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LINKING THE PSYCHOPATHOLOGY FIVE SCALES OF THE MMPI-2-RF TO THE  
PERSONALITY PATTERN AND CLINICAL SYNDROME SCALES OF THE MCMI-III:  
A STUDY OF CONCURRENT AND CONSTRUCT VALIDITY

A Dissertation by

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Submitted to the Department of Psychology  
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Wichita State University  
in partial fulfillment of  
the requirements for the degree of  
Doctor of Philosophy

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LINKING THE PSYCHOPATHOLOGY FIVE SCALES OF THE MMPI-2-RF TO  
THE PERSONALITY PATTERN AND CLINICAL SYNDROME SCALES OF THE MCMI-  
III: A STUDY OF CONCURRENT AND CONSTRUCT VALIDITY.

The following faculty members have examined the final copy of this dissertation for form and content, and recommend that it be accepted in partial fulfillment of the requirement for the degree of Doctor of Philosophy with a major in Psychology.

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## DEDICATION

I would not be where I am today without the loving support of my parents, Maureen and Peter Walsh. The values you instilled in me from a young age have given me the courage, perseverance, and enthusiasm to travel across the country to pursue my graduate work. The unconditional love and guidance you have shown me have given me the strength and resolve necessary to complete this both exciting and sometimes exhausting journey. You have worked hard to provide me with the opportunities and resources needed to achieve my goals. Most importantly, you have reminded me to never take myself too seriously. In the words of my grandfather William Walsh I will remember to always “hang loose.”

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## ABSTRACT

The MMPI, published in 1943, considered for years the gold standard for objective personality assessment, was revised in 1989 and published as the MMPI-2. In 1991, a revised version of the MMPI-2 was published which included the Personality Psychopathology Five (PSY-5) Scales. In 2008 the MMPI-2 Restructured Form (RF) scale was published and the PSY-5 scales were revised in the RF form. Another widely employed instrument is the MCMI-III (2009) which is the fourth iteration of the inventory and contains well researched Personality Pattern Scales and Clinical Syndrome Scales. This instrument will be used as a criterion to further examine the validity of the MMPI-2-RF PSY-5 scales.

The current study investigates the revised Personality Psychopathology Five (PSY-5) scales of the MMPI-2-RF and how they map onto the Clinical Syndrome, Severe Clinical Syndrome, Clinical Personality and the Severe Personality scales of the MCMI-III. A significant pattern of convergence was noted between the PSY-5r scales and expected diagnostic scales of the MCMI-III through zero order correlation analysis, which was further supported when the Personality Pattern and Clinical Syndrome scales of the MCMI-III were regressed onto the PSY-5r demonstrating conceptually expected patterns of covariation. Furthermore, two separate exploratory factor analyses were conducted with the PSY-5r scales and the Personality Pattern and Clinical Syndrome scales of the MCMI-III indicating two three factor solutions. These results clearly demonstrate that the PSY-5r scales of the MMPI-2-RF possess clinical utility in the assessment of personality disorders as they stand in Section II of the current DSM-5. They also provide further evidence of convergent validity of the scales against another widely used personality assessment which focuses specifically on DSM-IV Personality Disorder diagnoses.

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## ABBREVIATIONS

RC	Restructured Clinical Scales
MMPI-2	Minnesota Multiphasic Personality Inventory – 2
MMPI-2-RF	Minnesota Multiphasic Personality Inventory-2-Restructure Form
AGGR	Aggression
PSYC	Psychoticism
NEGE	Negative Emotionality/Neuroticism
INTR	Positive Emotionality/Extroversion
DISC	Constraint

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## CHAPTER 1: INTRODUCTION

This study links the new Personality Psychopathology Five (PSY-5) scales of the Minnesota Multiphasic Inventory-2-Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008/2011) to personality and psychopathology scales of the Millon Clinical Multiaxial Inventory Fourth Edition (MCMI-III; Millon, Millon, Davis, and Grossman, 2009). The MMPI-2-RF scales are the latest revision and update of the venerable MMPI. The fourth edition of the MCMI-III is the latest revision of the Millon scales. This study provides information on both the concurrent and construct validity of the instruments.

The PSY-5 scales, and to a lesser degree the MCMI-III scales, are at the center of a contemporary controversy within the enterprise of psychiatric diagnosis. Following the medical model, psychiatric diagnosis has always been categorical. That is, disorders are sorted into categories as when Kraepelin (1921) introduced a dichotomy between schizophrenia and bipolar disorder. The categorical nosological system has been useful in many branches of science. Indeed, the categorical system developed by Linnaeus (1707-1778) is still used. Linnaeus was a Swedish botanist, physician, and zoologist, who laid the foundations for the modern biological naming scheme of binomial nomenclature. He is known as the father of modern taxonomy, and is also considered one of the fathers of modern ecology (Blunt, 2001).

All scientific enterprises depend on having some sort of system for categorizing what it is they wish to study. John Gunderson (1984), a Harvard psychiatrist asserted that the purpose of a diagnosis is to predict the course of treatment (1984).

All of the psychiatric diagnostic systems traditionally have classified mental disorders as specific categories, much like the rest of medicine. The latest system for assessing and diagnosing psychiatric disorders is the *Diagnostic and Statistical Manual for Mental Disorder*, Fifth Edition (*DSM-5*; American Psychiatric Association [APA], 2013). The primary diagnostic

criteria articulated in the DSM-5 are polythetic and categorical assessing only pathological symptoms. Within this system an individual must exhibit a certain number of symptoms to meet criteria for a specific diagnosis (to be placed within a certain category). For example, the diagnostic criteria for Major Depressive Disorder consist of 9 symptom clusters. To meet criteria for this diagnosis an individual must exhibit at least 5 of these 9 criteria.

Before proceeding it may be helpful to clarify some key terms. The first is *nosology*. All scientific endeavors utilize some sort of classification system. Nosology [Gr. *nosos* disease + *ology* the study of] is the science of classification of diseases. Another term that requires a definition is *taxonomy*. Taxonomy [F. *taxonomie* fr. Gr. *tax* order + *nomie-nomy*] is the study of the general principles of scientific classification. A final term that requires definition is *diagnosis* [Gr. *dia* through-a prefix meaning through, between, apart, across, or completely + Gr. *gnosis* knowledge] is the determination of the nature of a case of disease.

Psychiatric diagnosis has had a stormy history. Often criticized as labeling or belittling people with emotional problems, anti-psychiatry proponents such as Szasz (1961, 1970) proposed that mental illness was a myth and advocated doing away with most psychiatric diagnoses. It should be noted that academic clinical psychologists have been especially harsh in condemning psychiatric diagnosis (Caplan & Cosgrove, 2004). However, although the field of clinical psychology was officially founded by Lightner Witmer in 1908 (Nietzel, Bernstein, Kramer, & Milich, 2003) over 100 years have passed and we have yet to see a psychological diagnostic system.

Most clinicians believe we need some sort of classification system to bring some order to the complex field of personality and psychopathology. However, there have been concerns that a categorical diagnostic system may not be appropriate for most mental health issues. One of

the concerns is that the system artificially dichotomizes the diagnosis. If an individual does not meet five of the nine diagnostic criteria for depression s/he will not receive the diagnosis. One either fits into the category or not, leaving no room for gradation or continua. Another problem is the question of what combination of the five out of nine actually describes, say, Major Depression? Indeed, binomial theory informs us that there are 227 of combinations of five out of nine symptom clusters (Levy & Bryant, 2013).

Another comment on the categorical system of psychiatric diagnosis which may shed light on this issue comes from Dr. Joel Paris (2013), a professor of psychiatry at McGill University, who wrote:

Using a cut-off, as in DSM's category of major depression, 5 of 9 criteria (as opposed to say, 7, 8 of 9) is an arbitrary procedure. That is why this category is so heterogeneous. Of course, patients with subclinical symptoms (less than 5) still suffer distress. It is also not clear that patients who have more than five criteria are fundamentally different from those who only barely meet the cut-off. (p. 69)

Yet another concern about the categorical model is the fact that the same symptoms may fit into different categories. This results in considerable overlap across categories which exacerbate the problem of co-morbidity and results in fuzzy boundaries between diagnostic categories. Lastly, it also must be noted that the current model of personality assessment and diagnosis is purely pathological. There are no healthy descriptors: one is either unhealthy or nothing at all. Finally it can be argued that the categorical method made psychiatric diagnosis more reliable, but not necessarily more valid (Paris, 2013).

For many years it has been argued that an alternative dimensional model be employed in diagnosing psychopathology. A dimensional model sees disorders as dimensions: manifestations

of pathology that then can be scored in terms of severity. Recognizing the difficulties of the categorical classification system many leaders of psychiatry and clinical psychology have come to the conclusion that it should be eliminated or kept on to be used in tandem with a dimensional system (Paris, 2013). The thought is that diagnosis would gradually become dimensional. Rather than forcing diagnosis into dichotomous slots, patients would receive scores or ratings on one or more dimensions of psychopathology. A dimensional system provides a more convenient system to consider a full personality continuum ranging from general mental health to profound psychopathology. The MMPI-2-RF PSY-5 scales were originally developed to assess human functioning on dimensions of personality and psychopathology.

The editors of the DSM-5 recognized the limitations of the categorical model of classification of mental disorders but were unwilling to make the drastic step of eliminating it altogether. Indeed, cognitive scientists inform us that people tend to think in categories (Rosch & Lloyd, 1978). Medicine has always classified illness in this way. Hence, although all the diagnoses in DSM-5 (American Psychiatric Association, 2013) are assessed using a categorical method, it also includes a new Section III by the title of Emerging Measures and Models. This new Section-III begins with the following statement:

A growing body of scientific evidence favors dimensional concepts in the diagnosis of mental disorders. The limitations of a categorical approach to diagnosis include the failure to find zones of rarity between diagnoses (i.e., delineation of mental disorders from one another by natural boundaries), the need for intermediate categories like schizoaffective disorder, high rates of comorbidity, frequent not-otherwise-specified (NOS) diagnoses, relative lack of utility in furthering the identification of unique

antecedent validators for most mental disorders, and lack of treatment specificity for the various diagnostic categories.

From both clinical and research perspectives, there is a need for a more dimensional approach that can be combined with DSM's set of categorical diagnoses. Such an approach incorporates variations of features within an individual (e.g., differential severity of individual symptoms both within and outside of a disorder's diagnostic criteria as measured by intensity, duration, or number of symptoms, along with other features such as type and severity of disabilities) rather than relying on a simple yes-or no approach. (p. 733)

The dimensional model is especially suited for use with the personality disorders because they are dimensional by their very nature. According to the DSM-5, "A personality disorder is 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" (p. 645). Put another way, all people have traits and when a person's traits are rigid, inflexible and maladaptive, s/he manifests a personality disorder.

In Table 3 of the DSM-5 Section III there is a listing of personality disorder trait domains and facets. A complete listing of these trait domains can be found in Appendix 3. Costa and McCrea (1995) define domains as "multifaceted collections of specific cognitive, affective and behavioral tendencies" and facets as "lower level traits. (p. 23). Table 1 (G. Veenstra, personal communication, January 28, 2014) provides a comparison among four versions of a five factor dimensional models with the last column representing the newest MMPI-2-RF PSY-5 scales. The first column includes the five traits or domains in DSM-5 Section III. The five DSM-5

domains (left column) proposed in this alternative model include: Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism. It should also be pointed out that each of the domains is bipolar. Negative affectivity is one pole of a dimension anchored by emotional stability on the other. The other four are detachment vs. extraversion, antagonism vs. agreeableness, disinhibition vs. conscientiousness and psychoticism vs. lucidity. The adjectives in each column are traits or domains according to various five factor models.

**Table 1: Comparison Among Various Versions of a Five Factor Dimensional model**

<u>DSM-5 Domains</u>	<u>Positive</u>	<u>Negative</u>	<u>NEO-PR-3</u>	<u>MMPI-2-RF PSY-5</u>
Negative Affectivity	Emotional Stability*	Neuroticism	Neuroticism	Negative Emotionality
Detachment	Extroversion*	Introversion	Extroversion*	Introversion
Antagonism	Agreeableness*	Antagonism	Agreeableness*	Aggressiveness
Disinhibition	Conscientiousness*	Disinhibition	Contentiousness*	Disconstraint
Psychoticism	Openness*	Conventional	Openness to new experiences*	Psychoticism

Items marked with a (\*) are positively poled scales

The second and third columns describe the positive and negative poles of the DSM-5 domains as well as what is known as the Big Five (Goldberg, 1981). The fourth column provides the descriptors for the NEO-PI-R-3 (Costa & McCrae, 2010), a marker of the Big Five in the normal population. Finally, the fifth column provides the names of the five dimensions cited in the PSY-5 (Harkness & McNulty, 1995). The similarities among the five sets of labels are striking. More importantly, the PSY-5 are direct markers of the five dimensions of personality that the writers of DSM-5 Section III suggest that we use in this new conceptualization of the personality disorders. Hence, if nothing else, this study is timely.

Also note that these dimensions range from normal or healthy to psychopathological. This reflects one of the many virtues of the dimensional model. In this new model it is not necessary to put italics around “healthy.” It is possible to be healthy in the DSM-5 diagnostic

system. The Big Five is one of the foundations of personality theory. Is it not interesting that personality theory is being integrated with the diagnostic system for personality disorders?

The only polarity that is not isomorphic with the Big Five is the psychoticism-openness, a dimensional formulation that is rather controversial and beyond the scope of this dissertation (Piedmont, Sherman, & Sherman, 2012).

At this point we will review a brief history of the decades of work that has gone into developing the Big Five. The purpose of this review is to link the DSM-5 personality disorder trait domains to the PSY-5 scales.

### **Brief History of the Big Five**

The Big Five evolved from the work of Allport and Odbert (1936) who in 1925 reviewed the then current unabridged American Unabridged dictionary containing about 550,000 words and identified about 18,000 adjectives that were descriptors of individual differences among persons. They then omitted adjectives that described temporary states (scared), conveyed social judgment (insignificant), and physical traits (redhead). What remained were about 4,500 relatively neutral personality trait terms that were judged to possess “the capacity...to distinguish the behavior of one human being from that of another” (Allport & Odbert, 1936, pg. 24). This definition of traits as relatively stable, internal, and causal tendencies has influenced much of the subsequent research on personality structure. This approach is known as the “lexical hypothesis” [Gr. *lexikos* of words] which is the idea that individual differences in personality are reflected in the words of our everyday language.

