

PREDICTING COMMON TWO-POINT COMBINATIONS OF THE MMPI WITH THE  
DEAN-WOODCOCK STRUCTURED EMOTIONAL STATUS EXAM IN A  
NEUROLOGICAL SAMPLE

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## DEDICATION

I wish to dedicate my progress and success as a graduate student and in life to my grandparents, whose love and encouragement have been vital influences in every aspect of my development. Thank you.

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Predicting Common Two-Point Combinations of the MMPI with the Dean-Woodcock  
Structured Emotional Status Exam in a Neurological Sample

CHAPTER I

INTRODUCTION

The paradigm shift from philosophy to science as a foundation of psychology led to an increased focus on utilizing statistically based inventories and standardized tests. Efforts to improve the reliability and validity of traditional techniques and instruments were made. Statistical judgment methods of interpretation were found to be more sound than clinical judgment (Meehl, 1954/1996). This finding is no more clear than with interviews, leading to the development of structured interviews and structured mental status exams (Anderson, Burton, Parker, & Gooding, 2001), which may be more easily evaluated and revised through statistical scrutiny compared to unstructured measures.

These advances in the assessment of emotional functions have been particularly important in the area of neuropsychological assessment, as brain injuries are often accompanied by a complex constellation of physical, cognitive, and emotional symptoms (Gasquoine, 1997; Mamelak, 2000). The majority of neuropsychological assessments commonly utilize assessment techniques such as interviews, mental status exams, and diagnostic inventories to assess emotional dysfunction and personality. Measures such as

the Minnesota Multiphasic Personality Inventory (MMPI), and its successor, the MMPI-2, have frequently been used to assess emotional dysfunction of individuals with brain injury in a more structured fashion (Reitan, 1974; Warriner, Rourke, Velikonja, & Metham, 2003).

The Dean-Woodcock Emotional Status Exam (D-WESE) is a newly developed 50-item structured interview that provides the clinician with data regarding a subsample of DSM criteria of emotional dysfunction and is a component of the Dean-Woodcock Neuropsychological Assessment System (2003). However, psychometric data pertaining to the D-WESE is currently limited. This study evaluated the utility and predictive validity of the D-WESE in interpreting representations of two-scale codetypes of the MMPI that have considerably evidence supporting their ability to evaluate emotional dysfunction and psychopathology.

#### Overview of Emotional Status and Interviews

The interview has been an important clinical tool throughout clinical psychology. Conventions with the field of psychology are rooted in the medical model early in the field's history, and the nature and structure of the interview were modified depending on the dominant ideologies and schools of psychology at the time. The interview has been particularly important in counseling, and the methods utilized in interviewing and counseling has evolved considerably over time. Clinical interviews provide valuable information the clinician to guide treatment and help build rapport between client and patient (Swartz, 1992).



### Overview of Mental Status Exams

Mental health professionals have been routinely using mental status examinations for well over 50 years (Hinkle, 1992). Mental status exams are usually conducted as part of the initial interview with the patient and provide both objective observations of the patient and subjective data provided by the patient (Polanski & Hinkle, 2000). Clinicians utilize interviews to gather background information, build rapport, and gather data pertaining to the patient's presenting clinical concerns, whereas mental status exams provide clinicians with information regarding basic intellectual and emotional functioning such as orientation, memory, and math and verbal skills. A variety of versions of mental status exams are available, and thus concerns about the psychometric properties and diagnostic utility of a given mental status exam may exist (Zuckerman, 2000). The mental status exam typically is used to briefly evaluate specific areas of mental functioning, including general appearance and behavior, cognitive functioning and flow of thought, and mood (Morrison, 1993). Some areas commonly assessed during mental status exams include attention, memory, visual-motor integration, fund of information, working memory, judgment, and orientation (Zuckerman, 2000).

Historically, mental status exams were developed by clinicians with face valid items used to briefly screen cognitive and emotional functioning; however, empirical examination revealed that most mental status exams lacked reliability and validity, particularly mental status exams that are not structured or standardized (Zuckerman, 2000). Newly developed instruments such as the Dean-Woodcock Emotional Status Exam provide additional structure that may be more easily examined and validated, and

the structured nature ensures that each administration will provide clinicians with a broad overview of each patient's emotional status.

One's mental status or emotional status can be affected by a wide variety of factors or combination of causes. For example, individuals with severe or chronic physical illnesses have been found to have increased elevation of depressed mood (Waterloo, Omdal, Husby, & Mellgren, 1998). The mental status exam is the most commonly used brief screening of cognitive performance in psychiatric settings (Nagle & Kawczak, 1989). Emotional status is commonly used as a measurement of emotional dysfunction in patients who have adversely impacted by pain due to severe injury and medical problems (van Balen, Essink-Bot, Steyerberg, Cools, & Habbema, 2003). The Dean-Woodcock Emotional Status Exam and diagnostic interviews are used together to aid in their assessment of social-emotional functioning.

#### Overview of the Dean-Woodcock Emotional Status Exam

The Dean-Woodcock Emotional Status Exam differs somewhat from a typical mental status exam or interview in that it focuses specifically on social-emotional functioning, as the Dean-Woodcock Neuropsychological Battery (2003) is accompanied by measures used to address other areas of functioning, including cognitive ability, sensory motor functioning, and other aspects of mental functioning (Dean & Davis, 2008). Thus, the D-WESE does not include many items or elements designed to assess specific components of cognitive functioning as a mental status exam often does given that the D-WESE is typically accompanied by a full cognitive and neuropsychological evaluation, as well as a structured diagnostic interview.

