author.
- Andrich, D., & Marais, I. (2019). *A course in Rasch measurement theory: Measuring in the educational, social and health sciences*. Springer.
- Bachrach, N., Croon, M. A., & Bekker, M. H. J. (2012). Factor structure of self-reported clinical disorders and personality disorders: A review of the existing literature and a factor analytical study: Factor structure of self-reported clinical disorders and personality disorders. *Journal of Clinical Psychology*, 68(6), 645–660. <https://doi.org/10.1002/jclp.21841>

- Barbot, B., Hunter, S. R., Grigorenko, E. L., & Luthar, S. S. (2012). Dynamic of change in pathological personality trait dimensions: A latent change analysis among at-Risk women. *Journal of Psychopathology and Behavioral Assessment*, 35(2), 173–185. <https://doi.org/10.1007/s10862-012-9331-4>
- Bastiaansen, L., Rossi, G., Schotte, C., & De Fruyt, F. (2011). The structure of personality disorders: Comparing the DSM-IV-TR Axis II classification with the five-factor model framework using structural equation modeling. *Journal of Personality Disorders*, 25(3), 378–396. <https://doi.org/10.1521/pedi.2011.25.3.378>
- Beasley, T. M., Erickson, S., & Allison, D. B. (2009). Rank-based inverse normal transformations are increasingly used, but are they merited? *Behavior Genetics*, 39(5), 580–595. <https://doi.org/10.1007/s10519-009-9281-0>
- Begemann, M. J. H., Boyette, L.-L., Kwast, A. K., & Sommer, I. E. C. (2020). Personality across the psychosis continuum: A fine-grained perspective. *Schizophrenia Bulletin Open*, 1(1). <https://doi.org/10.1093/schizbullopen/sgaa064>
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, 135(6), 885–908. <https://doi.org/10.1037/a0017376>
- Blackburn, R., Logan, C., Renwick, S. J. D., & Donnelly, J. P. (2005). Higher-order dimensions of personality disorder: Hierarchical structure and relationships with the five-factor model, the interpersonal circle, and psychopathy. *Journal of Personality Disorders*, 19(6), 597–623. <https://doi.org/10.1521/pedi.2005.19.6.597>
- Blashfield, R. K., Keeley, J. W., Flanagan, E. H., & Miles, S. R. (2014). The cycle of classification: DSM-I through DSM-5. *Annual Review of Clinical Psychology*, 10, 25–51. <https://doi.org/10.1146/annurev-clinpsy-032813-153639>
- Boone, W. J. (2016). Rasch analysis for instrument development: Why, when, and how? *CBE Life Sciences Education*, 15(4), rm4. <https://doi.org/10.1187/cbe.16-04-0148>
- Bornovalova, M. A., Choate, A. M., Fatimah, H., Petersen, K. J., & Wiernik, B. M. (2020). Appropriate Use of Bifactor Analysis in Psychopathology Research: Appreciating Benefits and Limitations. *Biological Psychiatry (1969)*, 88(1), 18–27. <https://doi.org/10.1016/j.biopsych.2020.01.013>

- Brainstorm, C., Anttila, V., Bulik-Sullivan, B., Finucane, H. K., Walters, R. K., Bras, J., Duncan, L., Escott-Price, V., Falcone, G. J., Gormley, P., Malik, R., Patsopoulos, N. A., Ripke, S., Wei, Z., Yu, D., Lee, P. H., Turley, P., Grenier-Boley, B., Chouraki, V., ... Murray, R. (2018). Analysis of shared heritability in common disorders of the brain. *Science*, 360(6395), 1–15.
<https://doi.org/10.1126/science.aap8757>
- Brown, T. A., & Barlow, D. H. (2005). Dimensional versus categorical classification of mental disorders in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders and beyond: Comment on the special section. *Journal of Abnormal Psychology*, 114(4), 551–556. <https://doi.org/10.1037/0021-843X.114.4.551>
- Căndel, O.-S., & Constantin, T. (1999). Antisocial and schizoid personality disorder scales: Conceptual bases and preliminary findings. *Romanian Journal of Applied Psychology*, 19(1), 10–16. <https://doi.org/10.24913/rjap.19.1.02>
- Caspi, A., Houts, R. M., Belsky, D. W., Goldman-Mellor, S. J., Harrington, H., Israel, S., Meier, M. H., Ramrakha, S., Shalev, I., Poulton, R., & Moffitt, T. E. (2014). The p factor: One general psychopathology factor in the structure of psychiatric disorders? *Clinical Psychological Science*, 2(2), 119–137.
<https://doi.org/10.1177/2167702613497473>
- Cervin, M., Norris, L. A., Ginsburg, G., Gosch, E. A., Compton, S. N., Piacentini, J., Albano, A. M., Sakolsky, D., Birmaher, B., Keeton, C., Storch, E. A., & Kendall, P. C. (2021). The p factor consistently predicts long-term psychiatric and functional outcomes in anxiety-disordered youth. *Journal of the American Academy of Child & Adolescent Psychiatry*, 60(7), 902–912.e5.
<https://doi.org/10.1016/j.jaac.2020.08.440>
- Chabrol, H., Rousseau, A., Callahan, S., & Hyler, S. E. (2007). Frequency and structure of DSM-IV personality disorder traits in college students. *Personality and Individual Differences*, 43(7), 1767–1776.
<https://doi.org/10.1016/j.paid.2007.05.015>
- Chen, F., Curran, P. J., Bollen, K. A., Kirby, J., & Paxton, P. (2008). An empirical evaluation of the use of fixed cutoff points in RMSEA test statistic in structural equation models. *Sociological Methods & Research*, 36(4), 462–494.
<https://doi.org/10.1177/0049124108314720>
- Choca, J. P., & Grossman, S. D. (2015). Evolution of the Millon Clinical Multiaxial Inventory. *Journal of Personality Assessment*, 97(6), 541–549.
<https://doi.org/10.1080/00223891.2015.1055753>