Raymond Cattell conducted the earliest research on these 4,500 adjectives using cluster analysis and the earliest rudimentary factor analysis using ratings on samples of normal people. In his early work he identified 12 factors from the lexical data. He also found four additional

factors based on questionnaire data which formed the basis of his 16 dimensions of normal personality. According to John (1990) he then factored these 16 factors (second order factoring) and found five higher order factors that he labeled warmth vs. cold, intelligence, neuroticism (more pathological), neuroticism (less pathological) and dominance vs. submissiveness. Decades of work on these issues ensued (John, 1990; Winter & Barenbaum, 1999) and finally in 1981, Goldberg anointed the five broad dimensions (top of the hierarchy), the Big Five. Today the Big Five consist of five bipolar dimensions called Agreeableness, Conscientiousness, Neuroticism, Extraversion, and Openness.

The NEO Personality Inventory Revised (NEO-PI-R) was created by Costa and McCrae (1992) and is designed to measure the five broad domains of normal personality in adults. Currently it is the most widely used self report measures of personality in the world. There are 9 published translations of the instrument, 25 validated translations, and 8 research translations (Costa & McCrae, 2003). There are many settings in which the NEO-PI-R is appropriate including: clinically (focusing on positive strengths versus severe, negatively valenced psychopathology), in educational settings (advising students about personality traits that will impede and/or facilitate academic success), in medical settings (identifying personality characteristics that may play a role in treatment), and also occupational settings (identifying traits that will interfere with and/or support success in a specific occupation), (Weiner & Greene, 2008).

### **The Big Five Dimensions and Psychopathology**

As useful as these five broad high level dimensions have been in guiding research (including cross cultural research, e.g., Pulver, Allik, Pulkkinen, & Hämäläinen, 1995) in normal personality, Harkness and McNulty (1994) recognized that the extensive extant research on the

five factor model had limited relevance to the psychopathological population on which the clinical professionals focus their efforts. Harkness and McNulty (1994, 1995) then embarked on a research endeavor that blended the Big Five domains with data on individual differences in pathological populations (the details of their efforts are explained below). Harkness and McNulty ultimately identified what may be called a psychopathological Big Five using items gleaned from the MMPI item pool (Harkness & McNulty, 2006; McNulty & Harkness, 2002; Rouse, Finger, & Butcher, 1999). They called their dimensions the Personality Psychopathology Five (PSY-5). The PSY-5 dimensions are called Negative Emotionality/Neuroticism, Introversion/Low Positive Emotionality, Aggressiveness, Disconstraint, and Psychoticism. The PSY-5 were introduced in the 2001 revision of the MMPI-2. They were revised and reappeared in the latest revision of the MMPI which is known as the MMPI-2-RF (Ben-Porath & Tellegen, 2008)

As noted above, the DSM-5 Section III is organized around a dimensional model of diagnosis which relies heavily on trait theory. Interestingly, the newest conceptualization of psychopathology, including personality disorders, has been recast in a five factor model. Table 1 (G. Veenstra, personal communication, January 28, 2014) provides a comparison among four versions of five factor dimensional models with the last column representing the newest PSY-5 scales.

The five DSM-5 domains proposed in this DSM-5 alternative model include Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism. They are clearly parallel to the PSY-5 scales created by Harkness and McNulty (Finn, Arbisi, Erbes, Polusny, & Thuras, 2014).

The PSY-5 scales of MMPI-2-RF clearly adhere to a dimensional model of personality assessment and diagnosis, examining personality and psychopathology on a continuum ranging

from normal to pathological. Lower scores on these five scales indicate behavior in the normal range of functioning, while high scores (usually T-scores above 65) indicate more pathological and rigid behaviors.

### **The Psychopathology Five**

The importance of a dimensional model to personality assessment and diagnosis was stated in previous sections. It was also noted that existing dimensional models constructed for measuring personality have been deemed by many researchers to be a poor tool for measuring truly pathological traits reflected in DSM personality disorders prior to the development of the PSY-5 (Harkness & McNulty, 1994; American Psychiatric Association, 2013). The Personality Psychopathology Five (PSY-5) was originally constructed to reflect a dimensional measurement model of Axis II disorders in the DSM-IV, as well as answer the question: Which dimensions should be measured to examine individual differences in personality that contribute to problems in clinical work? The PSY-5 constructs include five broad personality domains experienced both in clinical issues and everyday life. The goal of this model was to aid in the description of both normal personality as well as the diagnosis of more severe personality disorders (Harkness & McNulty, 1994). The initial constructs of the PSY-5 were created from analysis of fundamental topics of personality disorders of the DSM-III as well as trait words used to describe normal personality (Harkness & McNulty, 1994). The domains span diagnoses of both personality disorders as well as Axis I clinical syndrome scales. The authors administered a set of items to lay people.

Lay people participated in these studies because it is they who take tests and are interviewed by clinicians, they who respond to test items and provide the reports on symptoms, traits and life-adaptations that clinicians use to formulate their cases. We did

not want to ask more of our test respondents than they could reasonably be expected to do nor did we not want to ask less. (Harkness et al., 2002 pg. 12)

Items administered included those derived from DSM-III-R criteria, Cleckley's (1951) 16 descriptors of psychopathy, and Tellegen's (1982) primary normal personality factors. Data were gathered from approximately 201 participants resulting in 603 psychological similarities matrices as a means to examine both normal and pathological personality structure. A hierarchical structure was indicated. The upper level of the hierarchy indicated five broad traits including: Aggressiveness, Psychoticism, Constraint, Negative Emotionality/Neuroticism, and Positive Emotionality/Extroversion (Harkness & McNulty, 1994).

### **Statistical Development of the PSY-5 Constructs**

Instead of using factor analytic techniques (initially), the authors of the Psy-5 concentrated on the concept of "psychological distance" to differentiate the five dimensions. Psychological distance is a measurement of how different (far) or similar (near) two concepts are seen to an individual. Specifically, the Psy-5 constructs were determined through measurement of psychological distances perceived by lay people between descriptors of normal and pathological personality descriptors. Grouping decisions made by participants were used to create mathematical matrices that quantified similarities and differences of the descriptors. For example, if items 18 and 26 were grouped together by a lay person a "1" would be placed in the 18<sup>th</sup> row of the 26<sup>th</sup> column (as well as the 26<sup>th</sup> row of the 18<sup>th</sup> column). If two items were not grouped together by a participant, a "0" would be placed in the respective cells of the matrix. The matrices of all participants are added together to yield one summary matrix reflecting a group consensus. This procedure is called Replicated Rational Selection (RRS; Harkness, McNulty, Porath, & Graham, 2002).

This summary matrix was further transformed using advanced statistical procedures that are beyond the purpose of this manuscript to describe (Harkness, 1992). This matrix was further analyzed by the application of principal component factor analysis with a varimax rotation using a procedure designed by Auke Tellegen, implemented successfully by Clark (1990) and Watson, Clark, and Tellegen (1984).

### **Development of the MMPI-2-PSY-5 Scales**

The PSY-5 scales of the MMPI were published in 1994 and added to the revised MMPI-2 manual in 2001 (Butcher, Graham, Ben-Porath, Tellegen, Dahlstrom, & Kaemmer, 2001; Harkness & McNulty, 1994). Rather than creating new scales and starting data collection from scratch, the authors of the PSY-5 once again utilized the RRS procedure to create scales composed of MMPI-2 items for measuring the PSY-5 constructs. The use of this procedure avoided the problem of idiosyncrasy that can come with rational item writing by scale developers creating odd items that make perfect sense to them, but no one else. This was done to restrict the control of the test developers creating items that may accurately reflect the intended construct as interpreted by the test taker. Lay participants (college students) were first taught to understand the PSY-5 constructs; they were then instructed to examine the MMPI-2 item pool and select questions asking about the specific constructs. Items were then selected for the scales that were repeatedly chosen by the majority of trained participants. Items chosen were further reviewed by scale authors to ensure that they were properly keyed, not projective in nature (asking about the behavior of the others versus themselves), as well as to ensure that the item was only relevant to one concept. Lastly, the scales were psychometrically analyzed and items were deleted if they correlated stronger with a scale other than the one they were initially keyed for (Harkness, 2002).

Explanatory definitions of the PSY-5 constructs and their MMPI-2-RF scale names that were attempted to be captured by the MMPI-2-RF item pool are noted below.

**Aggression (AGGR).** The construct of Aggression is related to anger and rage. The MMPI-2-RF scale is titled Aggressiveness-Revised. A review of the literature surrounding the MMPI-2-PSY-5 AGGR scale established strong correlations with assessments measuring antagonism, dominance, and ambition (e.g., NEO-PI-R Agreeableness, MPQ Aggression, 16PF Scale E, and TCI-R Persistence). The desire for influence and power are also demonstrated in high levels of Aggression. Individuals scoring high on this scale enjoy intimidating others and use their aggression as a means to accomplish their goals. This scale does not emphasize aggression in a defensive or reactive form (Harkness et al., 2002).

**Psychoticism (PSYC).** The construct of Psychoticism involves significant disconnection from consensual reality with a presentation not linked to a specific etiology. The MMPI-2-RF scale is titled Psychoticism-Revised. PSYC scores of the MMPI-2 have been shown to be significant predictors of Schizotypal and Borderline Personality Symptoms as well as correlate with a history of prior suicide attempts (Ben-Porath, 2012). This construct has been described as representing the verisimilitude or inaccuracy of an individual's perception of their outer social and objective world (Ben-Porath, 2012). Individuals scoring high on the PSYC scale typically report sensory/perceptual problems that underlie the basis for unusual, even psychotic symptoms. They are generally suspicious of others and are sensitive to how they are being treated. It is important to distinguish the PSY-5 construct of Psychoticism from that proposed by Eysenck whose conceptualization of the term was more closely linked with criminality and antisocial behaviors (Harkness et al., 2002).

**Constraint (DISC).** The construct of Constraint combines features of control versus impulsivity, harm avoidance, and traditionalism (Tellegen, 1982; Watson & Clark, 1994). The MMPI-2-RF scale is titled Disconstraint-Revised. Harkness (2012) describes Disconstraint as resulting from the prospect of future consequences doing nothing to constrain behavior. The MMPI-2-PSY-5 scale Disconstraint has significant relationships with personality scales examining the impact of current behavior on future consequences, impulsivity, sensation seeking, and proneness for boredom (e.g., NEO-PI-R Conscientiousness, MPQ Constraint, 16PF Scale F, and TCI-R Novelty Seeing). Lastly, high scores on DISC have been shown to predict symptoms of antisocial personality disorder (Harkness, Finn, McNulty, & Shields, 2012).

**Negative Emotionality/Neuroticism (NEGE).** The construct of Negative Emotionality/Neuroticism relates to an emotional disposition to negative thoughts and emotions, especially those related to anxiety and nervousness (Eysenck & Eysenck, 1985; Tellegen, 1982). The MMPI-2-RF scale is titled Negative Emotionality/Neuroticism-Revised. This construct measures a propensity for pessimism, worry, and self-criticism (Harkness et al., 2002). It is linked to the Big Five construct of Neuroticism. Individuals scoring high on the MMPI-2-PSY-5 scale measuring the construct (NEGE) report significant subjective distress and negative emotionality. They are generally self-critical, pessimistic, and fearful (Graham, 2012).

**Positive Emotionality/Extroversion (INTR).** The final construct of Positive Emotionality/Extroversion represents a broad tendency to experience positive emotions, seek out social experiences, and have the energy to be engaged in life's tasks (Meehl, 1975). The MMPI-2-RF scale is titled Introversion/Low Positive Emotionality-Revised. The MMPI-2-PSY-5 INTR scale relates to a limited capacity to seek out joy and positive experiences. High scores reflect

minimal engagement in potential recourses (Harkness et. al., 2002). Common diagnoses for individuals scoring high on this dimension are Depression and Dysthymia.

Because the PSY-5 scales of the MMPI-2 RF are revised, it is important to conduct a series of concurrent validity studies to examine their psychometric properties to establish initial empirical correlates of these new scales. The main purpose of this study is to compare the revised PSY-5 scales of the MMPI-2-RF in relation to the Personality Pattern and Clinical Syndrome scale of the Millon Clinical Multiaxial Inventory-III Fourth Edition, also a gold standard in the field of personality assessment. Through correlational matrices, factor analytic work, and linear regression analysis, a better understanding of these broadband measures will be gained for this new version of an industry standard.

The publication of the MMPI-2-RF is a significant event in of the development history of the MMPI and can be best appreciated in the context of its long and rich history. Hence, a brief history of the MMPI will now be traced from its beginning in the early 1940s to its latest evolution published in 2008.

### **Brief History of the MMPI**

The original MMPI was first published by Hathaway and McKinley in 1943. It was designed to guide differential diagnosis of common clinical syndromes or disorders (Hoelzle & Meyer, 2008; Sellbom & Ben-Porath, 2005). It was very well received by the clinical and research community and was revised several times in its long history. The original MMPI enjoyed a huge research base and this base contributed to many changes in how the instrument was used clinically. Finally, in 1989 the norm base of the instrument was greatly expanded and improved and the language was updated and clarified (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989). This new edition of the MMPI instrument was named the MMPI-2. Twelve

years later a technically revised edition of the inventory appeared (Butcher et al., 2001) with more research-based innovations. The MMPI Psychopathology Five scales were published in 1995 and later included in the 2001 revised MMPI-2 (Harkness, McNulty, & Ben-Porath, 1995).

In 2003, the clinical scales of the inventory, basically untouched for decades, were revised, published as the Restructured Clinical (RC) scales, and included in the MMPI-2 (Tellegen, Ben-Porath, McNulty, Arbisi, Graham & Kaemmer, 2003). Finally, in 2008, an entirely restructured MMPI was published and is known as the MMPI-2-RF, or restructured form of the MMPI-2 (Tellegen & Ben-Porath, 2008). This new instrument introduced a revised set of PSY-5-r scales containing no item overlap, no item overlap with Demoralization, and internal consistency estimates comparable to the MMPI-2 PSY-5 scales. The PSY-5 scales adhere to a dimensional model of personality conceptualization similar to that which has been proposed in Section III of DSM-5.

### **Dimensions and Hierarchies**

As arguments against a categorical model have mounted in our diagnostic paradigm, more focus and advocacy have been in support of a dimensional approach to the assessment and diagnosis of personality pathology (Clark, McEwen, Collard, & Hickok, 1993). The concept of a dimensional model was first proposed by William McDougall in 1932, who stated that that “personality can be broadly analyzed into five distinguishable but separate factors... intellect, character, temperament, disposition, and temper,” (Digman, 1990). It was around this time that researchers including Klages (1926) and Baumgarten (1933) were beginning to carefully examine the role of language in understanding and assessing personality. This lexical study was further examined by Allport and Oshert (1936) who then influenced the factor analytic work of Raymond Cattell, (1943, 1947).