Unlike a typical mental status examination, which may not be accompanied by other forms of evaluation and is used to obtain a brief overview of the individual's mental state and functioning, the D-WESE provides a more specific focus on social-emotional functioning and can be compared directly to more in-depth, formal, and standardized measures of social-emotional functioning, such as the MMPI. In addition, the D-WESE provides the clinician with an opportunity to build rapport with the patient. The D-WESE also provides the clinician with opportunities to quickly obtain additional vital diagnostic information with queries to clarify responses to the items, such as inquiring about the origin and onset of depressed mood used to make specific diagnoses.

The Dean-Woodcock Emotional Status Exam consists of three components. The first section provides fields to complete regarding the patient's identifying information. The remaining two sections consist of a 50-item questionnaire that can be used by the practitioner to quickly identify disturbance in mood or social difficulties and a section for the practitioner to provide his or her clinical impressions of the patient, such as orientation, ability to attend, speech patterns, general comprehension of the material, and physical appearance (Dean & Woodcock, 2003).

This study will focus on the second component of the D-WESE, 50 questions, available in English and Spanish, which are used to assess social-emotional functioning. The items are phrased in easy to understand language and ask the patient whether he or she has experienced each behavior, difficulty, or problem recently. The patient is then asked to rate the intensity of the severity of the behavior or problem on a scale of 1 to 10, with 1 being the least intense and 10 being the most severe (Dean & Woodcock, 2003). This measure can be completed within a few minutes and may be used to quickly assess

commonly occurring social, emotional, and behavioral disturbances the individual may currently be experiencing.

*Rationale for Evaluation of the Validity of the Dean-Woodcock Emotional Status Exam*

The Dean-Woodcock Emotional Status Exam is a recently developed measure, published in 2003 by Dean and Woodcock. As such, research evaluating the reliability and validity of the measure has been limited. The D-WESE appears to assess some of the key constructs assessed by more complex, time-intensive measures, such as the MMPI and Millon Multiaxial Clinical Inventory-III, yet the ability of the D-WESE to identify and predict specific social, behavioral, and emotional difficulties has not yet been studied thoroughly. Galloway-Sharp (2004) investigated the ability of the D-WESE to predict pathology as identified primarily by the individual MMPI Clinical Scales, reporting 11 factors representing 67.9% of the variance.

However, the overall profile of the MMPI is typically interpreted using the highest elevated scales, which is referred to as a "codetype." Researchers such as Graham (1987), Friedman, Webb, and Lewak (1989), and Greene (2000) provide detailed descriptions of symptoms and behavioral patterns that are associated with each two-scale codetype. Codetypes may be derived from examining the associated social-emotional profile of the combination of the highest two or highest three elevated clinical scales, which are used to assess a wide variety of emotional dysfunction and personality traits (Graham, Smith, & Schwartz, 1986; Arbisi, Ben-Porath, & McNulty, 2003). This study will evaluate the ability of items of the D-WESE to predict elevated two-scale combinations of the clinical scales commonly found to be elevated in neuropsychological assessments, which is more similar to the social-emotional profiles utilized by clinicians

to determine the individual's general level of social-emotional functioning and personality traits.

### Diagnostic Inventories and Self-Report Questionnaires

In addition to working toward addressing psychometric concerns associated with interviews, psychologists eventually developed inventories and self-report questionnaires as measures of personality and social-emotional disturbances. The emergence of cognitive measures in the early 20<sup>th</sup> century such as the Binet scale are recognized as being the first instruments in a movement toward psychological assessment tools based upon psychometric principles (Cronbach, 1970). This movement led to the creation of a variety of measures that would continue and evolve over the following century. Eventually the elements of classical test theory were applied to the measures of psychopathology and emotional dysfunction (Burdock & Hardesty, 1968).

### Overview of the Minnesota Multiphasic Personality Inventory

Diagnostic inventories such as the MMPI became more prominent after Meehl (1954/1996) showed that a statistically oriented "cookbook" approach to assessment often exceeded the accuracy of traditional clinical interpretation methods. Cookbooks are created from extensive collections of clinical and actuarial research, although firmer scoring guidelines may be needed from some cookbooks (Payne & Wiggins, 1968; Shultz, Gibeau, & Barry, 1968). The MMPI, and its successor the MMPI-2, is the most widely used and researched measure of social-emotional functioning (Dahlstrom, Welsh, & Dahlstrom, 1975). The MMPI is also the most frequently used inventory of emotional functioning in neuropsychological assessment due to the interaction of emotional and neuropsychological factors (Lubin, Larsen, & Matarazzo 1985). The MMPI provides a

wealth of information to the clinician, ranging from generating scores that allow the clinician to evaluate individual emotional characteristics to yielding a broader and more general emotional profile referred to as a “codetype,” (Green, 2000).

The Validity Scales of the MMPI are scales provide the practitioner with information regarding the consistency and openness of the individual’s response set. Each individual scale provides information about the nature of the response pattern, as well as provides the practitioner with a broader overall impression of the response pattern when evaluating the configuration of the validity scales. The Clinical Scales provide the practitioner with information regarding specific personality and emotional concerns, such as elevations in anxiety and depression or a tendency toward introversion or social withdrawal (Graham, 1987). Combinations of elevated scales used to form codetypes, which are broad personality profiles, better represent the manner in which the instrument is typically interpreted. The two-scale combination scores used in this study will be derived from the concept of the codetype and will be utilized to evaluate the predictive validity of the D-WESE.