- Choca, J. P., Peterson, C. A., & Shanley, L. A. (1986). Factor analysis of the Millon Clinical Multiaxial Inventory. *Journal of Consulting and Clinical Psychology*, 54(2), 253–255. <https://doi.org/10.1037/0022-006X.54.2.253>
- Church, A. T. (2009). Prospects for an integrated trait and cultural psychology. *European Journal of Personality*, 23(3), 153–182. <https://doi.org/10.1002/per.700>
- Constantinou, M. P., Frueh, B. C., Fowler, J. C., Allen, J. G., Madan, A., Oldham, J. M., & Fonagy, P. (2020). Predicting depression outcomes throughout inpatient treatment using the general and specific personality disorder factors. *Psychological Medicine*, 1–9. <https://doi.org/10.1017/S003329172000361X>
- Cox, B. J., MacPherson, P. S. R., Enns, M. W., & McWilliams, L. A. (2004). Neuroticism and self-criticism associated with posttraumatic stress disorder in a nationally representative sample. *Behaviour Research and Therapy*, 42(1), 105–114. [https://doi.org/10.1016/s0005-7967\(03\)00105-0](https://doi.org/10.1016/s0005-7967(03)00105-0)
- Craddock, N., & Owen, M. J. (2010). The Kraepelinian dichotomy—Going, going... But still not gone. *British Journal of Psychiatry*, 196(2), 92–95. <https://doi.org/10.1192/bjp.bp.109.073429>
- Craig, R. J., & Bivens, A. (1998). Factor structure of the MCMI-III. *Journal of Personality Assessment*, 70(1), 190–196. https://doi.org/10.1207/s15327752jpa7001_13
- Cuevas, L., García, L. F., Aluja, A., & García, O. (2008). Exploratory and confirmatory factorial structure of the MCMI-III personality disorders: Overlapping versus non-overlapping scales. *European Journal of Psychiatry*, 22(2), 59–68. <http://dx.doi.org/10.4321/S0213-61632008000200001>
- Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods*, 1(1), 16–29. <https://doi.org/10.1037/1082-989X.1.1.16>
- Dahl, A. A. (1986). Some aspects of the DSM-III personality disorders illustrated by a consecutive sample of hospitalized patients. *Acta Psychiatrica Scandinavica*, 73(s328), 61–67. <https://doi.org/10.1111/j.1600-0447.1986.tb10526.x>
- Decker, H. S. (2007). How Kraepelinian was Kraepelin? How Kraepelinian are the neo-Kraepelinians?—From Emil Kraepelin to DSM-III. *History of Psychiatry*, 18(71 Pt 3), 337–360. <https://doi.org/10.1177/0957154X07078976>

- Dévieux, J. G., Jean-Gilles, M., Rosenberg, R., Beck-Sagué, C., Attonito, J. M., Saxena, A., & Stein, J. A. (2015). Depression, abuse, relationship power and condom use by pregnant and postpartum women with substance abuse history. *AIDS and Behavior*, 20(2), 292–303. <https://doi.org/10.1007/s10461-015-1176-x>
- DeYoung, C. G., Carey, B. E., Krueger, R. F., & Ross, S. R. (2016). Ten aspects of the Big Five in the Personality Inventory for DSM-5. *Personality Disorders*, 7(2), 113–123. <https://doi.org/10.1037/per0000170>
- DeYoung, C. G., Chmielewski, M., Clark, L. A., Condon, D. M., Kotov, R., Krueger, R. F., Markon, K. E., Miller, J. D., Mullins-Sweatt, S. N., Samuel, D. B., Sellbom, M., South, S. C., Thomas, K. M., Watson, D., Watts, A. L., Widiger, T. A., Wright, A. G., & the HiTOP Normal Personality Group. (2020). The distinction between symptoms and traits in the Hierarchical Taxonomy of Psychopathology (HiTOP). *Journal of Personality*, 90(1), 20–33. <https://doi.org/10.1111/jopy.12593>
- DiStefano, C., & Hess, B. (2005). Using confirmatory factor analysis for construct validation: An empirical review. *Journal of Psychoeducational Assessment*, 23(3), 225–241. <https://doi.org/10.1177/073428290502300303>
- Dong, Y., & Peng, C.-Y. J. (2013). Principled missing data methods for researchers. *SpringerPlus*, 2(1), 222. <https://doi.org/10.1186/2193-1801-2-222>
- Durrett, C., & Westen, D. (2005). The structure of axis II disorders in adolescents: A cluster- and factor-analytic investigation of DSM-IV categories and criteria. *Journal of Personality Disorders*, 19(4), 440–461. <https://doi.org/10.1521/pedi.2005.19.4.440>
- Dyce, J. A., O'Connor, B. P., Parkins, S. Y., & Janzen, H. L. (1997). Correlational structure of the MCMI-III personality disorder scales and comparisons with other data sets. *Journal of Personality Assessment*, 69(3), 568–582. https://doi.org/10.1207/s15327752jpa6903_10
- Flynn, P. M., & McMahon, R. C. (1984). An examination of the factor structure of the Millon Clinical Multiaxial Inventory. *Journal of Personality Assessment*, 48(3), 308–311. https://doi.org/10.1207/s15327752jpa4803_14
- Fossati, A., Beauchaine, T. P., Grazioli, F., Borroni, S., Carretta, I., De Vecchi, C., Cortinovis, F., Danelli, E., & Maffei, C. (2006). Confirmatory factor analyses of DSM-IV cluster C personality disorder criteria. *Journal of Personality Disorders*, 20(2), 186–203. <https://doi.org/10.1521/pedi.2006.20.2.186>