In a move towards more objective measures of personality assessment, Cattell began using questionnaires and peer rating scales to measure and quantify thousands of English adjectives into factors or dimensions to better understand personality and predict future behavior. Cattell's system yielded 16 primary factors and 8 second order factors (Cattell et al., 1970). The large number of factors extracted by Cattell was criticized as being excessive at the time of publication and efforts to replicate his complex structure of personality were unsuccessful. Fiske (1949) used 21 bipolar scales from Cattell's work and was unable to extract more than five factors in his solution (Digman, 1990). Tupes and Christal (1961) went on in an attempt to replicate Cattell's study using all 30 bipolar scales and were also unable to recreate a factor structure as complex as that which was initially proposed by Cattell. Tupes and Christal (1961) reanalyzed Cattell's earlier work as well as Fiske's agreeing that five factors was a better fit for a more global approach to personality assessment.

Further support for a five factor dimensional approach was demonstrated in the work of Norman (1963) and Smith (1967). In an effort to demonstrate the link between personality traits and behavior Norman (1967) investigated the "levels of abstraction" associated with the five factor model seen in Figure 1. Norman settled on a four level system with the five trait dimensions at the fourth highest level subsequently linked to characteristics, habits, and eventually behavioral responses (Digman, 1990). Later studies by Wiggins (1969) and Smith (1967) further demonstrated the usefulness of personality dimensions in the prediction of future behaviors. Specifically, these researchers examined the predictive power that the responsibility or conscientiousness factor has on school achievement.

The study of trait theory and the emergence of "the big five" as they are known today began in the 1980s and late 1970's beginning with Digman's (1972) analyses of High School

Personality Questionnaires creating second order factors correlating highly with the first four factors of the current five factor model. A five factor model similar to that which is mentioned above can be seen in analysis of the 16PF and the Zuckerman sensation seeking scales (Bierbaum & Montag, 1986).

Analysis of the Eysenck's big three factors and Cattell's 16PF led to Costa and McCrae's (1985) creation of the NEO Personality Inventory. Examination of the 16PF by Costa and McCrae (1976) highlighted three clusters of item responses including Eysenck's Extroversion and Neuroticism with the addition of an "open versus closed to experiences" scale. These three original scales were later joined by Agreeableness and Conscientiousness. Using the NEO-PI, Costa and McCrae have since demonstrated the presence of the five factor model in numerous personality inventories including Eysenck's Personality Inventory and the Myer's Brigg's type indicator (Costa & McCrae, 1985; McCrae & Costa, 1989). Analysis of the original Minnesota Multiphasic Personality Inventory yielded only four of the five factors, as the analysis did not identify the conscientiousness dimension (Costa, Busch, Zonderman, & McCrae, 1986).

Dimensional models by their very nature assume some sort of hierarchy. The first chapter in Section III of the DSM-5 begins with a discussion of dimensional concepts. A dimensional diagnostic model inherently assumes that there is some degree, amount, intensity, severity, pervasiveness or breadth to what we assess (mental illness).

A hierarchical model is a dimensional model that assumes the existence of higher or broader phenomena at the top end of a dimension, more contained phenomena at middle levels of a dimension and more narrow or focal phenomena toward the bottom of the dimension being considered. Consider the model presented in Figure 1 and theories discussed above, all of which support a dimensional model, but also a hierarchical structure to the assessment and

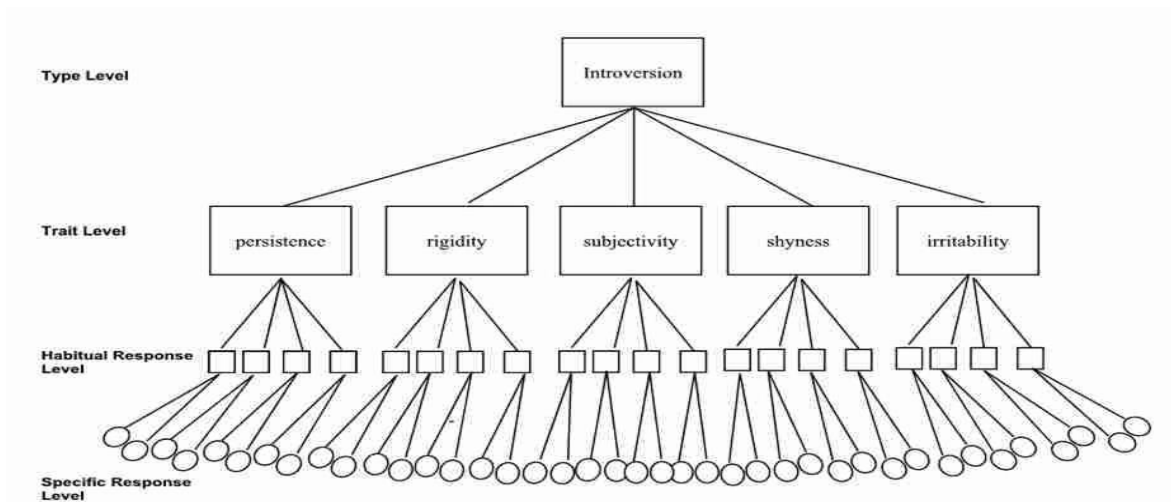
conceptualization of personality and personality disorders. Cattell (1946); Eysenck and Eysenck (1967); Goldberg, Norman, and Schwartz (1980); and Tellegen (1982) all utilized a comprehensive hierarchical structure when studying trait dimensions. These dimensions exist at various levels with lower levels examining narrower trait dimensions analyzing a fine band of behavior implications, while at higher levels trait dimensions become broad spanning a wide range of behavior implications (Harkness, 1992). Trait dimensional hierarchies differ from categorical hierarchies in that they are variance covariance hierarchies; the covariance of the lower order dimension becomes the variance higher order dimensions.

Specifically, this approach applies to a five factor model of personality assessment in that although it is nearly impossible to get a clear conceptual picture of the variance in human personality from five broad dimensions, it cannot be overlooked that personality can be examined at different levels of abstraction and breadth. An illustration of the vast bandwidth seen in hierarchical models would be that of a guppy. Describing a living creature as a guppy is certainly more informative than categorizing it as a fish, which is in turn more descriptive than describing it as an animal. In research on the big 5, broad trait dimensions such as Agreeableness or Extraversion are to personality what “animal” is to biology. These broad dimensions are often extremely useful for initial rough descriptions, but may be of less value when predicting specific behaviors (John, 1990).

### **The Hierarchical Structure of the Five Factor Model and the PSY-5r of the MMPI-2-RF**

Examination of personality from a hierarchical perspective began through examination of thousands of personality adjectives clustered into groups. According to Goldberg (1993), the hierarchical framework organizes personality descriptors from either a top down or a bottom up approach. The top down approach highlights large, broad domains supported by more specific

adjective clusters as mentioned previously. For example, the domain of extroversion is supported by descriptors such as “excitability” and more precisely “laughing at jokes.” A bottom up approach examines the more specific behavioral indicators and makes predictions about overarching personality structure based on those. Figure 1 illustrates one example of a traditional hierarchical model as demonstrated in Eysenck’s model of personality as it related to the higher level domain of introversion (Eysenck, 1970).



**Figure 1: Eysenck’s Hierarchical Model**

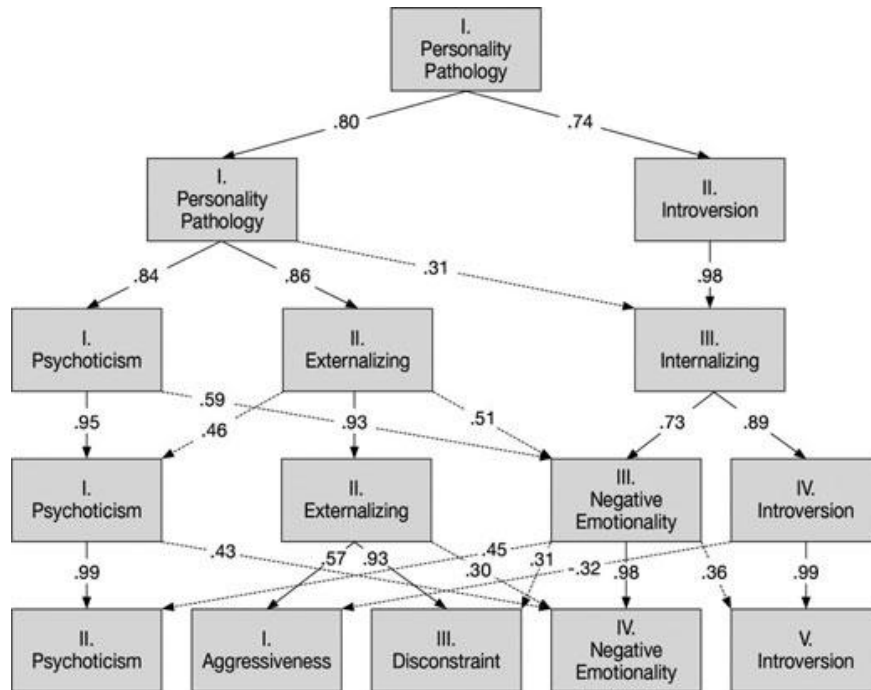
The hierarchical organization of the MMPI-2-RF through the inclusion of the higher order scales is a shift in the way the instrument is interpreted and utilized. Prior efforts have been made to delineate a higher order structure from the MMPI, however the issue of item overlap and the high inter-scale correlation of the clinical scales could not be ignored (Wiggins, 1968). The MMPI-2-RF introduces scales in hierarchical fashion 1) The higher order scales of Emotional/Internalizing Dysfunction (EID), Thought Dysfunction (THD), and Behavioral/Externalizing Dysfunction (BXD), these scales focus on broad dimensions of psychopathology; 2) nine intermediate level scales (The nine RC scales); 3) The revised Psychopathology Five scales as a model, specifically designed to assess personality pathology;

and 4) 23 lower order Specific Problem Scales viewed as facet scales of the RC scales. The creation and inclusion of the Higher Order scales was an attempt by test developers to first examine pathology based on broad band dimensional measures, using them to guide interpretation of subsequent RC and Specific Problem scales (Ben-Porath & Tellegen, 2008).

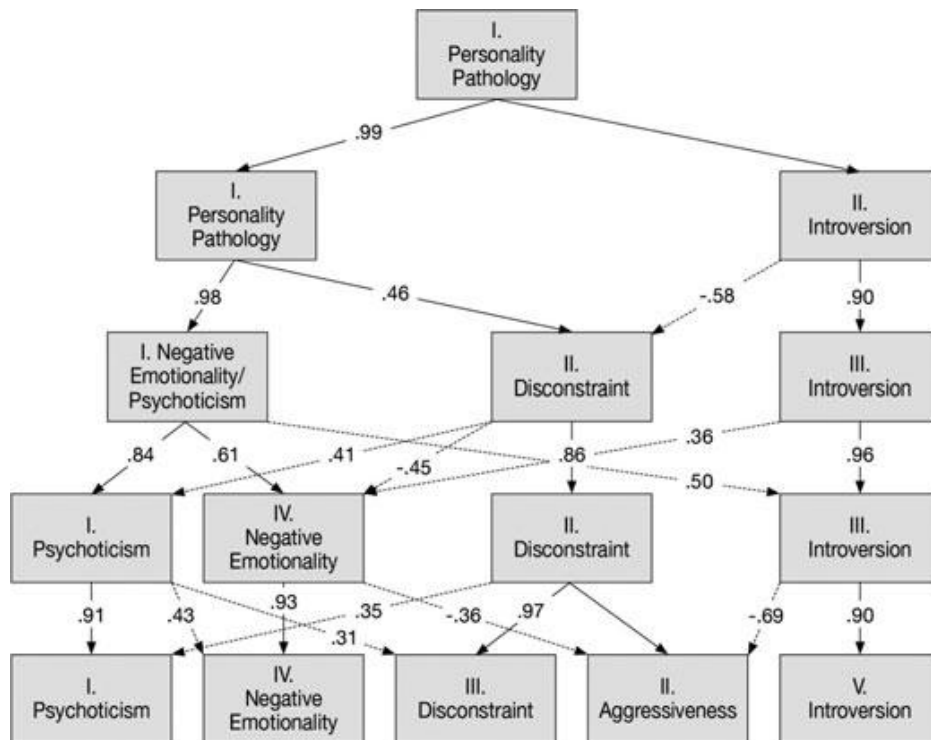
A recent study by Bagby, Sellbom, Ayearst, Chmielewski, Anderson, and Quilty (2014) has analyzed the hierarchical structure of the PSY-5r scales of the MMPI-2-RF using Goldberg's (2006) "bass-ackwards" method (Goldberg's term) to explicate hierarchy structure from a "top down perspective." Using this method the first and largest factors are extracted initially, followed by smaller components using principal factor and principal component analysis. To date, three prominent personality inventories have been examined using this method including The Revised NEO Personality Inventory (NEO PI-R) and the Personality Inventory for DSM-5 (PID-5; Krueger et al., 2012).

The resulting hierarchical structure of the PSY-5r examined in a psychiatric population is shown in Figure 2 and Figure 3. It should be noted that the three factor solution presented here is consistent with the hierarchical structure of the three higher order scales of the MMPI-2-RF as well as the "big three" general domains of psychopathology (Sellbom, Ben-Porath & Bagby, 2008). The authors did an additional hierarchical analysis on a non-clinical college student sample to examine a "normal" spectrum of personality domains as can be seen in Figure 3. The three factor solution from this sample included: Negative Emotionality/Psychoticism, Disconstraint, and Introversion which are consistent with studies examining college students (Wright, Thomas, Hopwood, Markon, Pincus, & Krueger, 2012). In general, both structures closely align with the hierarchical structure of DSM-5 personality traits as seen in Section III's

alternative model and the five factor model of personality, (Wright et al., 2012; Tackett, Quilty, Sellbom, Rector & Bagby, 2008).