The MMPI and MMPI-2 contain items that were developed statistically and vary by degree of subtlety. That is, items vary in face validity, and the meaning or purpose of some individual items are less apparent than other items. Seeman (1952) evaluated 30 items of the MMPI and demonstrated significant variation between response patterns of subtle and obvious items, as participants tended to have significantly greater difficulty identifying and assigning meaning to subtle items. The Dean-Woodcock Emotional Status exam, by contrast, utilizes direct questions stated in common language in order to assess emotional dysfunction.

*Rationale for Choosing the MMPI*

Given that the MMPI and MMPI-2 are the most widely used and researched measures of social emotional functioning (Dahlstrom, Welsh, & Dahlstrom, 1975), this instrument appeared to be an ideal benchmark to assess the validity of the Dean-Woodcock Emotional Status Exam, a briefer, less formal, and unscored measure of social-emotional functioning. Rather than yielding standardized scores, the items of the D-WESE are assigned ratings as of severity and frequency by the patient. In addition, the MMPI has often been utilized to validate other measures, including structured interviews and other inventories.

The time-intensive nature of the administration of the MMPI has led to interest by clinicians and researchers to create a briefer method of assessment of personality and emotional dysfunction, including shorter forms of the MMPI itself, which were evaluated by Alfano and Findlayson (1987). Thus, learning more about the predictive validity could provide researchers with a better sense of how it may be used to quickly identify key areas of emotional dysfunction and allow them to identify additional areas of assessment needed for evaluation, such as a more comprehensive assessment of emotional dysfunction and the addition of interview questions related to DSM criteria of psychopathology. Moreover, the items of the D-WESE are more obvious and direct.

Overview of Neuropsychological and Social-Emotional Assessment

Brain injuries are often associated with a variety of physical, cognitive, and emotional complications (Gasquoine, 1997; Mamelak, 2000). The Minnesota Multiphasic Personality Inventory (MMPI), and its successor, the Minnesota Multiphasic Personality Inventory, Second Edition (MMPI-2), have been used to assess emotional

dysfunction of individuals with brain injury (Reitan, 1974; Warriner, Rourke, Velikonja, & Metham, 2003), as well as study the behavior of patients with a history of brain injury exhibiting behaviors commonly associated with trauma to the brain, such as the presence of impulsivity (O'Jile, Ryan, Parks-Levy, Betz, & Gouvier, 2004).

The cause of such impairments is not always clear, as such impairments could be due to an emotional reaction to the trauma, neurological damage, confusion or disorientation related to impaired cognitive ability, and a variety of other factors, many of which may be overlooked or underestimated by healthcare providers (Gouick & Gentleman, 2004) or are not identified and treated at all (Ashman, Gordon, Cantor, & Hibbard, 2006). Individuals who have suffered from a close head injury tend to underestimate the sensory and cognitive impairments resulting from their injuries (Gasquoine, 1992), further complicating adjustment following injury. In addition, some difficulties following the injury seem to subside within a couple of months, whereas other injuries may persist for years, perhaps for the rest of the brain-impaired individual's lifetime (Warriner, Rourke, Velikonja, & Metham, 2003).

Fordyce, Roueche, and Prigatano (1983) found that patients with longstanding symptoms of brain injuries were more anxious and depressed than individuals who had acute, transient reactions to injuries. Length of coma, now a common method used to predict severity of a brain injury, was found to be correlated with head injury (Marcelli & Temey, 1977). In addition, Landry (1997) found length of coma to be positively correlated with scores on the MMPI scales. Golden and Golden (2003) found emotional problems increased with the severity of damage as determined by the length of loss of consciousness and severity of impairment. Alfano, Finlayson, Stearns, and MacLennan



(1991) were able to correctly discriminate neurologic patients from non-patients utilizing 44 items from the MMPI. Gass (1991) also found interactions between performance on a neuropsychological battery and responses on the MMPI. Thus, a strong link between brain injury severity and emotional impairments has been reported.

### Overview of Neuropsychological Assessment

Neuropsychological measures have been used for decades to successfully differentiate individuals with neurological impairment from individuals with a normal level of neuropsychological functioning. For example, the Halstead-Reitan Neuropsychological Test Battery has been used to predict the general presence of brain damage in patients at up to a 90% success rate (Golden, 1976). Similarly, the Luria Nebraska Neuropsychological Battery has been found to identify neuropsychological impairment at up to a 100% success rate (Golden, et al., 1978). In addition to pathognomonic signs utilized in the aforementioned studies, which discriminates between “normal” or deviant markers of impairment, neuropsychological batteries of assessment also commonly used to evaluate overall level of performance, right-left differences comparing both sides of the body, and patterns of performances (Selz & Reitan, 1979). The utilization of multiple methods provides a more accurate and robust system of assessment, as multiple factors could influence an individual’s performance in discrete components of assessment, such as anxiety adversely impacting one’s performance (Selz & Reitan, 1979) on certain types of tasks.

Given that the markers of impairment in neuropsychological functioning have been so effective in predicting the presence of neuropsychological dysfunction, the use of standardized administration, scoring, and interpretive procedures were not always

considered to be crucial in the identification of neuropsychological impairment (Boll, 1976; Satz, Friel, & Rudegair, 1976; Lang, Hill, & Dean, 2001). However, the severity and nature of each individual instance of brain injury, and associated symptoms, deficits, or complications associated with the injury, may vary widely.