- Fossati, A., Maffei, C., Bagnato, M., Battaglia, M., Donati, D., Donini, M., Fiorilli, M., Novella, L., & Prolo, F. (2000). Patterns of covariation of DSM-IV personality disorders in a mixed psychiatric sample. *Comprehensive Psychiatry*, 41(3), 206–215. [https://doi.org/10.1016/S0010-440X\(00\)90049-X](https://doi.org/10.1016/S0010-440X(00)90049-X)
- Fowler, J. C., Lamkin, J., Allen, J. G., Madan, A., Oldham, J. M., Petersen, N. J., & Frueh, B. C. (2022). Personality trait domains predict psychiatric symptom and functional outcomes. *Psychotherapy*, 59(1), 38–47. <https://doi.org/10.1037/pst0000421>
- Futschek, K. (2014). Actual type-I- and type-II-risk of four different model tests of the Rasch model. *Psychological Test and Assessment Modeling*, 56(2), 168–177.
- Gandal, M. J., Haney, J. R., Parikshak, N. N., Leppa, V., Ramaswami, G., Hartl, C., Schork, A. J., Appadurai, V., Buil, A., Werge, T. M., Liu, C., White, K. P., Horvath, S., & Geschwind, D. H. (2018). Shared molecular neuropathology across major psychiatric disorders parallels polygenic overlap. *Science*, 359(6376), 693–697. <https://doi.org/10.1126/science.aad6469>
- Garb, H. N. (2021). Race bias and gender bias in the diagnosis of psychological disorders. *Clinical Psychology Review*, 90, 102087–102087. <https://doi.org/10.1016/j.cpr.2021.102087>
- Georges, C. M., & Tomlinson-Clarke, S. M. (2015). Integrating positive psychology into counseling psychology doctoral education. *The Counseling Psychologist*, 43(5), 752–788. <https://doi.org/10.1177/0011000015584067>
- Gibertini, M., & Retzlaff, P. D. (1988). Factor invariance of the Millon Clinical Multiaxial Inventory. *Journal of Psychopathology and Behavioral Assessment*, 10(1), 65–74. <https://doi.org/10.1007/BF00962986>
- Greene, T. (2007). The Kraepelinian dichotomy: The twin pillars crumbling? *History of Psychiatry*, 18(71 Pt 3), 361–379. <https://doi.org/10.1177/0957154X07078977>
- Griffith, J. W., Zinbarg, R. E., Craske, M. G., Mineka, S., Rose, R. D., Waters, A. M., & Sutton, J. M. (2010). Neuroticism as a common dimension in the internalizing disorders. *Psychological Medicine*, 40(7), 1125–1136. <https://doi.org/10.1017/S0033291709991449>
- Grossman, S. D. (2015). Millon's evolutionary model of personality assessment: A case for categorical/dimensional prototypes. *Journal of Personality Assessment*, 97(5), 436–445. <https://doi.org/10.1080/00223891.2015.1055751>

- Grossman, S. D. (2017). *Essentials of MCMI-IV assessment*. John Wiley & Sons.
- Gunderson, R. (2021). Things are the way they are: A typology of reification. *Sociological Perspectives*, 64(1), 127–150.
<https://doi.org/10.1177/0731121420921891>
- Haddy, C., Strack, S., & Choca, J. P. (2005). Linking personality disorders and clinical syndromes on the MCMI–III. *Journal of Personality Assessment*, 84(2), 193–204.
https://doi.org/10.1207/s15327752jpa8402_09
- Haefffel, G. J., Jeronimus, B. F., Kaiser, B. N., Weaver, L. J., Soyster, P. D., Fisher, A. J., Vargas, I., Goodson, J. T., & Lu, W. (2021). Folk classification and factor rotations: Whales, sharks, and the problems with the Hierarchical Taxonomy of Psychopathology (HiTOP). *Clinical Psychological Science*, 10(2), 259–278.
<https://doi.org/10.1177/21677026211002500>
- Hair, J. F. Jr., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). Pearson Prentice Hall.
- Haslam, N. (2019). Unicorns, snarks, and personality types: A review of the first 102 taxometric studies of personality. *Australian Journal of Psychology*, 71(1), 39–49.
<https://doi.org/10.1111/ajpy.12228>
- Haslam, N., McGrath, M. J., Viechtbauer, W., & Kuppens, P. (2021). Dimensions over categories: A meta-analysis of taxometric research. *Psychological Medicine*, 50(9), 1418–1432. <https://doi.org/10.1017/S003329172000183X>
- Hirschfeld, G., & von Brachel, R. (2014). Improving multiple-group confirmatory factor analysis in R – A tutorial in measurement invariance with continuous and ordinal indicators. *Practical Assessment, Research & Evaluation*, 19, 7.
<https://doi.org/10.7275/qazy-2946>
- Hyland, P., Murphy, J., Shevlin, M., Carey, S., Vallières, F., Murphy, D., & Elklit, A. (2018). Correlates of a general psychopathology factor in a clinical sample of childhood sexual abuse survivors. *Journal of Affective Disorders*, 232, 109–115.
<https://doi.org/10.1016/j.jad.2018.02.048>
- Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., Sanislow, C., & Wang, P. (2010). Research Domain Criteria (RDoC): Toward a new classification framework for research on mental disorders. *The American Journal of Psychiatry*, 167(7), 748–751. <https://doi.org/10.1176/appi.ajp.2010.09091379>