**Figure 2: Bagby et al's., Hierarchical Structure of the Revised MMPI-2-RF Personality Psychopathology Five (PSY-5r) Domains in a Clinical Sample**



**Figure 3: Bagby et al's Hierarchical Structure of the Revised MMPI-2-RF Personality Psychopathology Five (PSY-5r) Domains in a Student Sample**

### DSM-5's Dimensional Model of Personality Disorder Diagnosis

As mentioned previously, further support for a dimensional approach to personality disorder diagnosis is highlighted in the DSM-5, Section III as an Alternative Model for Personality Disorders. The proposed model aims to address numerous shortcomings of the current system of personality diagnosis which remains in DSM-5 Section II. These shortcomings include the fact that patients meeting criteria for one personality disorder frequently are also meeting criteria for other personality disorders; although the diagnosis of Personality Disorder unspecified or other specified is often correct, given that individuals generally present with symptom patterns that correspond with more than one personality disorder diagnosis, these diagnoses are largely uninformative. The alternative model examines personality disorders

through impairments in personality functioning as well pathological personality traits (American Psychiatric Association, 2013).

This alternative model involves assessment of personality traits grouped into five domains. The model stresses that all individuals are located along a spectrum of trait dimensionality ranging in degree of severity, as opposed to being deemed present or absent. In line with a hierarchical model, certain traits are quite specific (e.g., talkative), while others are viewed as more broad (e.g., detachment), examining a far wider range of behaviors. Other than minimal variation across cultures surrounding trait facets, the five broad domains are consistent across cultures (American Psychiatric Association, 2013). The five domains closely align with MMPI-2-PSY5 and include Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism (American Psychiatric Association, 2013).

These five domains are composed of 25 specific traits facets. Although the DSM-5 and the previously explained trait model focus on traits and trait severity associated with psychopathology, healthy and adaptive traits are also available on these dimensions. The presence of these polarities has the potential to mitigate the effects and stigma associated with mental disorder and facilitate healthy coping and recovery (American Psychiatric Association, 2013). Figure 1 cited earlier highlights the domain polarities and compares them to the MMPI-2-PSY-5 model and the five factors of the NEO-PR. It is important to note that the categories listed below are not exact; for example, it may be a stretch to link Openness and Psychoticism on the same factor.

Research devoted to the examination of the big five has spanned the past 70 years. Virtually all of the early research and analyses have been conducted to assess normal, non-pathological personality dimensions. While committed to a dimensional approach in developing

the five factor model, Harkness, McNulty, and Ben-Porath (1995) recognized that existing scales for assessing a five factor personality structure such as the NEO-PI-R and NEO-PI-III (Costa & McRae, 1992) fell short when it came to assessing personality functioning ranging from normal to the pathological which is essential for clinical assessment, diagnosis, and treatment planning.

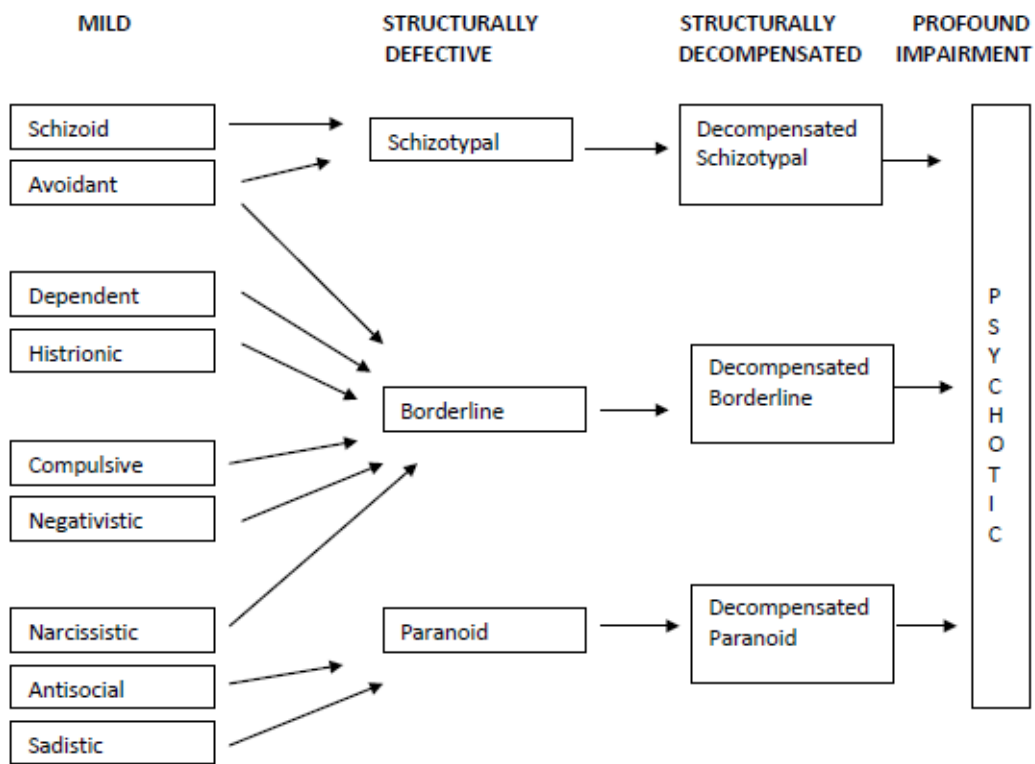
I will now review Theodore Millon's theory of personality that provides the theoretical foundation for the MCMI-III.

### **Theodore Millon's Theory of Personality**

Theodore Millon's theory of personality and psychopathology has greatly shaped the way the field of psychology thinks about and assesses psychopathology and personality disorder diagnoses today. (Theodore Millon passed away throughout the course of this project in January of 2014.) It is important that work on his current instrument continues with this project to further support the direction and evolution of the MCMI as progress is well underway for the fourth iteration of his assessment instruments.

The classification of personality disorders according to Millon's evolutionary theory are based on three domains or polarities. The three domains are *Aims of Existence* (pleasure-pain polarity), *Modes of Adaptation* (passive-active polarity), and *Strategies of Replication* (self-other polarity) (Choca, 2004). Millon believed that personality prototypes may be weak, neutral, or strong, and being strong in one polarity does not necessarily imply a positive attribute, rather a tendency to behave in a particular way. Millon was able to characterize each personality prototype using the three polarities mentioned above. For example, Histrionic Personality Disorder is characterized by a relative strength in the active polarity and weakness in passive polarity (Choca, 2004).

Within his theory Millon discusses how these personality prototypes have both a dimensional and categorical nature. A dimensional aspect is seen conceptualizing the strength or weakness in a categorical personality disorder diagnosis. Figure 4 highlights the dimensionality of these disorders ranging from Mild to Profound (Choca, 2004). The Millon Multiaxial Inventory was later created to measure these personality prototypes as well as disorders found on Axis I of the DSM-IV-TR (Choca, 2004).



*Figure 4:* Millon's Dimensional and Categorical Conceptualization of Personality Pathology (Choca, 2004).

In his most recent text, Millon (2011) places further emphasis on personality as a continuum which he planned to further implement with the upcoming MCMI-IV. Millon (2011) discusses 15 personality spectrum prototypes derived from his theory, each with three points of

severity across a continuum. Levels of severity span are *normal type, abnormal type, and clinical disorder*. The three points of each spectrum are listed in Table 2 below. Millon’s recent focus on a dimensional model spanning from adaptive to maladaptive is similar to that which is proposed in Section III of the DSM-5 as well the dimensional approach seen in the PSY-5 of the MMPI-2-RF. The proposed study will aid in bridging this gap between the “dimensions within pathological categories” approach of the MCMI-III to the incorporation of a healthy or adaptive lens that Millon (2011) proposes for the MCMI-IV. This link will be made by comparing the scales of the MCMI-III to the PSY-5r of the MMPI-2-RF.

Table 2:  
*Personality Pattern Scales from Millon (2011) Disorders of Personality 3<sup>rd</sup> Ed*

<b>Personality Patterns</b>			
<b>Spectrum</b>	<b>Normal Style</b>	<b>Abnormal Type</b>	<b>Clinical Disorder</b>
DADepn	Deferential	Attached	<u>Dependant</u>
SPHistr	Sociable	Pleasuring	<u>Histrionic</u>
CENarc	Confident	Egotistic	<u>Narcissistic</u>
ADAntis	Aggrandizing	Devious	<u>Antisocial</u>
RCComp	Reliable	Constricted	<u>Compulsive</u>
DRNegat	Discontented	Resentful	<u>Negativistic</u>
AAMasoc	Abused	Aggrieved	<u>Masochistic</u>
ADSadis	Assertive	Denigrating	<u>Sadistic</u>
AASchd	Apathetic	Asocial	<u>Schizoid</u>
SRAvoid	Shy	Reticent	<u>Avoidant</u>
DFMelan	Dejected	Forlorn	<u>Melancholic</u>
EETurbu	Ebullient	Exuberant	<u>Turbulent</u>
ESSchizoph	Eccentric	Schizotypal	<u>Schizophrenia</u>
UBCycloph	Unstable	Borderline	<u>Cyclophrenic</u>
MPParaph	Mistrustful	Paranoid	<u>Paraphrenic</u>

### **The Million Scales**

The original Millon Clinical Multiaxial Inventory (MCMI) was published in 1977 and later updated (MCMI-II) in 1983. Both versions of the instrument were based on Theodore Millon’s theory of personality which at that time was a bio-social learning theory (Millon, Millon, Davis, & Grossman, 2009). The MCMI was designed to measure both Axis I and Axis

II syndromes<sub>1</sub> as according to Millon's theory, both play a role in an individual's functional style. Millon theorized that Axis I syndromes accentuate the basic personality style and that evaluating for both Axis I and Axis II syndromes would provide beneficial information for a therapist (Millon et al., 2009). Unlike the MMPI, the MCMI is theoretically based and was constructed to provide correspondence with the various editions of *Diagnostic and Statistical Manual* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000). As the DSM-IV was published after the MCMI-II was constructed, the MCMI-III replaced 95 questions from the MCMI-II in order to reflect the current criteria of the DSM-IV. A Depressive personality pattern was added at this time as well as Post Traumatic Stress to the Clinical Syndrome Scales. The MCMI-II was updated in the early 1990s based on theoretical, professional, and empirical concerns (Millon et al., 2009).

In 2009, the MCMI-III was revised and renormed. The assessment was subjected to a threefold validation model. The first stage was the theoretical-substantive stage. This stage evaluated how firmly the items of the MCMI-III were based on theoretical framework. The second stage was the internal-structural stage. This stage examined the internal validity and consistency of the items and the scales comprising the instrument. External-criterion was the third stage. This stage evaluated the external validity of the instrument including convergent and discriminant validity (Millon et al., 2009).

The MCMI-III consists of 14 personality pathology scales and 10 Clinical Syndrome and Severe Clinical Syndrome Scales. The Personality scales include: 1) Schizoid; 2A) Avoidant; 2B) Depressive; 3) Dependent; 4) Histrionic; 5) Narcissistic; 6A) Antisocial; 6B) Sadistic; 7) Compulsive; 8A) Negativistic; and 8B) Masochistic. In addition to the pervasive personality styles mentioned above, three additional pathological personality scales were included in the

instrument including: S) Schizotypal; C) Borderline; and P) Paranoid. These severe personality patterns scales differ from basic personality disorders in several ways, including representing deficits in social competence and characterized by a high incidence of psychotic episodes. Individuals with these personality disorders have less integrated personality organization, are less effective in coping, and are more vulnerable to everyday stressors. Although Millon's position was that scales S, C, and P are more severe than other scales and diagnoses, this sentiment is not universally shared and was not arrived at through statements made within the DSM (American Psychiatric Association 2013; American Psychiatric Association 2000).

The Clinical Syndrome and Severe Clinical Syndrome scales of the MCMI-III were originally conceptualized as disorders embedded within the context of more pervasive personality patterns. In times of high distress, the Clinical Syndrome scales are thought to caricature and accentuate an underlying personality style. The Clinical Syndrome Scales of the MCMI-III include: A) Anxiety; H) Somatoform; N) Bipolar: Manic; D) Dysthymia; B) Alcohol Dependence; T) Drug Dependence; and R) Post-Traumatic Stress Disorder. Severe Clinical Syndrome Scales include: SS) Thought Disorder; CC) Major Depression; and PP) Delusional Disorder. The Severe Clinical Syndrome scales reflect disorders of marked severity (Millon, 2009).

## CHAPTER 2: PURPOSE OF THE STUDY

### **The Need for Convergent and Construct Validity**

Convergent validity allows researchers to establish credibility of new and restructured constructs within the field of assessment. Studies examining convergent validity allow one the opportunity to compare and link new scales and measurements with criteria that have previously been established. In this study, we are able to examine both the restructured scales of the PSY-5 within the MMPI-2-RF and compare them to the Personality Pattern and Severe Personality Pattern Scales of the Million Clinical Multiaxial Inventory-III, fourth edition (MCMI-III; Million, 2009). And by examining these two sets of scales which occupy different positions on the assessment hierarchy, we may also deepen our understanding concerning the validity of the constructs they intend to measure.

The purpose of this study is to deepen our understanding of the nature of the MMPI-2-RF PSY-5r scales in relation to both the Personality Pattern and Clinical Syndrome scales of the MCMI-III. This study will examine the patterns of covariation of the new PSY-5r scales with the scales of the MCMI-III. Specifically we will be examining personality structure at multiple levels of a hierarchical approach to personality conceptualization. The PSY-5r signify higher level broadband personality dimensions, while the scales of the MCMI-III represent more specific personality diagnoses found at a lower level of the hierarchy. Thus it is a concurrent validity study.

The recent attention in the literature on personality assessment has focused on a dimensional approach to personality pathology which is highlighted in Section III of the current DSM-5. As previously mentioned the five dimensions created to represent this new approach to personality conceptualization and diagnoses are very similar to the PSY-5r of the MMPI-2-RF. The PSY-5 were initially contrived to address concerns that current five factor models of the time did not

adequately account for severe forms of personality psychopathology. For example, explaining the behavior of a repeat criminal offender who has been convicted of armed robbery and battery as low in conscientiousness and agreeableness does not seem to cut it, nor does a high score in Openness to New Experiences accurately capture a woman frequently dissociating and feeling as if she has special abilities to predict the future and read the minds of others (Harkness & McNulty, 1994).

According to Harkness and McNulty (1994), normal sample based five factor models do not adequately capture the essence of the clinical picture for individuals experiencing severe personality pathology. This concern has been recognized and accounted for to a degree in Section III of the DSM-5, but further research must be done to examine the behavior of this dimensional model. The current study seeks to further expand our understanding of this model represented through the PSY-5r as it relates to another heavily utilized personality inventory.

Although the current study supports a dimensional approach to personality assessment, it should be noted that the authors are not attempting to validate, or argue for a specific number of underlying dimensions. The purpose of the study is exploratory in nature examining the covariation of two theoretically distinct personality inventories created using vastly different methodologies.