A reliance by clinicians on self-reported information by patients and the use of subjective, clinically-based methods rather than objective, empirically based methods of assessment may lead to misinterpretation (Grinker, & Sahs, 1966) and difficulties in accurate identification (Glick, 1993) and has limited the depth of systematic evaluation of sensory-motor measures (Volpe, Davis, & Dean, 2006). Investigation of neuropsychological functioning has also been limited in breadth in that many researchers have chosen to focus their studies on higher level types of mental processing, such as cognitive functioning, rather than evaluating lower level brain functioning, such as sensory and motor processing (Reitan & Wolfson, 2003).

Recently, efforts have been made to develop a more comprehensive method of assessment to address neuropsychological deficits and the myriad of cognitive and social-emotional impairments that may be associated with a brain injury. Indeed, a number of studies showed neuropsychological impairments for patients with psychiatric disorders, without obvious neurological disorders (Dean & Noggle, in press). The neuropsychological examination incorporates investigation of emotional status, cognitive, and sensory-motor functioning to obtain a more accurate assessment and diagnosis.

#### Rationale of the Study

The purpose of this study was to evaluate the ability of the Dean-Woodcock Emotional Status Exam to predict two-point combinations of elevated codetypes of the

MMPI. This study builds upon Sharp-Galloway’s (2004) investigation of the D-WESE. She examined the structure and predictive validity of the D-WESE in the prediction of individual clinical scales of the MMPI. As in the present study, the MMPI was used because it is the most thoroughly researched and respected measure of social-emotional functioning and personality assessment. These data were viewed as having potential clinical and research utility. Moreover, the items of the D-WESE were written from criteria of diagnoses used by the DSM. The most frequently occurring diagnoses were incorporated into the measure in order to quickly assess social-emotional functioning and may be used to further expand upon our knowledge regarding the validity and clinical utility of the measure. The findings in this study may be particularly useful to clinicians in need of a comprehensive consideration of a patient’s emotional functioning before other parts of the neuropsychological battery have been administered. The D-WESE is a component of the Dean-Woodcock Neuropsychological Assessment System, which also includes assessments of sensory-motor and cognitive functioning (Dean & Davis, 2008). A table illustrating the theoretical factor structure of the D-WESE was constructed by Dean (2003; Table 1).

Table 1

*Theoretical Classification of the D-WESE*

Items of Emotional Status	Mood Symptoms	Anxiety Symptoms	Cognitive Functions	Psychotic Symptoms	Somatic Symptoms	Executive Planning	Attention Vigilance	Behavior Control	Asocial Behavior	Personality Features
1 Present Depression	X									
2 Depression for 2 Weeks	X									
3 Suicidal Thoughts	X									
4 Hyper/Motor Behavior	X	X						X		
5 Euphoric Feelings	X							X		
6 Low Energy	X				X					

7 Change in Appetite/Weight	X				X					
8 Sleep Disturbance	X	X			X					
9 Self-Deprecatory Thoughts	X									X
10 Distractibility	X		X				X			
11 Inattention	X		X			X	X			
12 Impulsivity			X			X	X	X		
13 Poor Concentration	X		X				X			
14 Confusion			X	X		X	X			
15 Obsessive Thoughts		X								
16 Antisocial Behaviors									X	X
17 Compulsive Behavior		X								
18 Fears/Phobias		X								
19 Free Floating Anxiety		X								
20 Racing Thoughts		X								
21 Panic/Anxiety Attacks		X								
22 Anxiety/Nervousness		X								
23 Memory Impairment			X							
24 Gastrointestinal Problems					X					
25 Anger								X		
26 Homicidal Thoughts									X	
27 Somatic Concerns					X					X
28 Recent Headaches					X					
29 Aggressive Behavior								X	X	
30 Problems with the Law									X	
31 Alcohol Use									X	
32 Drug Use									X	
33 Tobacco Use									X	
34 Sexual Problems					X					
35 Personality Changes										X
36 Introversion/Shy										X
37 Paranoid Thoughts				X						X
38 Delusional Thinking				X						
39 Hallucinations				X						
40 Depersonalization				X						
41 Ideas of Reference				X						

42 Abuse History										X
43 Running Away									X	
44 Oppositional Defiant								X	X	
45 Decision Making	X		X							
46 Planning Ability			X			X				
47 Confabulation						X				
48 Affect Response						X				
49 Disinhibition	X					X		X	X	
50 Utilizing Feedback			X			X				

CHAPTER II  
LITERATURE REVIEW

Emotional Assessment

A myriad of emotional assessment techniques have been developed to provide information for various reasons. The number of available techniques and instruments for assessment has grown over time with the move from subjective to objective instruments. The two primary approaches of personality and emotional assessment include interviews and diagnostic inventories. Both categories of personality and social-emotional assessment include a wide variety of measures and instruments with unique properties and levels of diagnostic sensitivity (Guthrie & Mobley, 1994; Hotopf, Sharp, & Lewis, 1998; Hopwood et al., 2008).