- Jakobsen, J. C., Gluud, C., Wetterslev, J., & Winkel, P. (2017). When and how should multiple imputation be used for handling missing data in randomised clinical trials—A practical guide with flowcharts. *BMC Medical Research Methodology*, 17(1), 162. <https://doi.org/10.1186/s12874-017-0442-1>
- James, G., Witten, D., Hastie, T., & Tibshirani, R. (2021). *An introduction to statistical learning: With applications in R* (2nd ed.). Springer.
- Kajonius, P., & Mac Giolla, E. (2017). Personality traits across countries: Support for similarities rather than differences. *PLOS ONE*, 12(6), e0179646. <https://doi.org/10.1371/journal.pone.0179646>
- Kalichman, S., Malow, R., Dévieux, J., Stein, J. A., & Piedman, F. (2005). HIV risk reduction for substance using seriously mentally ill adults: Test of the Information-Motivation-Behavior skills (IMB) model. *Community Mental Health Journal*, 41(3), 277–290. <https://doi.org/10.1007/s10597-005-5002-1>
- Kendler, K. S., Aggen, S. H., Knudsen, G. P., Røysamb, E., Neale, M. C., & Reichborn-Kjennerud, T. (2011). The structure of genetic and environmental risk factors for syndromal and subsyndromal common DSM-IV axis I and all axis II disorders. *The American Journal of Psychiatry*, 168(1), 29–39. <https://doi.org/10.1176/appi.ajp.2010.10030340>
- Kimhy, D., Lister, A., Liu, Y., Vakhrusheva, J., Delespaul, P., Malaspina, D., Ospina, L. H., Mittal, V. A., Gross, J. J., & Wang, Y. J. (2020). The impact of emotion awareness and regulation on psychotic symptoms during daily functioning. *NPJ Schizophrenia*, 6(1), 7. <https://doi.org/10.1038/s41537-020-0096-6>
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (Third edition.). New York : Guilford Press.
- Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking “big” personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin*, 136(5), 768–821. <https://doi.org/10.1037/a0020327>
- Kotov, R., Krueger, R. F., Watson, D., Achenbach, T. M., Althoff, R. R., Bagby, R. M., Brown, T. A., Carpenter, W. T., Caspi, A., Clark, L. A., Eaton, N. R., Forbes, M. K., Forbush, K. T., Goldberg, D., Hasin, D., Hyman, S. E., Ivanova, M. Y., Lynam, D. R., Markon, K., ... Zimmerman, M. (2017). The Hierarchical Taxonomy of Psychopathology (HiTOP): A dimensional alternative to traditional nosologies. *Journal of Abnormal Psychology*, 126(4), 454–477. <https://doi.org/10.1037/abn0000258>

- Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2012). Initial construction of a maladaptive personality trait model and inventory for DSM-5. *Psychological Medicine*, 42(9), 1879–1890. <https://doi.org/10.1017/S0033291711002674>
- Krueger, R. F., Eaton, N. R., Clark, L. A., Watson, D., Markon, K. E., Derringer, J., Skodol, A., & Livesley, W. J. (2011). Deriving an empirical structure of personality pathology for DSM-5. *Journal of Personality Disorders*, 25(2), 170–191. <https://doi.org/10.1521/pedi.2011.25.2.170>
- Krueger, R. F., Hopwood, C. J., Wright, A. G. C., & Markon, K. E. (2014). DSM-5 and the path toward empirically based and clinically useful conceptualization of personality and psychopathology. *Clinical Psychology*, 21(3), 245–261. <https://doi.org/10.1111/cpsp.12073>
- Krueger, R. F., & Markon, K. E. (2014). The role of the DSM-5 personality trait model in moving toward a quantitative and empirically based approach to classifying personality and psychopathology. *Annual Review of Clinical Psychology*, 10(1), 477–501. <https://doi.org/10.1146/annurev-clinpsy-032813-153732>
- Kupfer, D. J., Kuhl, E. A., & Regier, D. A. (2013). DSM-5—The future arrived. *JAMA*, 309(16), 1691–1692. <https://doi.org/10.1001/jama.2013.2298>
- Kyriazos, T. A. (2018). Applied psychometrics: Sample size and sample power considerations in factor analysis (EFA, CFA) and SEM in general. *Psychology*, 09(08), 2207–2230. <https://doi.org/10.4236/psych.2018.98126>
- Lahey, B. B., Applegate, B., Hakes, J. K., Zald, D. H., Hariri, A. R., & Rathouz, P. J. (2012). Is there a general factor of prevalent psychopathology during adulthood? *Journal of Abnormal Psychology*, 121(4), 971–977. <https://doi.org/10.1037/a0028355>
- Latzman, R. D., Palumbo, I. M., Sauvigné, K. C., Hecht, L. K., Lilienfeld, S. O., & Patrick, C. J. (2019). Psychopathy and internalizing psychopathology: A triarchic model perspective. *Journal of Personality Disorders*, 33(2), 262–287. https://doi.org/10.1521/pedi_2018_32_347
- Leibing, E., Jamrozinski, K., Vormfelde, S. V., Stahl, J., & Doering, S. (2008). Dimensions of personality-relationship between DSM-IV personality disorder symptoms, the five-factor model, and the biosocial model of personality. *Journal of Personality Disorders*, 22(1), 101–108. <https://doi.org/10.1521/pedi.2008.22.1.101>

- Levin-Aspenson, H. F., Watson, D., Clark, L. A., & Zimmerman, M. (2021). What is the general factor of psychopathology? Consistency of the p factor across samples. *Assessment*, 28(4), 1035–1049. <https://doi.org/10.1177/1073191120954921>
- Linacre, J. M. (2022). *Winsteps Rasch measurement computer program User's Guide* (Version 5.2.4). Winsteps.com.
- Lingiardi, V., & McWilliams, N. (2015). The psychodynamic diagnostic manual – 2nd edition (PDM-2). *World Psychiatry*, 14(2), 237–239. <https://doi.org/10.1002/wps.20233>
- Little, T. D., Lindenberger, U., & Nesselroade, J. R. (1999). On selecting indicators for multivariate measurement and modeling with latent variables: When “good” indicators are bad and “bad” indicators are good. *Psychological Methods*, 4(2), 192–211. <https://doi.org/10.1037/1082-989X.4.2.192>
- Löffler-Stastka, H., Ponocny-Seliger, E., Fischer-Kern, M., Rössler-Schüle, H., Leithner-Dziubas, K., & Schuster, P. (2006). Validation of the SWAP-200 for diagnosing psychostructural organization in personality disorders. *Psychopathology*, 40(1), 35–46. <https://doi.org/10.1159/000096388>
- Lovik, A., Nassiri, V., Verbeke, G., & Molenberghs, G. (2020). A modified tucker's congruence coefficient for factor matching. *Methodology*, 16(1), 59–74. <https://doi.org/10.5964/meth.2813>
- Luthar, S. S., & Sexton, C. C. (2007). Maternal drug abuse versus maternal depression: Vulnerability and resilience among school-age and adolescent offspring. *Development and Psychopathology*, 19(1), 205–225. <https://doi.org/10.1017/S0954579407070113>
- Macina, C., Bendel, R., Walter, M., & Wrege, J. S. (2021). Somatization and somatic symptom disorder and its overlap with dimensionally measured personality pathology: A systematic review. *Journal of Psychosomatic Research*, 151, 110646. <https://doi.org/10.1016/j.jpsychores.2021.110646>
- Malow, R. M., McMahon, R. C., Dévieux, J., Rosenberg, R., Frankel, A., Bryant, V., Lerner, B., & Miguez, M. J. (2012). Cognitive behavioral HIV risk reduction in those receiving psychiatric treatment: A clinical trial. *AIDS and Behavior*, 16(5), 1192–1202. <https://doi.org/10.1007/s10461-011-0104-y>
- Markon, K. E. (2010). Modeling psychopathology structure: A symptom-level analysis of Axis I and II disorders. *Psychological Medicine*, 40(2), 273–288. <https://doi.org/10.1017/S0033291709990183>