I will conclude this section with a final explanation that is intended to prevent a misunderstanding of the intent of this study. As the review of Section III of the DSM-5 reveals, there is growing enthusiasm in the mental health world for a dimensional conceptualization of mental disorders as opposed to a categorical model. This research was mounted to further investigate the structure of dimensions of mental illness employing two theoretically distinct psychometric measures of these phenomena. The MMPI-2-RF PSY-5r scales would appear to be

credible indices of dimensions of psychopathology. However, the “controversy” regarding the use of a categorical vs. a dimensional conceptualization of mental disorder under examination is at the center of this work. The determination of the exact number of dimensions that accurately characterize pathology is, at best, of secondary interest. (or, not the central focus of this project).

## CHAPTER 3: METHODOLOGY

### **Participants**

This sample consisted of 440 in patients hospitalized in a psychiatric facility in a Midwestern city. MMPI-2 protocols were excluded for non-responsiveness if omitted items were  $\geq 32$ , TRIN raw scores  $\leq 5$  or  $\geq 13$ , or Fp T scores  $> 100$ . MCMI-III protocols were excluded if 2 or more items on Scale V were endorsed (Morgan, Schoenberg, Dorr, & Burke, 2002). 440 valid profiles remained. Of the 440 individuals, 47.5% were male and 52.5% were female. The sample had a mean age of 34 years and 12.8 years of education. The sample was predominately White (88.3%); other reported ethnicities included African-American (6.1%), Native American (3%), Hispanic (1.6%), Asian (.5%), and "other" (.5%). Principal diagnoses for this sample are as follows: 60% mood disorders, 8.3% schizophrenic and other psychotic disorders, 6.7% substance abuse disorders, 4.3% anxiety disorders, and 13.8% "other". Additionally, 49% of this sample was given a comorbid Axis II diagnosis.

### **Measures**

#### *Minnesota Multiphasic Personality Inventory-2- Restructured Form (MMPI-2-RF)*

The MMPI-2 (Butcher et al., 2001) is a self-report measure consisting of 567 items designed to measure patterns of personality and psychopathology. Respondents respond to the 567 items in a true-false format depending on whether the statement applies to them. Reliability and validity of the MMPI-2 have been empirically supported in countless studies including Butcher and Williams (2000); Graham (2000); and Greene (2000). This study focused on the revised Psy-5 scales of the MMPI-2-RF. Since the PSY-5 scales were extensively revised for the RF inventory they are labeled AGGR-r, INTR-r and so on to reflect the revisions. This investigation is one of the first examinations of the validity of the RF scales. The MCMI-III was be utilized as a criterion measure to assess the concurrent and construct validity of the MMPI-2-

PSY-5 scales. Examining relationships between new assessments (revised scales in this case) and previously validated tests are often cited as evidence for validity, (Urbina, 2014).

*Millon Clinical Multiaxial Inventory-Third Edition (MCMI-III)*

The MCMI-III (Millon et al., 2009) is a self-report measure consisting of 175 items also designed to measure patterns of personality and psychopathology. Each of the 175 items is answered in a true-false format depending on whether the statement applies to the respondent. Psychometric characteristics of the MCMI-III including reliability and validity can be found in the technical manual (Millon et al., 2009). The current study encompasses all scales of the MCMI-III including: the Personality Pattern scales, the Severe Personality Pattern scales, the Clinical Syndrome scales, and Severe Clinical Syndrome scales of the MCMI-III: 1) Schizoid; 2A) Avoidant; 2B) Depressive; 3) Dependent; 4) Histrionic; 5) Narcissistic; 6A) Antisocial; 6B) Sadistic; 7) Compulsive; 8A) Negativistic; and 8B) Masochistic; S) Schizotypal; C) Borderline; P) Paranoid; A) Anxiety; H) Somatoform; N) Bipolar: Manic; D) Dysthymia; B) Alcohol Dependence; T) Drug Dependence; and R) Post-Traumatic Stress Disorder. Severe Clinical Syndrome Scales include: SS) Thought Disorder; CC) Major Depression; and PP) Delusional Disorder. The current research focuses on how these scales relate to the revised PSY-5 scales of the MMPI-2-RF as no work has been done in this area.

Schizoid (1): This 16 item scale assesses an individual for lack of desire and inability to experience both pleasure and pain to a notable extent. Individuals scoring high on this scale are generally listless, apathetic, and antisocial. They tend to be viewed as passive observers detached from rewards, affections, and expected demands associated with human relationships (Millon et al., 2009).

Avoidant (2A): This scale is a measure of hyper vigilance, mistrust of others, and a persistent anticipation of pain in relationships and consists of 16 items. Individuals scoring high on this scale are inclined to maintain constant vigilance to prevent natural impulses and longings for affection from others. In order to protect themselves high scorers in this scale actively withdraw despite desire to relate to others.

Depressive (2B): This 15-item scale assesses a tendency towards glumness, pessimism, and an inability to experience pleasure. A high score reflects a sense of giving up and loss of hope that happiness is possible. High scorers experience pain as a permanent state in which pleasure is no longer considered possible. This scale is not a measure of clinical depression, but rather a depressive personality style.

Dependent (3): This 16-item scale assesses an individual's willingness to lean on others for affection, security, and guidance. A high score on this scale indicates a learned pattern of behavior in which individuals turn to others for nurturance and protection and wait passively for leadership and protection (Millon et al., 2009).

Histrionic (4): This 17-item scale assesses a need for affection and guidance similar to the dependent scale but with a differing overt style involving manipulation of events to maximize attention and favor received by others while avoiding indifference and disapproval from others. Individuals scoring high on this scale exhibit an insatiable search for affection from others. However, beneath this attention seeking guise lies an intense fear of autonomy and a need for constant signs of affection and approval from others which are sought from all interpersonal relationships. This scale behaves directionally opposite of many other MCMI-III personality pattern scales.

Narcissistic (5): This scale is 24 items. Individuals scoring high on this scale endorse items evidencing egotistic self-involvement and overvalued self-worth. They often present with an air of snobbishness, pretentiousness, and superiority that may be unsubstantial by actual achievements. This scale also behaves opposite of many other MCMI-III personality pattern scales.

Antisocial (6A): This 17-item scale assesses engagement in illegal, insensitive and ruthless behavior as a means to counter the expectation of pain and avoid abuse and victimization. Individuals scoring high on this scale are often skeptical of the others, desire autonomy, and often wish for revenge against individuals they believe are responsible for past injustices.

Sadistic (Aggressive) (6B): This 20-item scale indicates a tendency to be domineering, antagonistic and frequently engage in persecutory actions. Although Sadistic Personality Disorder was deleted from the DSM-IV, this scale recognizes individuals who do not meet criteria for Antisocial Personality Disorder while getting personal pleasure and satisfaction from humiliating and violating the rights of others.

Compulsive (7): This 17-item scale coincides with a DSM-5 diagnosis of Obsessive Compulsive Personality Disorder. Individuals scoring high on this scale are prudent, controlled, and perfectionistic. They appear overly passive and publicly compliant. This scale behaves opposite of many other MCMI-III personality pattern scales.

Negativistic (8A): This 16-item scale corresponds with passive-aggressive (negativistic) personality traits of the DSM-5. Individuals scoring high on this scale experience endless disappointments, with behavior characterized by explosive anger, stubbornness in addition to periods of guilt and shame.

Masochistic (Self-Defeating) (8b): This 15 -item scale corresponds to the DSM-III-R self defeating personality disorder which was deleted with DSM-IV. Individuals scoring high on this scale relate to others in a self-sacrificing manner. They allow and even sometimes encourage others to exploit and take advantage of them. They act in self-effacing ways intensifying their deficits and viewing themselves in an inferior position.

Schizotypal (S): This 16-item scale represents cognitive dysfunction and interpersonal detachment. Individuals scoring high on this scale prefer social isolation with minimal social obligations. Behavior eccentricities are often noted with individuals perceived as strange and different.

Borderline (C): This 16-item scale indicates affect dysregulation, mood instability, and a preoccupation with securing affection. Individuals scoring high on this scale usually have difficulty maintaining a stable sense of identity and are often preoccupied with securing affection (Millon et al., 2009).

Paranoid (P): This 17-item scale represents a vigilant mistrust of others and defensiveness against anticipated criticism. Individuals scoring high on this scale express a chronic fear of losing independence leading to vigorous resistance of anticipated control, (Millon et al., 2009).

Anxiety (A): This 14-item scale assesses apprehension and specific phobias. A high score on this scale indicates tension, indecisiveness, restlessness, and ill-defined muscle aches. Typically anxious individuals exhibit a generalized state of tension, inability to relax, somatic discomfort, and worrisomeness among others, (Millon et al., 2009).

Somatoform Scale (H): This 12-item scale assesses physical discomfort and complaints of fatigue, tension, sweating aches and pains. Secondly this scale also assesses deficits in self-confidence, difficulty organizing thoughts, feelings of dependence, and easy provocation to tears

(Choca, 2004). Individuals scoring high on this scale may evidence a primary somatization disorder or possess a history of hypochondrical complaints. Typically these complaints are employed to gain attention.

Bipolar: Manic (N): This scale is 13 items. Individuals scoring high on this scale endorse items evidencing superficial elation, inflated self-esteem, restlessness, pressured speech, irritability, and rapid shifts in mood. Very high scores may indicate a more severe psychotic process.

Dysthymia (D): This 14-item scale assess feelings of discouragement and guilt, apathy, low self-esteem, as well as expressed futility and self-depreciating comments. Individuals scoring high on this scale have a pessimistic outlook towards the future, may be socially withdrawn, and experience a decreased interest in once pleasurable activities.

Alcohol Dependence (B): This 15-item scale indicates a likely history of alcoholism. Considerable discomfort is often experienced in family and work settings.

Drug Dependence (T): This 14-item scale indicates a recurrent or recent history of drug abuse. Individuals scoring high on this scale find it difficult to control impulses and are often unable to manage personal consequences of behavior.

Post-Traumatic Stress Disorder (R): This 16-item scale indicates experiencing an event that involved a threat to the life of the test taker and reactions of intense fear or feelings of helplessness. Reactions to the traumatic event that result include distressing recollections and nightmares. Symptoms of anxious arousal are often present, including an exaggerated startle response and hyper vigilance.

Thought Disorder (SS): This 17-item scale indicates a likely psychotic disorder such as Schizophrenia, Schizophreniform, or another form of brief psychosis. Individuals scoring high on this scale exhibit incongruous, disorganized, or regressive behavior.

Major Depression (CC): This 17-item scale indicates debilitating depression. Individuals scoring high on this scale express dread towards the future and suicidal.

Delusional Disorder (PP): This 13-item scale indicates acute paranoia accompanied by irrational interconnected delusions. Individuals scoring high on this scale usually have a hostile mood and feel that they are picked on or mistreated by others. Common traits also include suspiciousness, vigilance, and alertness to possible betrayal (Millon et al., 2009).

All MCMI-III protocols were scored using NCS and Pearson Assessment's computerized scoring program Microtest-Q which calculates scale scores reported as Base Rate (BR) scores. Base Rate scores, as opposed to T-scores, take into account the base rate or prevalence rate of the disorder being measured, thus accounting for the non-normal distribution of psychopathology in the population.

## **Procedures**

Subjects were administered the MMPI-2-RF and MCMI-III during their inpatient hospital stay as part of treatment or evaluation. Tests were administered by either a Licensed Psychologist or Psychology Intern who provided both written and verbal instructions to each subject prior to testing. All protocols were scored using NCS and Pearson Assessment's computerized scoring program Microtest-Q by a trained psychometrist.

## **Analyses**

The data was analyzed in three steps: Scores from the PSY-5 scales of the MMPI-2-RF were correlated with scores from the personality pattern and severe personality pattern scales of the MCMI-III to evaluate discriminant and convergent associations between the PSY-5 scales

and personality pattern and severe personality pattern scales of the MCMI-III. To account for the likelihood of a Type 1 error, a conservative alpha of .001 was used to determine statically significance. Cohen's (1988) benchmarks for small ( $r = .10$ ), medium ( $r = .30$ ), and larger ( $r = .50$ ) effect size coefficients were used to determine the magnitude of relationship. These were the standards used by Anderson et. al.,(2013)in their study for which the current study was based.

Secondly, to examine the degree to which the revised PSY-5 scales are uniquely associated with the personality scales of the MCMI-III, a multiple linear regression analysis was conducted to examine the linear combination of the Personality Pattern and Severe Personality Pattern scales of MCM-III with the revised PSY-5.

Third, an exploratory factor analysis was conducted to provide a multivariate analysis demonstrating how the PSY-5 and personality pattern scales converge in multivariate space. Velicer's MAP analysis was used to aid in the determination of factors to extract (MAP, Velicer, 1976). The model will be rotated using an oblique (promax) rotation.

### **Anticipated Results**

Anticipated results of the study were theoretically expected patterns of covariation across the assessment measures. In the administration manual of the MMPI-2RF Ben-Porath and Tellegan (2008) discuss personality pathology associations. The Aggressiveness revised and Disconstraint revised scales are said to be associated with DSM-IV cluster B Personality Disorders, therefore we expect to see strong positive relations between AGG-r and DISC-r and related scales on the MCMI-III such as Narcissistic, Sadistic, Histrionic, and Antisocial. The Psychoticism scale is said to be related to DSM-IV Cluster A personality disorders, we expect to see significant positive relationships with this scale and the MCMI-III Schizoid, Schizotypal, and Paranoid scales. The Negative Emotionality revised and Introversion revised scales are said to be associated with DSM-IV Cluster C Personality Disorders, therefore we expect to see strong

positive relations between NEGE-r and INTR-r and related scales on the MCMI-III such as Avoidant, Dependent, and Compulsive.

## CHAPTER 4: RESULTS

### Correlation Analysis

A zero-order correlation analysis was conducted to analyze convergent and discriminant associations between the PSY-5r scales and those of the MCMI-III. Patterns of inter-correlation between the MCMI-III and the PSY-5r are shown in Tables A5 and A8. To account for Type 1 error, a conservative alpha of .001 was implemented to assess the statistical significance of these correlations. Correlations greater than .30 were interpreted as meaningful, indicating a medium effect size (Cohen, 1988).