Diagnostic interviews and mental and emotional status exams are often the first form of diagnostic evaluation and information gathering when seeing new patients (Rosenthal & Akiskal, 1985) and often provide important early impressions that guide decisions pertaining to further assessment and treatment (Sandifer, Hordern, & Green, 1970; Lezak, 1995). Interviews are typically conducted in a face-to-face meeting between a mental health provider and patient. One-half or more of the symptoms or presenting problems may be reported within the first few minutes of an initial meeting with the patient. Sandifer, Hordern, and Green (1970) demonstrated the need for attentive listening and observation as much as concise communication and inquiry are important

features of the interview. Further, information gathered in a diagnostic interview and accompanying mental or emotional status exam may guide the examiner or counselor regarding further questioning, clinical actions, or examination techniques for the remainder of the evaluation or treatment program.

The reliability and validity of interviews is of concern to researchers and clinicians (Zimmerman & Mattia, 1999). Unstructured or partly structured interviews have been found to have lower interrater reliability than structured interviews (Widiger, Sanderson, & Warner, 1986). Alternative structures of interviews were developed to address this issue with structured interviews, which increase the ease at which one may evaluate the psychometric properties and diagnostic utility of the measure. Structured interviews require strict adherence to the questions, which has been criticized in terms of limiting a practitioner's ability to build rapport (Briere, 1997; Stanghellini, 2004) and follow-up with additional inquiries that may surface that are not included within a given structured interview.

Personality inventories and self-report measures were developed as a result of both the emergence of formal assessment techniques, which began with cognitive measures early in the 20<sup>th</sup> century. Development continued with Woodworth's effort to detect mental instability and emotional dysfunction with the development of the first personality inventory, the Woodworth Personal Data Sheet (Woodworth, 1917, 1919), and the later findings by researchers such as Meehl (1954/1996), who found that rules of interpretation with objective based inventories met or exceeded the level of accuracy of clinical judgment and decision making by the "clinical expert." Most self-report measures are administered via paper and pencil format (Forbey & Ben-Porath, 2007).

Psychiatric diagnostic inventories used to assess personality and social-emotional functioning offer considerable variety to the practitioner, including measures that vary greatly regarding depth and length of administration and inventories that range in scope from general assessment of social-emotional functioning to the assessment of very specific aspects of social-emotional functioning or personality assessment, such as depression, anxiety, or personality disorders (Hodges, 1990; Guthrie & Mobley, 1994; Hotopf, Sharp, & Lewis, 1998).

This study focused upon comparing the information obtained from both a formally scored, statistically based emotional assessment inventory, the MMPI, and a structured 50-item component of an emotional status exam, the D-WESE, which is routinely used in concert with a structured interview to evaluate neuropsychological injury and dysfunction. This chapter will discuss the background and utility of both the MMPI and the D-WESE, as well as how these measures are utilized within the context of neuropsychological evaluation.

### Interviews and Clinical Decision Making

The diagnostic interview has long been considered of key importance in mental health diagnosis and treatment and among the principal methods of assessment in clinical practice (Nagler & Glueck, 1985). Hartman (1933) reminded early critics of clinical interviews that "the individual mental test is merely a highly standardized interview," (Hartmann, 1933, p.207) and that interviews may provide valuable information and rapport building even as a supplementary advice in a clinician's evaluation. Perry (1992) emphasized the importance of gathering a detailed history in the interview process to provide an overview and context of the patient's current situation. Widiger and Axelrod



(1995) also noted the importance of supplementing information gather directly from patients with data procured from additional informants who are familiar with the individual and the individual's situation to provide additional perspectives to the evaluation.

It is crucially important that the clinician is attentive and thorough to obtain accurate, detailed information about a patient's presenting problems. The diagnostic interview generally is among the first components of a comprehensive psychological evaluation and often tends to guide the clinician's course of action for the remainder of the evaluation or treatment (Sandifer, Hordern, & Green, 1970). The diagnostic interview provides the mental health professional with an opportunity to assess the individual's situation, presenting problems, note observed nonverbal behaviors, and make clinical judgments regarding how to proceed with the evaluation or treatment. Given the crucial importance of the diagnostic interview, as well as the subjective nature of this process, clinicians and researchers have been concerned regarding the accuracy and reliability of evaluating patients in this manner and improving interview techniques (Spitzer, Endicott, & Robins, 1978; Watson, Juba, Manifold, Kucala, & Anderson, 1991) The clinical interview has long been the subject of vigorous debate (Barber, Rigby, & Napoli, 1962), and many questions remain regarding the psychometric properties of these instruments (Vacc & Juhnke, 1997) despite the frequency of their use in clinical practice.

There may also be concern regarding clinical judgment and bias of the mental health professional and how this could adversely affect treatment, as clinicians may give a great deal of weight to their conclusions made during the interview process. According to a study by Sandifer, Hordern, and Green (1970), one-half of the total symptoms

observed of the patient were reported within the first three minutes of a psychiatric interview, which underscores the importance of careful recording of the information provided within the clinical interview and how clinician's should be maximally attentive and concise regarding gathering information.

It is also of much concern that a mental health professional be weary of bias and making premature judgments, although studies have shown that key diagnostic impressions are often reported very early in the evaluation process and tend to be very resistant to change (Sandifer, Hordern, & Green, 1970; Elstein, Shulman, & Sprafka, 1978). A more recent evaluation of judgments formed by clinicians indicated that they generally tended to delay making final diagnostic decisions and judgments rather than make rapid, inflexible diagnostic decisions, although the authors indicated that the participants were graduate students and that diagnostic decision-making and outcomes may vary depending on level of training and other factors (Hill & Ridley, 2001). Regardless, it remains a concern that such a crucial component of psychological evaluation may be highly prone to errors in decision making and in judgment.