- Markon, K. E., Krueger, R. F., & Watson, D. (2005). Delineating the structure of normal and abnormal personality: An integrative hierarchical approach. *Journal of Personality and Social Psychology*, 88(1), 139–157. <https://doi.org/10.1037/0022-3514.88.1.139>
- Martel, M. M., Pan, P. M., Hoffmann, M. S., Gadelha, A., do Rosário, M. C., Mari, J. J., Manfro, G. G., Miguel, E. C., Paus, T., Bressan, R. A., Rohde, L. A., & Salum, G. A. (2017). A general psychopathology factor (p factor) in children: Structural model analysis and external validation through familial risk and child global executive function. *Journal of Abnormal Psychology*, 126(1), 137–148. <https://doi.org/10.1037/abn0000205>
- McAdams, D. P., & Pals, J. L. (2006). A new Big Five: Fundamental principles for an integrative science of personality. *American Psychologist*, 61(3), 204–217. <https://doi.org/10.1037/0003-066X.61.3.204>
- McGilloway, A., Hall, R. E., Lee, T., & Bhui, K. S. (2010). A systematic review of personality disorder, race and ethnicity: Prevalence, aetiology and treatment. *BMC Psychiatry*, 10(1), 33. <https://doi.org/10.1186/1471-244X-10-33>
- McMahon, R. C., Abbamonte, J. M., & Dévieux, J. G. (2017). Psychopathology subgroups and HIV risk among women in psychiatric treatment. *AIDS and Behavior*, 22(5), 1446–1460. <https://doi.org/10.1007/s10461-017-1686-9>
- McMahon, R. C., Malow, R. M., Dévieux, J., Rosenberg, R., & Jennings, T. (2008). HIV risk and history of STDs in MCMI-III psychopathology subgroups of comorbid substance abusers. *The American Journal of Drug and Alcohol Abuse*, 34(3), 329–337. <https://doi.org/10.1080/00952990802010876>
- Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research*, 3(1), 111–130. <https://doi.org/10.21500/20112084.857>
- Millon, T. (2011). *Disorders of Personality: Introducing A DSM/ICD Spectrum From Normal to Abnormal* (3rd ed.). John Wiley & Sons, Inc.
- Millon, T., & Davis, R. D. (1997). The MCMI--III: Present and future directions. *Journal of Personality Assessment*, 68(1), 69–85. https://doi.org/10.1207/s15327752jpa6801_6
- Millon, T., Davis, R. D., & Millon, C. (1997). *The Millon Clinical Multiaxial Inventory-III manual* (2nd ed.). National Computer Systems.

- Modestin, J. (1987). Quality of interpersonal relationships: The most characteristic DSM-III BPD criterion. *Comprehensive Psychiatry*, 28(5), 397–402.
[https://doi.org/10.1016/0010-440X\(87\)90056-3](https://doi.org/10.1016/0010-440X(87)90056-3)
- Morey, L. C., Skodol, A. E., & Oldham, J. M. (2014). Clinician judgments of clinical utility: A comparison of DSM-IV-TR personality disorders and the alternative model for DSM-5 personality disorders. *Journal of Abnormal Psychology*, 123(2), 398–405. <https://doi.org/10.1037/a0036481>
- Mullins-Sweatt, S. N., Bernstein, D. P., & Widiger, T. (2012). Retention or deletion of personality disorder diagnoses in the DSM-V: An expert consensus approach. *Journal of Personality Disorders*, 26(5), 689–703.
<https://doi.org/10.1521/pedi.2012.26.5.689>
- Mullins-Sweatt, S. N., & Widiger, T. A. (2007). Millon's dimensional model of personality disorders: A comparative study. *Journal of Personality Disorders*, 21(1), 42–57. <https://doi.org/10.1521/pedi.2007.21.1.42>
- Munley, P. H., Vacha-Haase, T., Busby, R. M., & Paul, B. D. (1998). The MCMI-II and race. *Journal of Personality Assessment*, 70(1), 183–189.
https://doi.org/10.1207/s15327752jpa7001_12
- Nestadt, G., Hsu, F.-C., Samuels, J., Bienvenu, O. J., Reti, I., Costa, P. T., & Eaton, W. W. (2006). Latent structure of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition personality disorder criteria. *Comprehensive Psychiatry*, 47(1), 54–62. <https://doi.org/10.1016/j.comppsy.2005.03.005>
- Nurnberg, H. G., Hurt, S. W., Feldman, A., & Suh, R. (1987). Efficient diagnosis of Borderline Personality Disorder. *Journal of Personality Disorders*, 1(4), 307–316.
<https://doi.org/10.1521/pedi.1987.1.4.307>
- Nurnberg, H. G., Raskin, M., Levine, P. E., Pollack, S., Siegel, O., & Prince, R. (1991). Hierarchy of DSM-III-R criteria efficiency for the diagnosis of Borderline Personality Disorder. *Journal of Personality Disorders*, 5(3), 211–224.
<https://doi.org/10.1521/pedi.1991.5.3.211>
- O'Connor, B. P. (2005). A search for consensus on the dimensional structure of personality disorders. *Journal of Clinical Psychology*, 4(4), 323–345.
<https://doi.org/10.1002/jclp.20017>
- O'Connor, B. P., Dyce, J. A., O'Connor, B. P., & Dyce, J. A. (1998). A test of models of personality disorder configuration. *Journal of Abnormal Psychology*, 107(1), 3–16. <https://doi.org/10.1037//0021-843x.107.1.3>