When examining the relationship between the PSY-5 and the Personality and Severe Personality Pattern scales of the MCMI-III as can be seen in Table A5 only medium correlations were examined with the AGGRr scale including 3 (Dependent)  $r = -.343$ , 4 (Histrionic)  $r = .343$ , 5 (Narcissistic)  $r = .488$ , and 6B (Sadistic)  $r = .317$ . Several medium correlations were seen with the PSYCr scales as well including 4 (Histrionic)  $r = -.303$ , 7 (Compulsive)  $r = -.351$ , and 8A (Negativistic)  $r = .371$ ; S (Schizotypal)  $r = .516$  was the only strong correlation seen with this PSYCr scale. DISCr was moderately correlated with 6B (Sadistic)  $r = .408$  and 7(Compulsive)  $r = -.357$ ; a strong correlation was observed with 6A (Antisocial)  $r = .591$ . All Personality and Severe Personality Pattern scales correlated in the moderate to strong range with NEGER; the strongest correlation was with 8A (Negativistic)  $r = .652$ . INTRr also had a substantial number of moderate to strong correlations with the strongest positive relationship observed with scale 1 (Schizoid)  $r = .619$  and the strongest negative relationship with 4 (Histrionic)  $r = -.757$ .

With respect to the MCMI-III Clinical Syndrome and Severe Clinical Syndrome scales only small correlations were demonstrated with the AGGRr scale. These coefficients are exhibited in Table A8. The highest correlation was with scale T (Drug Dependence)  $r = .249$ . The PSYCr scale demonstrated moderate correlations with scales A (Anxiety)  $r = .412$  and SS

(Thought disorder); a strong correlation was seen with PP (Delusional Disorder)  $r = .501$ . Medium correlations were observed with DISCr and scales N (Bipolar: Manic)  $r = .305$  and B (Alcohol Dependence)  $r = .611$ ; A large correlation was seen with T (Drug Dependence)  $r = .611$ . Numerous medium and large correlations were made between NEGEr and Clinical and Severe Clinical Syndrome scales. Large correlations were seen with scales A (Anxiety)  $r = .700$ , H (Somatoform)  $r = .555$ , D (Dysthymia)  $r = .674$ , R (Post-Traumatic Stress Disorder)  $r = .667$ , SS (Thought Disorder)  $r = .637$ , and CC (Major Depression)  $r = .593$ . The INTRr scale also demonstrated numerous medium and large correlations. Large effects were seen with D (Dysthymia)  $r = .565$  and CC (Major Depression)  $r = .533$ .

### **Regression Analysis**

To examine the degree to which the PSY-5r scales were uniquely associated with each scale of the MCMI-III, each of the MCMI-III scales were regressed onto the PSY-5r scales. Two separate tables were created examining the Personality and Severe Personality Scales in one, and the Clinical Syndrome and Severe Clinical Syndrome scales in the other. In most cases, the conceptually expected PSY-5r scales were associated with the largest amount of unique variance from the MCMI-III scales.

The regression analyses focusing on the Personality Pattern and Severe Personality Pattern scales of the MCMI-III predicted by the PSY-5 yielded significant predictions with  $R^2$  ranging from .339 to .684. Beta weights are reported in Table A6. The AGGRr was a significant predictor of positive movement for scale 5 (Narcissistic) and negative movement for scale 3 (Dependent). The PSYCr was a relatively weak predictor for all MCMI-III Personality Pattern and Severe Personality pattern scales with highest contributions to scales S (Schizotypal) and P

(Paranoid). DISCr was a significant predictor of positive movement for scale 6A (Antisocial) and negative movement for scale 7 (Compulsive). NEGER contributed significantly in the positive or negative direction for all Personality Pattern scales except scale 1 (Schizoid). Lastly the INTRr scale predicted positive movement for scales 1 (Schizoid) and 2A (Avoidant) and predicted negative movement for scales 4 (Histrionic).

The regression analyses focusing on the Clinical Syndrome and Severe Clinical Syndrome scales of the MCMI-III predicted by the PSY-5 yielded significant findings with  $R^2$  ranging from .268 to .500. Beta weights can be found in Table A9. The AGGRr scale was a significant predictor of negative movement for scale D (Dysthymia). The PSYCr was a strong predictor of scale PP (Delusional Disorder) with weaker contributions to SS (Thought Disorder) and B (Alcohol Dependence). DISCr was a significant predictor of positive movement for scale B (Alcohol Dependence) and T (Drug Dependence), and a significant weak predictor for scales N (Bipolar Manic) and PP (Delusional Disorder). NEGER contributed significantly in the positive direction to all Clinical Syndrome and Severe Clinical Syndrome scales except scale PP (Delusional Disorder). Lastly the INTRr scale predicted positive movement for scales A (Anxiety), H (Somatoform), D (Dysthymia), T (PTSD), SS (Thought Disorder), and CC (Major Depression). INTRr was the only significant predictor of CC (Major Depression). It was a negative predictor for scale N (Bipolar Manic).

### **Exploratory Factor Analysis**

Lastly, an exploratory factor analysis (EFA) was conducted to demonstrate how the PSY-5r scales and MCMI-III scales converge. Two separate factor analyses were conducted, examining the Clinical and Severe Clinical Syndrome scales in one, and the Personality Pattern and Severe Personality Scales examined in the other. Principle axis factoring utilizing promax

(oblique) rotations were used to develop the resulting factor structures. Minimum average parcel (MAP, Velicer, 1976) was used to determine how many factors to rotate. The result of this technique suggested rotating three factors in both solutions shown in Tables A7 and A10. These solutions account for 70% of the total variance when examining the Personality Pattern scales of the MCMI-III, and 69.8% when examining the Clinical Syndrome scales of the MCMI-III. A cutoff of .40 was used for each factor loading to determine if the variance associated with a scale score was meaningfully captured by a factor.

The results of the EFA involving the Personality Pattern and Severe Personality Pattern Scales was consistent with theoretical expectations. Prior factor analyses of the MCMI-III have produced similar factor loadings (Rendinell-Salamone, Leiker, Partridge Latronica, Dorr & Webster, 2011). This pattern matrix can be viewed in Table A7. Names surrounding themes present with each factor in the current solution include: factor 1 “internalizing”, factor 2 “externalizing”, and factor 3 “thought dysfunction.” Similar themes were observed with the factor analysis including the Clinical Syndrome and Severe Clinical Syndrome scales of the MCMI-III. This pattern matrix can be viewed in Table A10. Because of the similarities in the patterns of loadings observed the factor names for the second EFA are identical to the first. 4 and 5 factor solutions were examined as well and were determined to be a weaker fit due to increased cross loadings, fewer loadings on each factor, and lower individual factor scores.

## CHAPTER 5: DISCUSSION

The current study examined the link between the revised MMP-2-RF PSY-5r scales and the Personality Pattern and Clinical Syndrome scales of the MCMI-III in a sample of psychiatric inpatients. The patterns of covariation among the scales used in this study are similar to those within the normative group for each instrument. Overall, results from these analyses demonstrate convergence between these two independent personality pathology models.

Although both assessment instruments used in this study are self report in nature, there are major differences in their theoretical groundings and the psychometric methods employed in their development. The MMPI was originally created to be consistent with the current psychiatric diagnostic system of the time, while the MCMI was heavily based on Millon's theory of personality which was intentionally grounded in the older sciences of biology and physics. Millon intentionally avoided using factor analysis in the development of his dimensions and their scales (Millon, 2009) whereas many of the new scales and iterations of the MMPI were factorially derived. In this study, we are comparing the PSY-5r scales of the MMPI-2-RF to the dimensions of personality and psychopathology scales of the personality and clinical syndrome scales of the MCMI-III at two different levels of the hierarchy of personality assessment. The PSY-5r scales are at a higher, broader level with the scales of the MCMI-III being at the midrange of the hierarchy and which are specific to (or isomorphic with) DSM-IV diagnoses. Furthermore, examination of the patterns of covariation among the two rather different instruments can be used as a reliable gage of convergence and construct validity.

The pattern of findings revealed by the correlation and regression analyses demonstrate construct validity nicely in that the broad level PSY-5r scales correlate with and relate to expected scales of the MCMI-III with some exceptions that are discussed in more detail later. The two factor analyses conducted provide support for the validity of the constructs being

measured. Both solutions not only show expected relationships among scales of the two instruments, but also both support a three factor model of personality and psychopathology that differs from five factor models discussed earlier in the manuscript. Comparison of a three versus five factor solution will be further discussed later in this section. A three factor solution relates to those proposed by Ruiz & Edens (2008), Blais (2010), Achenbach & Edelbrock (1978), and Eysenck & Eysenck (1975), as well as Ben-Porath and Tellegen's (2008) three higher order constructs of the MMPI-2-RF.

Concurrent validity is demonstrated sufficiently in the regression analyses with many of the PSY-5r scales significantly predicting the behavior of MCMI-III Personality Pattern and Clinical Syndrome scales. The current study also allows us to better understand the nature of PSY-5r elevations and what the practical implications are for clinicians interpreting test results and treating clients who have been assessed using the MMPI-2-RF PSY-5r scales. This is discussed further in this section. Lastly, results of the factor analyses allow us to better understand the outward manifestation (internalizing, externalizing, or thought dysfunction) of both the PSY-5r and the Personality Pattern and Clinical Syndrome scales of the MCMI-III.

Though a three factor solution was not expected it does confirm, in part, anticipated results of the study. It was noted above that the PSY-5r scales were expected to relate to those MCMI-III scales related to conceptually similar Personality Disorder clusters A, B, and C as notes in the DSM-5 (American Psychiatric Association, 2013). The pattern matrices reveal three factors similar to these "clusters." Though individual scales of the MCMI-III do not always conform to expected factors or "clusters" a definite pattern was observed.

### **Review of Patterns of Covariation of PSY-5r scales with Personality Pathology**

With respect to the Personality Pattern and Severe Personality Pattern scales Zero-order correlations show that PSY-5r scales were highly correlated with conceptually similar counterparts. A large number of intercorrelations are seen with the PSY-5r NEGEr scales and conceptually similar (or linked) MCMI-III middle level scales. The only exception to this was the MCMI-III scale 1 (Schizoid) which one might expect to relate more to the PSY-5r scale as a DSM-IV cluster A personality disorder. Millon describes individuals scoring high on this scale as lacking the capacity to experience deep pleasure or pain, detached from basic rewards, affections, and human interactions in general (Millon 2009). A similar pattern of results was seen in the regression analysis. NEGEr significantly predicts all scale performance with the exception of scale 1 (Schizoid), a finding consistent with the zero-order correlation analysis.

In fact, INTRr was the only PSY-5r scale that was able to significantly predict variance on scale 1 (Schizoid). Initially this was viewed as a puzzling finding as the PSYCr scale is indicated as a predictor for cluster A personality disorders which include Schizoid Personality Disorder (Ben-Porath & Tellegen 2008; Ben-Porth 2012). However, further examination of the INTRr scale suggests that it may be a better marker of the social manifestations of what one thinks of as socially “introverted” including isolation and detachment rather the cognitive manifestations which include an inward focus when examining and interacting with the world, (Anderson 2013). This is further supported in the regression analysis with INTRr also being a significant predictor of the Avoidant scale another personality disorder diagnosis that is marked socially by detachment from others (Millon 2009).

The factor models were created through two separate EFAs and resemble those seen in similar studies conducted using the same inpatient sample (Rendinell-Salamone et al. 2011; Webster 2013; Walsh, Chaw, Jones, Morgan, & Dorr 2014) as well as other studies examining the

hierarchical structure of broad personality dimensions at higher levels. The MMPI-2-RF Higher Order scales (Externalizing, Internalizing, and Thought Dysfunction) exactly parallel the dimensions identified in the current study (Ben-Porath & Tellegen 2008). The Personality Pattern, Clinical Syndrome scales, and PSY-5r scales were factored using principle axis analysis utilizing promax (oblique) rotations. A Minimum average parcel (MAP, Velicer, 1976) was used to determine the number of factors to rotate arriving at a 3 factor structure in both solutions accounting for 70% of the total variance when examining the Personality Pattern scales of the MCMI-III, and 69.8% when examining the Clinical Syndrome scales of the MCMI-III.

When examining the relationship between the PSY-5r and the MCMI-III Personality Pattern Scales Factor 1 was named *Internalizing*. The name was derived from salient loadings in the positive direction including: Avoidant, Depressive, INTRr, Dependent, Schizoid, and NEGER. Noteworthy negative loadings include Narcissistic, Histrionic, Compulsive, and AGGRr. As mentioned in the description of the Personality Pattern scales of the MCMI-III, the Narcissistic Histrionic, and Compulsive scales act directionally opposite of all other MCM-III scales. This is demonstrated here in the first factor of this solution. Individuals scoring high on this factor may be seen or described as depressed, insecure, fear rejecting, sensitive to criticism, self doubting, and self degrading among other descriptors. An internalizing dimension or factor has been observed in numerous factor analytic studies of assessments measuring both normal and pathological personality dimensions (Ruiz & Edens 2008; Blais 2010; Achenbach & Edelbrock 1978).

Factor 2 is labeled *Externalizing*. Prominent positive loadings for this factor include Antisocial, Sadistic, Borderline, DISCr, and AGGRr. Individuals scoring high on this factor have a tendency to act counter to expectations for society. They have a propensity to engage in illegal

behavior that often exploits others for personal gain. They engage in acts frequently demonstrating domination, antagonism, and persecution of others. They may get satisfaction and pleasure from humiliating and violating the rights of others.

Lastly, factor 3 is labeled: *Thought Dysfunction*. Positive loadings include PSYCr, Paranoid, and Schizotypal. Individuals scoring high on this factor may be perceived as odd, likely presenting for treatment endorsing delusions or hallucinations. Reality testing is influenced and a diagnosis of Schizophrenia or another psychotic disorder is likely for individuals scoring high on these scales. Although a factor encompassing thought dysfunction is absent in many higher level dimensional models (Heymans & Wiersma 1906; Wiggins 1968; Welsh 1956; Blais 2010) largely due to the examination of non clinical samples, researchers acknowledge that it becomes much more important to assess in settings serving more pathological populations (Meehl 1946; Skinner & Jackson 1978; Ben-Porath 2012). It was for this reason that Ben-Porath and Tellegen (2008) took extra steps to include thought dysfunction into the higher order scales of the MMPI-2-RF.

### **Review of Patterns of covariation of the PSY-5r scales with General Psychopathology**

When examining the relationship between the PSY-5r scales and the Clinical Syndrome and Severe Clinical Syndrome Scales of the MCMI-III Zero-order correlations demonstrated similar patterns to those observed with the personality scales in that NEGEr, again, correlated with almost all MCMI-III scales with the exception of scale PP (Delusional Disorder). Another interesting finding when examining the correlation matrix is the lack of correlation any of the Clinical Syndrome and Severe Clinical Syndrome scales have with AGGRr. Both of these relationships are further supported in the regression analysis. NEGEr is a significant predictor of

all MCM-III scales with the exception of PP (Delusional Disorder). AGGRr does not predict the behavior of any scale except D (Dysthymia) with a small negative beta weight.