Gatz, Popkin, Pino, and VandenBos (1985) reported that clinicians' judgment and perceptions may be adversely impacted by negative attitudes towards the elderly that can lead to inaccuracies regarding perceptions of prognosis and misconceptions about the patient. Setin (1982) found that older clients tended to be viewed by clinicians more negatively, and studies have shown a general tendency for clinicians to incorrectly overdiagnose organic brain syndrome and underdiagnose depression in older patients (McAllister, 1983). Clinicians have also been shown to demonstrate bias regarding gender. For example, Kirshner and Johnson (1983) found that admitted female patients

were treated differently than men regarding admission and discharge criteria. In order to address concerns regarding the validity of the diagnostic interview, alternative structures of the diagnostic interview have been developed.

### *Types of Interviews*

Two primary types of constructions of diagnostic interviews exist, unstructured and structured interviews. Both are still routinely utilized in clinical assessment, although the use of unstructured interviews for the initial assessment in particular has become somewhat less desirable due to concerns about obtaining a thorough assessment of a patient's presenting problems and symptoms, current circumstances, and background information. Criticisms of unstructured interviews include lack of systematic assessment, susceptibility to idiosyncrasies, and bias related to gender, culture, or ethnicity (Widiger & Axelrod, 1995).

The unstructured interview consists of questions of the interviewer's choice. Each interviewer constructs their own set of questions, which could vary greatly regarding depth and level of detail and the patient's responses. The unstructured interview offers considerable flexibility and freedom to the interviewer, who is free to pose any questions of his choosing. Gibson (1998) found that unstructured interviews provided greater depth and detail compared to structured interviews. However, it is quite difficult to compare the results of unstructured interviews or find ways to quantitatively improve the measure. As a result, studies have identified significant problems with the psychometric properties of unstructured interviews (Spitzer, Endicott, & Robins, 1978; Mellsop, Varghese, Joshua, Hicks, 1982).

The structured interview, by contrast, consists of previously developed questions that are presented in a strict, manualized manner (Vacc & Juhnke, 1997). That is, items in structured interview are presented each time and in the same manner, restricting the interviewer to only present the items included in the instrument. A variant of the structured interview, the “semi-structured” interview, which contains previously developed questions asked in a standardized measure but allows the interviewer additional flexibility to ask follow-up questions as needed (Widiger & Axlerod, 1995), is sometimes utilized.

Wright, Adler, Bliese, and Eckford (2008) posit that the semi-structured interview format may be favored in clinical settings, as rigid adherence to the instrument’s format may conflict with the practitioner’s need to follow-up on an important symptom or problem. The same instrument may be used as a structured interview that follows all manualized guidelines if no additional lines of inquiry are necessary. Another example in which the situation could dictate the use of the interview is in a research rather than a clinical setting, which would require a high emphasis on standardization of procedures in order to quantitatively evaluate the results.

The Dean-Woodcock Emotional Status Exam consists of 50 questions posed to each patient. The patients are also asked to rate the frequency and severity of symptoms of psychopathology. In addition, the examiner may wish to query for additional information, such as admission of suicidal ideation, obsessive thoughts, or phobias. The D-WESE provides structure and breadth often missing in unstructured interviews, yet it provides clinicians with flexibility to obtain additional information pertaining to individual items as needed.

*Strengths of Structured Interviews*

There are various structures that have been utilized in an attempt to address potential biases and errors in judgment (Matarazzo, 1977). In general, structured interviews, in which interviews are followed rigidly, are generally viewed as being more reliable than other interview formats and have been found to reduce the error variance and problems with reliability often found in the interview process (Matarazzo, 1977).

Interviews have long been viewed by as potential tools for research and training (Hartman, 1933), and structured interviews in particular present an advantage in that items can be easily compared for research purposes or for instrument evaluation given that they are identical for each administration (Vacc & Juhnke, 1997). Structured interviews tend to be constructed with the diagnostic criteria of the DSM in mind (Vacc & Juhnke, 1997), and thus structured interviews tend to carefully address specific criteria needed by the practitioner for successful social-emotional evaluation and diagnosis.

The uniformity of structured interviews are also useful for developing screening programs or assessing specific psychological concerns or situations. For example, Wright, Adler, Bliese, and Eckford (2008) outlined guidelines for using structured interviews for screening for a variety of social-emotional difficulties following military deployment, including suicide risk, post-traumatic stress disorder, relationship problems, excessive anger, alcoholism, and difficulties with sleep. They utilized both the Mini International Neuropsychiatric interview and the Diagnostic and Statistical Manual of Mental Disorders to develop a psychological screening program for soldiers exposed to combat and commonly associated psychological disorders.

*Comparison of Structured and Unstructured Interviews*

However, some practitioners criticize the limitations of the structured interview. Stanghellini (2004) posits that although the introduction of the structured interview may have reduced problems with reliability and validity, structured interviews focused narrowly on signs and symptoms within diagnostic categories, which the author felt restricts the range and richness of the information that can be gathered in the interview. He also questioned whether rigid adherence may actually make building rapport more difficult and challenged that such a format may not be conducive to freedom of exploration often required in therapy. Briere (1997) indicated that some structured interviews do not encompass all possible criteria or possibilities in some clinical situations. Thus strict adherence to a structured set of questions may be a hindrance to investigating a specific type of difficulty not included in a standard set of questions.