- Oltmanns, J. R., Smith, G. T., Oltmanns, T. F., & Widiger, T. A. (2018). General factors of psychopathology, personality, and personality disorder: Across domain comparisons. *Clinical Psychological Science*, 6(4), 581–589. <https://doi.org/10.1177/2167702617750150>
- Ormel, J., Jeronimus, B. F., Kotov, R., Riese, H., Bos, E. H., Hankin, B., Rosmalen, J. G. M., & Oldehinkel, A. J. (2013). Neuroticism and common mental disorders: Meaning and utility of a complex relationship. *Clinical Psychology Review*, 33(5), 686–697. <https://doi.org/10.1016/j.cpr.2013.04.003>
- Packman, T., Brown, G. S., Englert, P., Sisarich, H., & Bauer, F. (2005). Differences in personality traits across ethnic groups within New Zealand and across an international sample. *New Zealand Journal of Psychology*, 34(2), 77–85.
- Paris, J. (1997). Social factors in the personality disorders. *Transcultural Psychiatry*, 34(4), 421–452. <https://doi.org/10.1177/136346159703400401>
- Perkins, E. R., Joyner, K. J., Patrick, C. J., Bartholow, B. D., Latzman, R. D., DeYoung, C. G., Kotov, R., Reininghaus, U., Cooper, S. E., Afzali, M. H., Docherty, A. R., Dretsch, M. N., Eaton, N. R., Goghari, V. M., Haltigan, J. D., Krueger, R. F., Martin, E. A., Michelini, G., Ruocco, A. C., ... Zald, D. H. (2020). Neurobiology and the Hierarchical Taxonomy of Psychopathology: Progress toward ontogenetically informed and clinically useful nosology. *Dialogues in Clinical Neuroscience*, 22(1), 51–63. <https://doi.org/10.31887/DCNS.2020.22.1/eperkins>
- Pianowski, G., Carvalho, L. de F., & Miguel, F. K. (2019). Investigating the spectra constellations of the Hierarchical Taxonomy of Psychopathology (HiTOP) model for personality disorders based on empirical data from a community sample. *Revista Brasileira de Psiquiatria*, 41(2), 148–152. <https://doi.org/10.1590/1516-4446-2018-0015>
- Pignolo, C., Rosalo, R., Andò, A., Cristofanelli, S., Ferro, L., & Zennaro, A. (2017). The factor structure of the Italian version of the MCMI-III compared to the Dutch and American versions. *BPA - Applied Psychology Bulletin (Bollettino Di Psicologia Applicata)*, 65(278), 36–46.
- Pincus, A. L., & Krueger, R. F. (2015). Theodore Millon's contributions to conceptualizing personality disorders. *Journal of Personality Assessment*, 97(6), 537–540. <https://doi.org/10.1080/00223891.2015.1031376>

- Plana-Ripoll, O., Pedersen, C. B., Holtz, Y., Benros, M. E., Dalsgaard, S., de Jonge, P., Fan, C. C., Degenhardt, L., Ganna, A., Greve, A. N., Gunn, J., Iburg, K. M., Kessing, L. V., Lee, B. K., Lim, C. C. W., Mors, O., Nordentoft, M., Prior, A., Roest, A. M., ... McGrath, J. J. (2019). Exploring comorbidity within mental disorders among a Danish national population. *JAMA Psychiatry*, 76(3), 259–270. <https://doi.org/10.1001/jamapsychiatry.2018.3658>
- Ponterotto, J. G. (2010). Multicultural personality: An evolving theory of optimal functioning in culturally heterogeneous societies. *The Counseling Psychologist*, 38(5), 714–758. <https://doi.org/10.1177/0011000009359203>
- Porter, J. S., & Risler, E. (2014). The new alternative DSM-5 model for personality disorders: Issues and controversies. *Research on Social Work Practice*, 24(1), 50–56. <https://doi.org/10.1177/1049731513500348>
- Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review*, 41, 71–90. <https://doi.org/10.1016/j.dr.2016.06.004>
- Raveendranathan, D., Shiva, L., Sharma, E., Venkatasubramanian, G., Rao, M. G., Varambally, S., & Gangadhar, B. N. (2012). Obsessive compulsive disorder masquerading as psychosis. *Indian Journal of Psychological Medicine*, 34(2), 179–180. <https://doi.org/10.4103/0253-7176.101800>
- Retzlaff, P. D., & Gibertini, M. (1990). Factor-based special scales for the MCMI. *Journal of Clinical Psychology*, 46(1), 47–52. [https://doi.org/10.1002/1097-4679\(199001\)46:1%3C47::AID-JCLP2270460108%3E3.0.CO;2-J](https://doi.org/10.1002/1097-4679(199001)46:1%3C47::AID-JCLP2270460108%3E3.0.CO;2-J)
- Ridley, C. R., Li, L. C., & Hill, C. L. (1998). Multicultural assessment: Reexamination, reconceptualization, and practical application. *The Counseling Psychologist*, 26(6), 827–910. <https://doi.org/10.1177/0011000098266001>
- Ronningstam, E. F., Keng, S.-L., Ridolfi, M. E., Arbabi, M., & Grenyer, B. F. S. (2018). Cultural aspects in symptomatology, assessment, and treatment of personality disorders. *Current Psychiatry Reports*, 20(4), 22–22. <https://doi.org/10.1007/s11920-018-0889-8>
- Rosenström, T., Gjerde, L. C., Krueger, R. F., Aggen, S. H., Czajkowski, N. O., Gillespie, N. A., Kendler, K. S., Reichborn-Kjennerud, T., Torvik, F. A., & Ystrom, E. (2019). Joint factorial structure of psychopathology and personality. *Psychological Medicine*, 49(13), 2158–2167. <https://doi.org/10.1017/S0033291718002982>