The factor analysis of the PSY-5r, Clinical Syndrome Scales, and Severe Clinical Syndrome scales yielded a similar structure to that which was observed in the previously discussed model. Factor 1 is named *Internalizing*. Strong positive loadings include Major Depression, Dysthymia, Anxiety, INTRr, and NEGER. Individuals scoring high on this factor experience chronically low self esteem manifesting in depression and guilt regarding perceived inadequacies. The perception of personal failure paired with emotional instability leads to depressive and dysphonic symptomatology.

Factor 2 was labeled *Externalizing*. Positive loadings include Drug Dependence, Alcohol Dependence, DISCr, and AGGRr. Clinical presentations of this factor include: a history of arrests, substance use, having made a prior suicide attempt, and a prior diagnosis of Borderline Personality Disorder or Antisocial Personality Disorder (Ben-Porath 2012). Individuals scoring high on this factor present with family problems, difficulty trusting others, and aggression among other behaviors. The presence of an externalizing dimension when examining the hierarchical structure of personality assessment has been observed in numerous studies (Ruiz & Edens 2008; Blais 2010; Achenbach & Edelbrock 1978).

Lastly, factor 3 retains the same name as it does when examining the factor structure of the Personality Pattern and PSY-5r scales: *Thought Dysfunction*. Only two scales load on this factor, PSYCr and Delusional Disorder. The description of symptom presentation is identical to that which was described with the Thought Dysfunction factor in the previous model. One interesting point to make is that the MCMI-III SS scale (Thought Disorder) is not appreciably associated with this factor.

Although the thought disorder scale correlates moderately with the PSYCr scale it is not significantly predicted by it in the regression analysis nor does it load on what is being called the Thought Dysfunction factor. In the development of the original MCMI Millon made the conscious decision to eliminate potential test items that were endorsed by more than 85% or less than 15% of the development sample in order to focus on the middle range of pathology, by doing so he eliminated the most pathological items which were likely better predictors of severe pathology and psychoticism (Paul Retzlaff, personal communication, November 16<sup>th</sup> 2014).

### **Five vs. Three Factors**

The PSY-5r scales of the MMPI-2-RF were based on and represent an extension of the Big Five model of personality assessment and conceptualization. It was implicitly assumed that this research project would find that a five factor solution would provide the best description of the underlying dimensions under examination. However using various criteria for determining the number of factors to rotate (Kaiser-Guttman (Kaiser 1991), Cattell Scree Tests (Cattell 1966), and minimum average parcel (MAP, Velicer, 1976)) the three factor solution was the preferred analysis.

In fact, a three factor structure of personality and psychopathology has been observed many times (Eysenck & Eysenck 1975; Tellegen 1995/2003). Recent studies examining underlying dimensions among a widely used 5 factor personality assessment, the NEO-PI-R and the PAI have also found three broad dimensions (Blais 2010). Although Millon himself did not develop his theory of personality and psychopathology with underlying dimensions or factors in mind, research on the MCMI-III personality disorder scales have identified three underlying dimensions labeled Emotionality vs. Restraint, Introversion vs Extroversion, and Dominance vs

Submissiveness, (Craig & Bivens 1998; Haddy, Strack, & Choca 2005; Strack, Choca & Gurtman 2001).

Additionally, the newest revision of the MMPI (RF) has adopted a 3 factor structure with the addition of three higher order scales. These include: Emotional/Internalizing Dysfunction (EID), Thought Dysfunction (THD), and Behavioral/Externalizing Dysfunction (BXD). The authors of this instrument, as one might expect examining dimensions at the broadest level of a hierarchy, acknowledge that these scales may often provide meaningful indications of an individual's level of functioning however a test interpreter must always examine the behavior of more narrow and specific sub domain levels and scales (Ben-Porath & Tellegen 2008). This sentiment must also be considered when examining the findings of the current study. The factor structure of both the personality and general pathology analyses demonstrate similar themes as those presented in the higher order scales of the MMPI-2-RF.

Literature on the underlying factors of personality structure and assessment have long noted two factors known to many as internalizing and externalizing. They have also been referred to as over-controlled vs. under-controlled, and in psychoanalytic language Anxiety and Repression (Wiggins 1968; Ruiz & Edens 2008; Achenbach & Edelbrock 1978; Welsch 1956). Although these dimensions have been consistently demonstrated within the personality assessment field many clinicians and researchers have questioned the sufficiency of this two dimensional framework. Although variations in emotional and behavioral adjustment may be clearly reflected, professionals in the field have called for a third dimension addressing reality testing and thought disturbance (Eysenck 1952; Tellegen 1995/2003). Analyses conducted by the authors of the MMPI-2-R-RF found three distinct factors including thought dysfunction which has previously been absent from the literature (Tellegen & Ben-Porath 2008). The current study

further confirms the existence of a third dimension representing distinctly dysfunctional thinking. The small number of scale loadings for this factor may be the result of Millon's removal of the most highly endorsed items of each scale, particularly with respect to his thought dysfunction scale as previously discussed (Paul Retzlaff, personal communication, November 16th 2014).

Through examination of the Kaiser-Guttman, Cattell Scree Tests, and minimum average parcel (MAP, Velicer, 1976) all suggest a 3 factor solution. 4 and 5 factor solutions were examined as well and can be found in the appendices, tables 11, 12, 13, and 14. It should be noted that although the presentation of these results provides evidence in support of a three factor model we are not attempting to distract or argue against a five factor model. The five factor model is current and relevant to the field of personality assessment today. Rather than debating the number the factors underlying personality and general psychopathology the current study emphasizes and supports a dimensional model for diagnosing and assessing personality as opposed to the current categorical system. Both a 3 factor as well as a 5 factor model support this.

When examining the pattern matrices of the 3, 4, and 5 factor solutions of the Personality Pattern scales of the MCMI-III several characteristics should be noted across matrices that further support the decision in favor of a 3 factor solution. In terms of cross loadings across factors the three factor solution has 2 cross loadings, the 4 factor solution has 3, and the 5 factor solution has 6 cross loadings. The 3 factor pattern matrix is also the only solution with no PSY-5r cross loadings across factors. Pattern matrices examining 4 and 5 factor structures examining the Personality Pattern scales of the MCMI-III can be found in Tables A11 and A12.

Specifically examining the 5 factor solution it is made clear that the structure begins to collapse as more factors are extracted. This is visible through the high number of cross loadings

as well as a breakdown of the underlying constructs or dimensions to be explained through each factor. When examining the 5 factor structure as it relates to the dimensions of the PSY-5r the first factor could be labeled NEGEr as this is the only PSY-5r scale that loads on the factor with a relatively weak coefficient of .464. The second and third factors are respectively defined by the INTRr and DISCr scales. The AGGRr scale loads on the factor called DISCr. The fourth factor is where the structure begins to unravel. PSYCr defines this factor, however a cross loading of the NEGEr scale is present that is higher than NEGEr's loading on the second factor. Lastly the 5<sup>th</sup> factor could be defined by the AGGRr scale though AGGRr has cross loadings on 3 other factors, both positive and negative. It would be difficult to argue that the 5<sup>th</sup> factor brings this construct out with such a high number of cross loadings. In sum, the 3 factor matrix provides a tighter structure both statistically and theoretically.

Pattern matrices examining 4 and 5 factor structures examining the Clinical Syndrome scales of the MCMI-III can be found in Tables A13 and A14. When comparing the pattern matrices of the Clinical Syndrome scales cross loadings among factors were not a concern as the 3 and 4 factor solutions presented no cross loadings; the 5 factor solution only has 1 cross loading. Concerns with increased factors primarily included low numbers of factor loadings and isolation of the PSY-5r scales. As can be discerned from the factor names discussed earlier, the structure of the 3 factor solution is conceptually similar to the solution found examining the Personality Pattern scales. The four factor solution begins to isolate the PSY-5r scales when INTRr stands alone as the only positive loading on the 4<sup>th</sup> factor shared only by negative loadings among the AGGRr scale and the N (Bipolar-Manic) scale.

This isolation of the PSY-5 scales is exacerbated in the 5 factor solution in which the INTRr factor includes only the positive loading of INTRr and a negative loading of AGGRr. The

AGGRr scale does not load on any other factor. Another concern with the 5 factor solution is that the fifth factor does not contain any positive PSY-5r loadings. The highest loading on the factor is N (Bipolar-Mania) with a cross loading of A (Anxiety) and a negative INTRr loading. Just as the conceptual structure of the constructs being described fell apart at this level with the Personality Pattern scales evidence of that is present in this factor structure as well.

### **Practical Conclusions for Clinicians**

Review of relevant literature and examination of the current results have led to helpful interpretive considerations for clinicians examining the new PSY-5r scales of the MMPI-2-RF.

1. When examining personality pathology, the INTRr scale has been shown to be a good marker of internalizing, social withdrawal, and disengagement from interpersonal relationships. With respect to predictors of more general pathology, INTRr and NEGER are both good predictors of depression and anxiety pathology.
2. NEGER is a weaker marker of internalizing personality disorders compared to INTRr. NEGER's high number of significant correlations and high beta weights indicate that it is a general marker of psychological distress but may not be able to accurately specify or differentiate well among diagnoses.
3. Low scores in AGGRr are likely good indicators of internalizing behavior and moderate predictors of acting out tendencies. AGGRr and DISCr are good marker of acting out and externalizing pathology
4. DISCr is a good predictor of "acting out" and externalizing personality disorder diagnoses.
5. PSYCr is a good predictor of personality disorders involving bizarre thinking such as Schizoaffective and Paranoid personality disorders. It should be noted through

examination of the behavior of the Schizoid scale of the MCMI-III that INTRr rather than PSYCr is a much better indicator of Schizoid Personality Disorder despite its inclusion with Schizoaffective Personality Disorder and Paranoid Personality Disorder in the cluster A personality disorders of the DSM-IV. A high score on scale 1 (Schizoid) should be interpreted as evidence of social shyness, not as an indication of unusual thinking. PSYCr is a good distinctive maker of delusional pathology as it was not highly correlated or predictive of any other scales besides those on the MCM-III that explicitly referenced delusions and paranoia.

6. Results of this study also highlight that high scores on the MCMI-III Thought Disorder scale should not alone be viewed as indicative of dysfunctional (psychotic-like) thinking, but more as an indicator of depression and Dysthymia.

The DSM-5's model explores personality from a 5 factor model examining more numerous and specific trait dimensions known as facets which describe a narrow range of behavior within each dimension. The results of the current study examine a similar 5 factor model (the PSY-5r) along with another widely used personality assessment instrument, the MCMI-III. Millon (2009) did not base his instrument and theory on methodologies like factor analysis and never factored the MCMI himself. Therefore, it is not entirely surprising that the MCMI-III does not adhere to a 5 factor model in the same way the PSY-5r do. As noted earlier, previous studies on the MCMI-III have also suggested three factor solutions for the instrument (Craig & Bivens 1998; Haddy et al., 2005; Strack, Choca & Gurtman 2001). Results of the factor analysis present an even broader (yet less specific) lens with which to examine both personality structure as well as more general pathology at the 3 factor level.

## **Limitations**

Though the sample used in the current study is large, it still does not have the size needed to determine universal dimensions of personality pathology. The MMPI-2-RF was normed using a stratified sample of 2600 people including in patients, outpatients, and non-patients. The MCMI-III was renormed in 2009 using a purely clinical sample including both inpatients and outpatients. To remain consistent with Millon's theory no non-patients were sampled in this study. Strong caution should be used in generalizing these results to the larger population. It should be heavily emphasized that the current study was conducted using only an acute inpatient sample.

A further limitation is the recency of the changes to the PSY-5r and the newness of the proposed changes cited in DSM-5 section 3. The MMPI-2-RF was published in 2008 (Tellegen & Ben-Porath, 2008). A limited number of studies have been conducted on these scales and even fewer on the five dimensions proposed in DSM-5 section 3. No studies are currently published linking the two instruments together in this way highlighting the truly exploratory nature of the current study. As a literature base builds on the PSY-5r and their behavior is re-examined across settings and they are validated across instruments, the results of the current study may be validated and understood with greater certainty.

### **Further Directions**

Based on the findings presented in the current study, a logical next step would involve a cross validation with a larger and more diverse sample. This could be made possible through collaboration with other professionals in the field to expand our database. Observation of these dimensions across various settings including inpatient, outpatient and community samples would undoubtedly prove beneficial.

Secondly, it would be beneficial to explore the first NEGEr PSY-5r scale and how it relates specifically to the RCd (Demoralization) scale of the MMPI-2-RF. The results of the current study demonstrate how the NEGEr scale shows high correlations and predictive power for almost all scales. The scale behaves somewhat like underlying emotional discomfort present with almost all psychiatric scale elevations in much the same way that demoralization did with the clinical scales of the MMPI-2.

Finally, the combination of statistical analyses in the current study has proven to be particularly revealing. It would be beneficial to replicate this study with the upcoming MCMI-IV which claims to adhere more closely to a dimensional model examining personality characteristics and assessment from normal to pathological. As has been stated previously, the MCMI was designed to assess personality from a purely pathological standpoint. The inclusion of a more dimensional framework examining normal personality variance will be quite a change worthy of study.

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## **FOOTNOTES**

## FOOTNOTES

<sup>1</sup>Though the recently released DSM-5 does group diagnoses according to a 5 axial system any longer, the author of this dissertation chose to retain the terminology, “Axis I” and “Axis II,” to conveniently differentiate between general and often more acute psychiatric disorders and more pervasive and chronic personality pathology. This is especially helpful when examining and differentiating the results of the current study.

<sup>2</sup>This study examined, in part, the personality and clinical scales of the MCMI-III that was designed to be mostly isomorphic with the categorical diagnostic system employed by the DSM-IV. Work has begun on the development of the MCMI-IV that will likely conform to the DSM-5 diagnostic system. While the DSM-5 introduces few changes in the categorical system for assessing the personality disorders, its new Section III advances the idea of dimensional system of diagnosis.