In addition, Briere (1997) argued that the format may result in a decrease in rapport between the clinician and the patient. Structured interviews may be seen as problematic and undesirable in particular by some clinicians, as a key component of treatment is building trust and rapport early in the therapeutic process. However, Briere (1997) acknowledged that structured protocols do ensure that relevant clinical and diagnostic issues are addressed, as well as provide a high level of attention to detail.

Patton (1990) and Guba and Lincoln (1981) described unstructured interviews as being less remote and arbitrary form of interviewing compared to other types of interviews. Mischler (1986) also argued that some aspects of information gathered within unstructured interviews, such as a rich description of a patient's experience, may be overlooked and seen as less effective than structured interviews because such information

is not easily quantified or compared with other descriptions or interviews. Rubin and Rubin (1995) also argue that unstructured interviews also have an advantage over other forms of interviews in that they allow patients to respond in a manner in which they choose and feel best represents their situation or story. That is, an unstructured format not only provides greater freedom and flexibility to the clinician, but also for the patient and how they may express their concerns.

Although some structured interviews have generally been found to have moderate to strong psychometric properties (Kroll et. al., 1981; Germans et al., 2010), poor reliability has been found with structured interviews with young children (Edelbrock, Costello, Dulcan, Kalas, & Conover, 1985). Some clinicians prefer a variant of the structured format, the “semi-structured” interview format in which one has a previously determined set of questions but is free to deviate to ask additional questions or address additional concerns when necessary, such as when a problem surfaces that must be further expanded upon or when a problem emerges that is not addressed within the standard, previously determined set of questions.

Other clinicians maintain a preference for unstructured interviews over structured or semi-structured interviews for a variety of reasons. Gibson (1998) used a comparative analysis of semi-structured and unstructured interviews and reported that he found that unstructured interviews resulted in greater detail in the description of patients’ descriptions of their experiences and presenting problems than with semi-structured interviews. Theoretically, there is no limit to the depth of an unstructured interview, as the interviewer is free to include whatever lines of inquiry or information he or she chooses.

A key problem with the use of unstructured interviews, however, is that just as a clinician may exceed the depth and level of detail one might find in a given structured interview, another clinician may lack depth in their unstructured interview necessary to gain the details necessary to fully understand a patient's current situation and evaluate or treat the patient's concerns and difficulties. That is, there is little consistency in quality and depth when comparing one unstructured interview to the next. Kubinger, Wiesflecker, and Steindl (2008) suggested that using an interview guide provided higher validity and greater efficiency than using a typical unintuitive unstructured approach, and they also noted that conducting thorough and informative unstructured interviews may be particularly challenging for interviewers with less practical experience. That is, thorough and efficient unstructured interviewing tends to require a greater level of clinical expertise and experience than manualized, structured interviews. This suggests that experienced and skilled clinicians may in some cases be able to extract greater depth of information (Gibson, 1998).

A review of the literature demonstrates mixed results regarding the psychometric properties of various types of interviews. For example, Hodges (1990) compared scores derived from children in an inpatient psychiatric setting of the Children's Depression Inventory (CDI), Revised Children's Manifest Anxiety Scale (RCMAS), and State-Trait Anxiety Inventory for Children (STATIC) to the Child Assessment Schedule (CAS). Hodges (1990) found convergent and discriminant validity in the CDI and STATIC but rather poor discriminant and convergent validity with the RCMAS.

Hotopf, Sharp, and Lewis (1991) compared four psychiatric assessments, the Hamilton Depression Rating Scale (HDRS), the Beck Depression Inventory (BDI),



Revised-Clinical Interview Schedule (CIS-R), and General Health Questionnaire (GHQ), all of which are used to detect and evaluate severity of psychiatric disorders. However, the measures vary in structure, as the HRSD is a rating scale based on an unstructured interview, the CIS-R is a structured interview, and the GHQ and BDI are self-administered questionnaires. Factor analysis suggested all measured a single underlying construct, and with reliability ranging between 0.68 to 0.78. Measures were also found to intercorrelate between 0.70 to 0.79 (Hotopf, Sharp, & Lewis, 1991), suggesting that the measures were similarly effective in detecting psychopathology despite varying greatly by structure and range of specificity. That is, measures such as the HRSD and BDI are designed to specifically evaluate mood in individuals previously diagnosed with depression, whereas the CIS-R is more general in its focus.

Kroll et al. (1981) found interrater reliability of the Diagnostic Interview for Borderlines (DIB) to fall between 0.62 and 0.78. They found the measure had adequate reliability for clinical research, although the study was limited by small sample size. Hopwood et al. (2008) evaluated methods to evaluate borderline personality disorder criteria using both self-report and interview methods, noting limited agreement between methods, with kappa ranging from 0.25 to 0.52 on the nine criteria. Overall categorical diagnosis was found to be 0.53, suggesting moderate convergence. The authors suggested the combination of interviews and self-report data optimally defines borderline personality disorder, as this approach would provide both experiential data and observations of behavioral symptoms (Hopwood, 2008).