- Rossi, G., & Derksen, J. (2015). International adaptations of the Millon Clinical Multiaxial Inventory: Construct validity and clinical applications. *Journal of Personality Assessment*, 97(6), 572–590. <https://doi.org/10.1080/00223891.2015.1079531>
- Rossi, G., Elklit, A., & Simonsen, E. (2010). Empirical evidence for a four factor framework of personality disorder organization: Multigroup confirmatory factor analysis of the Millon Clinical Multiaxial Inventory—III personality disorder scales across Belgian and Danish data samples. *Journal of Personality Disorders*, 24(4), 128–150. <https://doi.org/10.1521/pedi.2010.24.1.128>
- Rossi, G., van der Ark, L. A., & Sloore, H. (2007). Factor analysis of the Dutch-language version of the MCMI-III. *Journal of Personality Assessment*, 88(2), 144–157. <https://doi.org/10.1080/00223890701267977>
- Røysamb, E., Kendler, K. S., Tambs, K., Ørstavik, R. E., Neale, M. C., Aggen, S. H., Torgersen, S., & Reichborn-Kjennerud, T. (2011). The joint structure of DSM-IV Axis I and Axis II disorders. *Journal of Abnormal Psychology* (1965), 120(1), 198–209. <https://doi.org/10.1037/a0021660>
- Rushton, J. P., & Irwing, P. (2009). A general factor of personality in the Millon Clinical Multiaxial Inventory-III, the dimensional assessment of personality pathology, and the personality assessment inventory. *Journal of Research in Personality*, 43(6), 1091–1095. <https://doi.org/10.1016/j.jrp.2009.06.002>
- Sanislow, C. A., Pine, D. S., Quinn, K. J., Kozak, M. J., Garvey, M. A., Heinssen, R. K., Wang, P. S., & Cuthbert, B. N. (2010). Developing constructs for psychopathology research: Research Domain Criteria. *Journal of Abnormal Psychology*, 119(4), 631–639. <https://doi.org/10.1037/a0020909>
- Saulsman, L. M., & Page, A. C. (2004). The five-factor model and personality disorder empirical literature: A meta-analytic review. *Clinical Psychology Review*, 23(8), 1055–1085. <https://doi.org/10.1016/j.cpr.2002.09.001>
- Schotte, C. K. W., de Doncker, D., Vankerckhoven, C., Vertommen, H., & Cosyns, P. (1998). Self-report assessment of the DSM-IV personality disorders. Measurement of trait and distress characteristics: The ADP-IV. *Psychological Medicine*, 28(5), 1179–1188. <https://doi.org/10.1017/S0033291798007041>
- Selzam, S., Coleman, J. R. I., Caspi, A., Moffitt, T. E., & Plomin, R. (2018). A polygenic p factor for major psychiatric disorders. *Translational Psychiatry*, 8(1), 205. <https://doi.org/10.1038/s41398-018-0217-4>

- Sinclair, S. J., McRitchie, A., DeFilippo, S., Blais, M. A., Toomey, J., Colby, K. A., Goldsmith, G., Antonius, D., Laguerre, J., & Haggerty, G. (2021). The spectra: Indices of psychopathology: Construct validity and sensitivity to change in an inpatient psychiatric sample. *Journal of Psychopathology and Behavioral Assessment*, 44, 286–296. <https://doi.org/10.1007/s10862-021-09885-0>
- Skodol, A. E. (2012). Personality disorders in DSM-5. *Annual Review of Clinical Psychology*, 8(1), 317–344. <https://doi.org/10.1146/annurev-clinpsy-032511-143131>
- Skodol, A. E., Morey, L. C., Bender, D. S., & Oldham, J. M. (2013a). The ironic fate of the personality disorders in DSM-5. *Personality Disorders: Theory, Research, and Treatment*, 4(4), 342–349. <https://doi.org/10.1037/per0000029>
- Skodol, A. E., Morey, L. C., Bender, D. S., & Oldham, J. M. (2013b). When is it time to move on? Rejoinder for “The ironic fate of the personality disorders in DSM-5.” *Personality Disorders: Theory, Research, and Treatment*, 4(4), 354. <https://doi.org/10.1037/per0000054>
- Spearman, C. (1904). “General Intelligence,” objectively determined and measured. *The American Journal of Psychology*, 15(2), 201–292. <https://doi.org/10.2307/1412107>
- Strack, S., Choca, J. P., & Gurtman, M. B. (2001). Circular structure of the MCMI-III personality disorder scales. *Journal of Personality Disorders*, 15(3), 263–274. <https://doi.org/10.1521/pedi.15.3.263.19206>
- Strack, S., & Guevara, L. F. (1999). Relating PACL measures of Millon’s basic personality styles and MMPI-2 scales in patient and normal samples. *Journal of Clinical Psychology*, 55(7), 895–906. [https://doi.org/10.1002/\(sici\)1097-4679\(199907\)55:7%3C895::aid-jclp10%3E3.0.co;2-6](https://doi.org/10.1002/(sici)1097-4679(199907)55:7%3C895::aid-jclp10%3E3.0.co;2-6)
- Strack, S., Lorr, M., Campbell, L., & Lamnin, A. (1992). Personality disorder and clinical syndrome factors of MCMI-II scales. *Journal of Personality Disorders*, 6(1), 40–52. <https://doi.org/10.1521/pedi.1992.6.1.40>
- Strack, S., & Millon, T. (2007). Contributions to the dimensional assessment of personality disorders using Millon’s model and the Millon Clinical Multiaxial Inventory (MCMI–III). *Journal of Personality Assessment*, 89(1), 56–69. <https://doi.org/10.1080/00223890701357217>