## **APPENDIX**

## APPENDIX

**Table A1: Big Five Model of the NEO**

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Name	Number	Factor Definer
Extraversion (E)	I	quantity and intensity of energy directed outwards into the social world
Agreeableness (A)	II	the kinds of interactions an individual prefers from compassion to tough mindedness
Conscientiousness (C)	III	degree of organization, persistence, control and motivation in goal directed behavior
Neuroticism (N)	IV	Identifies individuals who are prone to psychological distress.
Openness (O)	V	The active seeking and appreciation of experiences for their own sake

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**Table A2: Psychopathology Five-r model of the MMPI-2-RF**

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Name	Scale	Factor Definer
Aggressiveness-Revised	AGGR-r	Instrumental, goal directed aggression,
Psychoticism- Revised	PSYC-r	Disconnection from reality
Disconstraint- Revised	DISC-r	Under controlled behavior
Negative Emotionality- Revised	NEGE-r	Anxiety, insecurity, worry, and fear
Introversion/ Low positive Emotionality- Revised	INTR-r	Social disengagement and anhedonia

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**Table A3: Definitions of DSM-5 personality disorder trait domains and facets**

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<b>DOMAINS (Polar Opposites) and Facets</b>	<b>Definitions</b>
NEGATIVE AFFECTIVITY (vs. Emotional Stability)	Frequent and intense experiences of high levels of a wide range of negative emotions (e.g., anxiety, depression, guilt/shame, worry, anger) and their behavioral (e.g., self-harm) and interpersonal (e.g., dependency) manifestations.
DETACHMENT (vs. Extraversion)	Avoidance of sociomotional experience, including both withdrawal from interpersonal interactions (ranging from casual, daily interactions to friendships to intimate relationships) and restricted affective experience and expression, particularly limited hedonic capacity.
ANTAGONISM (vs. Agreeableness)	Behaviors that put the individual at odds with other people, including an exaggerated sense of self-importance and concomitant expectation of special treatment, as well as callous antipathy towards others, encompassing both an awareness of others' needs and feelings and a readiness to use others in the service of self enhancement.
DISINHIBITION (vs. Conscientiousness)	Orientation towards immediate gratification, leading to impulsive behavior driven by current thoughts, feelings, and external stimuli, without regard for past learning or consideration of future consequences.
PSYCHOTICISM (vs. Lucidity)	Exhibiting a wide range of culturally incongruent odd, eccentric, or unusual behaviors and cognitions, including both process (e.g., perception, dissociation) and content (e.g., beliefs).

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**Table A4: Demographic and Research Characteristics of Participants**

<b>Variable</b>	
Age in years (mean, SD)	34.5 (12.04)
Gender (%)	
Females	52.5 (n=229)
Males	47.5 (n=207)
Highest education level (%) (n=355)	
Less than High School	20.3 (n=72)
Completed High School	34 (n=148)
More than High School	38.1% (n=135)
Race/ethnicity (%) (n=436)	
Caucasian	88.3 (n=385)
African-American	6.1 (n=27)
Hispanic/Latino	1.6 (n=7)
Native-American	3 (n=13)
Asian-American	0.5 (n=2)
Other	0.5 (n=2)
Primary Diagnosis at Discharge (%) (n=387)	
Mood Disorders	60.1 (n=245)
Schizophrenia and other Psychotic Disorders	8.3 (n=37)
Substance Abuse	6.8 (n=28)
Anxiety Disorders	4.3 (n=21)
Other	13.8 (n=56)

**Table A5: PSY-5r correlations with Personality Pathology and Severe Pathology scales of MCMI-III**

	<b>1</b>	<b>2</b>	<b>2B</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6A</b>	<b>6B</b>	<b>7</b>	<b>8A</b>	<b>8B</b>	<b>S</b>	<b>C</b>	<b>P</b>
<b>AGGR-r</b>	-.204**	-.282**	-.237**	<b>-.300**</b>	<b>.343**</b>	<b>.488**</b>	.215**	<b>.317**</b>	-.046	.061	-.263**	-.057	-.015	.090
<b>PSYCr</b>	.256**	.235**	.208**	.268**	-.256**	-.183**	.197**	.213**	<b>-.351**</b>	<b>.371**</b>	.266**	<b>.516**</b>	.279**	<b>.455**</b>
<b>DISCr</b>	.037	.042	.075**	.078	-.026	.141	<b>.591**</b>	<b>.408**</b>	<b>-.357**</b>	.221**	.082	.186**	.260**	.255**
<b>NEGE-r</b>	.022**	<b>.575**</b>	<b>.616**</b>	<b>.545**</b>	<b>-.567**</b>	<b>-.516**</b>	<b>.362**</b>	<b>.457**</b>	<b>-.583**</b>	<b>.652**</b>	<b>.606**</b>	<b>.621**</b>	<b>.589**</b>	<b>.505**</b>
<b>INTRr</b>	<b>.619**</b>	<b>.605**</b>	<b>.484**</b>	<b>.331**</b>	<b>-.699**</b>	<b>-.660**</b>	.056	.068*	<b>-.353**</b>	<b>.359**</b>	<b>.476**</b>	<b>.460**</b>	<b>.334**</b>	.279**

**Table A6: MCMI Personality Pattern and Severe Personality Pattern scales regressed onto the PSY-5r**

	<b>AGGR-r</b>	<b>PSYC-r</b>	<b>DISC-r</b>	<b>NEGE-r</b>	<b>INTR-r</b>	<b>R<sup>2</sup></b>
<b>Schizoid</b>	.003	.053	.035	.167	<b>.547</b>	.415
<b>Avoidant</b>	-.139	-.072	.078	<b>.441</b>	<b>.392</b>	.511
<b>Depressive</b>	-.161	-.139	.094	<b>.582</b>	.221	.476
<b>Dependant</b>	<b>-.393</b>	.001	.081	<b>.572</b>	-.053	.437
<b>Histrionic</b>	.131	-.009	-.058	<b>-.355</b>	<b>-.564</b>	.684
<b>Narcissistic</b>	<b>.306</b>	.050	.037	<b>-.392</b>	-.383	.596
<b>Antisocial</b>	.013	-.090	<b>.554</b>	<b>.314</b>	.007	.420
<b>Sadistic</b>	.246	-.125	.265	<b>.466</b>	.033	.368
<b>Compulsive</b>	.116	-.028	<b>-.337</b>	<b>-.452</b>	-.151	.446
<b>Negativistic</b>	.099	.009	.106	<b>.557</b>	.184	.456
<b>Masochistic</b>	-.216	-.046	.108	<b>.533</b>	.193	.462
<b>Schizotypal</b>	-.018	<b>.252</b>	.103	<b>.367</b>	.265	.494
<b>Borderline</b>	-.047	-.075	.225	<b>.577</b>	.120	.435
<b>Paranoid</b>	.096	<b>.230</b>	.130	<b>.303</b>	.169	.339

**Table A7: Pattern Matrix for PSY-5r with MCMI-III personality pattern scale**

	Factor		
	1	2	3
<b>5 Narcissistic</b>	-.942		
<b>4 Histrionic</b>	-.827		
<b>2A Avoidant</b>	.817		
<b>AGGR</b>	-.804	.393	
<b>2B Depressive</b>	.772		
<b>8B Masochistic</b>	.751		
<b>INTR</b>	.744		
<b>3 Dependent</b>	.702		
<b>1 Schizoid</b>	.607		
<b>NEGE</b>	.386		
<b>6A Antisocial</b>		.970	
<b>6B Sadistic</b>		.819	
<b>C Borderline</b>	.453	.648	
<b>DISC</b>	-.387	.611	
<b>7 Compulsive</b>		-.519	
<b>8A Negativistic</b>		.432	
<b>PSYC</b>			.690
<b>P Paranoid</b>			.646
<b>S Schizotypal</b>	.413		.531

**Table A8: PSY-5 correlations with Clinical Syndrome and Severe Clinical Syndrome scales of MCMI-III**

	<b>A</b>	<b>H</b>	<b>N</b>	<b>D</b>	<b>B</b>	<b>T</b>	<b>R</b>	<b>SS</b>	<b>CC</b>	<b>PP</b>
<b>AGGR</b>	-.071	-.150**	.202**	-.222**	.124**	.249**	-.120*	-.100*	-.213**	.177**
<b>r</b>										
<b>PSYCr</b>	<u>.412**</u>	<u>.315**</u>	.321**	<u>.344**</u>	.205**	.250**	<u>.399**</u>	<u>.446**</u>	.273**	<u>.501**</u>
<b>DISCr</b>	.137**	-.027	<u>.305**</u>	.008	<u>.456**</u>	<u>.611**</u>	.123**	.129**	.006	.247**
<b>NEGER</b>	<u>.700**</u>	<u>.555**</u>	<u>.459**</u>	<u>.674**</u>	<u>.428**</u>	<u>.324**</u>	<u>.667**</u>	<u>.637**</u>	<u>.593**</u>	.277**
<b>INTRr</b>	<u>.368**</u>	<u>.496**</u>	-.103*	<u>.565**</u>	.116*	.027	<u>.464**</u>	<u>.466**</u>	<u>.533**</u>	.051

**Table A9: Regression analysis with Clinical Syndrome Scales**

	<b>AGGR-r</b>	<b>PSYC-r</b>	<b>DISC-r</b>	<b>NEGE-r</b>	<b>INTR-r</b>	<b>R<sup>2</sup></b>
Anxiety	-.061	.069	.051	<u>.621**</u>	<u>.085*</u>	.500
Somatoform	.008	.053	-.080	<u>.414**</u>	<u>.315**</u>	.396
Bipolar: Manic	.001	.079	<u>.171**</u>	<u>.512**</u>	<u>-.307**</u>	.337
Dysthymia	<u>-.085*</u>	.014	-.022	<u>.547**</u>	<u>.305**</u>	.559
Alcohol	-.020	<u>-.092*</u>	<u>.418**</u>	<u>.405**</u>	.006	.336
Dependence						
Drug	.029	.004	<u>.561**</u>	<u>.230**</u>	.000	.419
Dependence						
PTSD	-.061	.073	.064	<u>.531**</u>	<u>.217**</u>	.494
Thought	-.040	<u>.157**</u>	.060	<u>.447**</u>	<u>.244**</u>	.474
Disorder						
Major	-.073	-.030	-.007	<u>.483**</u>	<u>.315**</u>	.456
Depression						
Delusional	.071	<u>.456**</u>	<u>.115*</u>	.026	-.010	.268
Disorder						

**Table A10: Pattern Matrix for PSY-5r with MCMI-III Clinical Syndrome scales**

	<b>Factor</b>		
	<b>1</b>	<b>2</b>	<b>3</b>
<b>CC Major Depression</b>	.986		
<b>D Dysthymia</b>	.957		
<b>H Somatoform</b>	.873		
<b>SS Thought Disorder</b>	.788		
<b>R PTSD</b>	.787		
<b>A Anxiety</b>	.700		
<b>INTR</b>	.686		
<b>NEGE</b>	.570		
<b>AGGR</b>	-.438	.362	
<b>T Drug Dependence</b>		.917	
<b>B Alcohol Dependence</b>		.815	
<b>DISC</b>		.696	
<b>N Bipolar: Manic</b>		.421	
<b>PSYC</b>			.795
<b>PP Delusional Disorder</b>			.638

**Table A11: 4 Factor Pattern Matrix for PSY-5r with MCMI-III Personality Pattern scales**

	Factor			
	1	2	3	4
<b>INTR</b>	1.029			
<b>Histrionic</b>	-.915			
<b>Schizoid</b>	.662			
<b>Narcissistic</b>	-.620			
<b>AGGR</b>	-.447			.408
<b>Dependent</b>		1.026		
<b>Masochistic</b>		.829		
<b>Depressive</b>		.818		
<b>Borderline</b>		.624	.419	
<b>Avoidant</b>	.437	.455		
<b>NEGE</b>		.442		.430
<b>Negativistic</b>		.411		
<b>Antisocial</b>			1.087	
<b>Sadistic 6B</b>			.685	
<b>DISC</b>			.674	
<b>Compulsive 7</b>			-.521	
<b>PSYC</b>				.757
<b>Paranoid P</b>				.687
<b>Schizotypal S</b>				.580

**Table A12: 5 Factor Pattern Matrix for PSY-5r with MCMI-III Personality Pattern scales**

	<b>Factor</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Dependent 3</b>	1.063				
<b>Depressive 2B</b>	.891				
<b>Masochistic 8B</b>	.887				
<b>Borderline C</b>	.647		.404		
<b>Avoidant 2A</b>	.539	.486			
<b>Negativistic 8A</b>	.497				
<b>INTR</b>		1.017			
<b>Histrionic 4</b>		-.921			
<b>Schizoid 1</b>		.821			
<b>Narcissistic 5</b>	-.333	-.560			.360
<b>Antisocial 6A</b>			1.019		
<b>DISC</b>			.676		
<b>Sadistic 6B</b>			.650		
<b>Compulsive 7</b>			-.613		.326
<b>PSYC</b>				.887	
<b>NEGE</b>	.464			.479	
<b>Paranoid P</b>				.415	.301
<b>Schizotypal S</b>	.322			.366	
<b>AGGR</b>	-.314	-.354	.325		.449

**Table A13: 4 Factor Pattern Matrix for PSY-5r with MCMI-III Clinical Syndrome scales**

	Factor			
	1	2	3	4
<b>Major Depression CC</b>	.969			
<b>Dysthymia D</b>	.938			
<b>Somatoform H</b>	.894			
<b>Thought Disorder SS</b>	.829			
<b>PTSD R</b>	.816			
<b>Anxiety A</b>	.810			
<b>NEGE</b>	.599			
<b>Bipolar: Manic N</b>	.439			-.384
<b>Drug Dependence T</b>		.988		
<b>Alcohol Dependence B</b>		.779		
<b>DISC</b>		.654		
<b>PSYC</b>			.783	
<b>Delusional Disorder PP</b>			.686	
<b>INTR</b>				.892
<b>AGGR</b>				-.408

**Table A14: 5 Factor Pattern Matrix for PSY-5r with MCMI-III Clinical Syndrome Scales**

	<b>Factor</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Major Depression CC</b>	1.067				
<b>Somatoform H</b>	1.041				
<b>Dysthymia D</b>	.849				
<b>Thought Disorder SS</b>	.742				
<b>PTSD R</b>	.681				
<b>Anxiety A</b>	.641				.333
<b>NEGE</b>	.504				
<b>Drug Dependence T</b>		.923			
<b>Alcohol Dependence B</b>		.722			
<b>DISC</b>		.663			
<b>PSYC</b>			.833		
<b>Delusional Disorder PP</b>			.630		
<b>INTR</b>				.663	-.444
<b>AGGR</b>				-.640	
<b>Bipolar: Manic N</b>					.566