- Sunderland, M., Forbes, M. K., Mewton, L., Baillie, A., Carragher, N., Lynch, S. J., Batterham, P. J., Calear, A. L., Chapman, C., Newton, N. C., Teesson, M., & Slade, T. (2020). The structure of psychopathology and association with poor sleep, self-harm, suicidality, risky sexual behavior, and low self-esteem in a population sample of adolescents. *Development and Psychopathology*, 1–12. <https://doi.org/10.1017/S0954579420000437>
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (Sixth edition.). Boston : Pearson Education.
- Tong, X., Zhang, Z., & Yuan, K.-H. (2014). Evaluation of test statistics for robust structural equation modeling with nonnormal missing data. *Structural Equation Modeling*, 21(4), 553–565. <https://doi.org/10.1080/10705511.2014.919820>
- Urbán, R., Kun, B., Farkas, J., Paksi, B., Kökönyei, G., Unoka, Z., Felvinczi, K., Oláh, A., & Demetrovics, Z. (2014). Bifactor structural model of symptom checklists: SCL-90-R and Brief Symptom Inventory (BSI) in a non-clinical community sample. *Psychiatry Research*, 216(1), 146–154. <https://doi.org/10.1016/j.psychres.2014.01.027>
- van der Heijden, P. T., Egger, J. I., Rossi, G. M., & Derksen, J. J. (2012). Integrating psychopathology and personality disorders conceptualized by the MMPI-2-RF and the MCMI-III: a structural validity study. *Journal of Personality Assessment*, 94(4), 345–357. <https://doi.org/10.1080/00223891.2012.656861>
- van Loo, H. M., & Romeijn, J. W. (2015). Psychiatric comorbidity: Fact or artifact? *Theoretical Medicine and Bioethics*, 36(1), 41–60. <https://doi.org/10.1007/s11017-015-9321-0>
- van Prooijen, J. W., & van der Kloot, W. A. (2001). Confirmatory analysis of exploratively obtained factor structures. *Educational and Psychological Measurement*, 61(5), 777–792. <https://doi.org/10.1177/00131640121971518>
- Verguts, T., & De Boeck, P. (2000). A note on the Martin-Löf test for unidimensionality. *Methods of Psychological Research Online*, 5(1).
- Watkins, M. W. (2018). Exploratory factor analysis: A guide to best practice. *Journal of Black Psychology*, 44(3), 219–246. <https://doi.org/10.1177/0095798418771807>
- Watson, D., Clark, L. A., & Harkness, A. R. (1994). Structures of personality and their relevance to psychopathology. *Journal of Abnormal Psychology*, 103(1), 18–31. <https://doi.org/10.1037/0021-843X.103.1.18>

- Widiger, T. A., Bach, B., Chmielewski, M., Clark, L. A., DeYoung, C., Hopwood, C. J., Kotov, R., Krueger, R. F., Miller, J. D., Morey, L. C., Mullins-Sweatt, S. N., Patrick, C. J., Pincus, A. L., Samuel, D. B., Sellbom, M., South, S. C., Tackett, J. L., Watson, D., Waugh, M. H., ... Thomas, K. M. (2019). Criterion A of the AMPD in HiTOP. *Journal of Personality Assessment*, 101(4), 345–355. <https://doi.org/10.1080/00223891.2018.1465431>
- Widiger, T. A., Hurt, S. W., Frances, A., Clarkin, J. F., & Gilmore, M. (1984). Diagnostic efficiency and DSM-III. *Archives of General Psychiatry*, 41(10), 1005–1012. <https://doi.org/10.1001/archpsyc.1984.01790210087011>
- Widiger, T. A., & Mullins-Sweatt, S. N. (2010). Clinical utility of a dimensional model of personality disorder. *Professional Psychology, Research and Practice*, 41(6), 488–494. <https://doi.org/10.1037/a0021694>
- Widiger, T. A., & Simonsen, E. (2005). Alternative dimensional models of personality disorder: Finding a common ground. *Journal of Personality Disorders*, 19(2), 110–130. <https://doi.org/10.1521/pedi.19.2.110.62628>
- Wright, A. G. C., & Simms, L. J. (2015). A metastructural model of mental disorders and pathological personality traits. *Psychological Medicine*, 45(11), 2309–2319. <https://doi.org/10.1017/S0033291715000252>
- Wright, A. G., Thomas, K. M., Hopwood, C. J., Markon, K. E., Pincus, A. L., & Krueger, R. F. (2012). The hierarchical structure of DSM-5 pathological personality traits. *Journal of Abnormal Psychology*, 121(4), 951–957. <https://doi.org/10.1037/a0027669>
- Wright, B., & Stone, M. (1999). *Measurement Essentials* (2nd ed.). Wide Range, INC.
- Yang, J., Bagby, R. M., Costa, P. T., Ryder, A. G., & Herbst, J. H. (2002). Assessing the DSM-IV structure of personality disorder with a sample of Chinese psychiatric patients. *Journal of Personality Disorders*, 16(4), 317–331. <https://doi.org/10.1521/pedi.16.4.317.24127>
- Yocom, B. E. (2018). *Psychiatric severity and HIV risk in adults with mental illness* (991031447920202976) [Unpublished doctoral dissertation]. University of Miami.
- Zuccaro, C. (2010). Statistical alchemy – the misuse of factor scores in linear regression. *International Journal of Market Research*, 52(4), 511–531. <https://doi.org/10.2501/S1470785309201429>