Oldham et al. (1992) noted agreement between the Structured Clinical Interview for the DSM-III-R Personality Disorders (SCID-II) and Personality Disorder

Examination (PDE) ranged from good for dependent ( $k=0.66$ ), antisocial ( $k=0.59$ ), and histrionic ( $k=0.58$ ) to poor for schizoid ( $k=0.14$ ) and paranoid ( $k=0.29$ ) depending on the individual personality disorder classified. Overall agreement between these interviews was found to be modest. Germans et al. (2010) also found that components of structured interviews could be used to successfully classify outpatients by using 10 items from the Structured Clinical Interview for the DSM-IV Personality Disorders (SCID-II). Compared to full SCID-II interviews, Germans et al. (2010) found that 78% were correctly classified by the 10-items administered as a brief self-report measure.

### Mental and Emotional Status Exams

Mental health professionals have been routinely using mental status examinations for decades (Hinkle, 1992), which provides a useful rapid assessment of an individual's social-emotional state, ranging from during a formal evaluation to a situation in which an individual has suffered a severe injury and may be disoriented or confused. Mental status exams have traditionally been a component of neurological exams, and are now considered to be a staple of initial mental health evaluations (Morrison, 1993). Mental status exams are typically conducted early in a formal evaluation process with the patient and provide both objective observations of the patient and subjective data provided by the patient (Polanski & Hinkle, 2000).

The mental status exam can be a quite valuable tool for clinicians, as they may not conduct a formal standardized assessment of social-emotional functioning and may use a mental status examination as a basis of whether further assessment may be beneficial. Mental status exams are often a desirable means of assessment for clinicians as a screening device (Zuckerman, 2000). This is the case because they tend to be brief in

duration and may be less disruptive in the rapport building process that is crucial in therapy, which is considered a problematic trait of rigidly administered instruments, such as structured interviews and standardized measures (Briere, 1997; Stanghellini, 2004). Some of the tasks that often appear on mental status exams, such as copying a geometric figure, may be relatively resistant to cultural biases, although one must be wary of cognitive and neurological impairments or language related difficulties when using these assessments (Srivastava et al., 2006).

It is crucial that clinicians note which areas of functioning are assessed or screened with the specific version of mental or emotional status exam they are administering and not overlook important aspects of mental and emotional functioning that may be associated with a particular problem, such as executive functioning with traumatic brain injury (Thomas, Rosenthal, & Barone, 2001). That is, additional cognitive and social-emotional assessment may be necessary even if such problems are not detected during a mental status examination. It is also important to consider whether the mental status exam is likely to be effective in detecting specific problems or disorders, such as for depression (Jorge & Starkstein, 2005) or postconcussion syndrome (Mittenberg, Wittner, & Miller).

Given the brevity of a typical mental status examination, practitioners should be careful not to substitute the findings of a mental exam for a full evaluation and interpret the results with caution appropriate for such a measure, as the psychometric properties of these assessments tend to be rather limited (Zuckerman, 2000). A mental status exam should also generally be used in concert with other evaluations to provide a thorough and in-depth representation of that individual's current level of functioning. For example,

Srivastava et al. (2006) found that the diagnostic utility of the Mini-Mental Status Exam, one of the most widely used mental status exams (Crum, Anthony, Bassett, & Folstein; 1993), was limited in clinical utility for individuals who have suffered a mild to moderate traumatic brain injury and that the Mini-Mental Status Exam may not be adequate to evaluate cognitive functioning in such instances.

Srivastava et al. (2006) noted limited predictive validity and specificity to components of measures commonly used in neuropsychological assessment, including the California Verbal Learning Test, Long Delay Free Recall, Rey Complex Figure, and Boston Naming Test. Srivastava et al. (2006) also noted that literature regarding utilizing mental status exams with certain populations and demographics, including elderly patients with a history of traumatic brain injury, was quite limited, suggesting that clinicians should use caution until these techniques are more refined and more data about their use is available.

As previously stated, a plethora of versions of the mental status exam exist, and thus there are concerns regarding the psychometric properties of each. Blais and Baity (2005) compared the psychometric properties of two mental status exams, the Mini-Mental Status Exam (MMSE) and the Modified MMSE (3MSE). Blais and Baity (2005) found that the 3MSE was better able to predict the length of hospital stay for patients and the need for additional follow-up services after discharge, which was found to be predicted by Word Generalization items. Internal consistencies were also reported to be significantly higher for the 3MS than the MMSE; internal consistency was reported to be .72 for the 3MS but only .56 for the MMSE. Another study (Teng, Chiu, & Gong, 1990) indicated that the 3MS was more sensitive in detecting dementia, although the study also

indicated that overall both measures had similar psychometric properties. These studies demonstrate how variations of an instrument can vary significantly depending on the presenting problem. Practitioners must therefore carefully research the instrument they use to ensure that significant areas of difficulty are not overlooked or the presenting problem is not misdiagnosed or misjudged.

Anderson, Burton, Parker, and Godding (2001) analyzed the Cognitive Capacity Screening Examination (CCSE) using an exploratory factor analysis. They found that 3 of the 11 factors, digit span with interference, complex mental mathematics, and verbal memory, were most sensitive to impairment compared to other factors, accounting for 90% of the total variance. Thus, the authors concluded a subset of the items of the measure or an equivalent brief mental status exam may provide adequate screening data for many patients.

Of greater concern regarding validity and reliability are unstructured mental status exams created and administered by individual clinicians, which have traditionally been the nonstandardized format clinicians have most frequently used (Trzepacz & Baker, 1993). As the content is developed by individual clinicians, it is subject to similar idiosyncrasies and problems with reliability and validity as seen with unstructured interviews and lack the standardized scoring and interpretation of structured mental status exams (Nelson, Fogel, & Faust, 1986). However, studies of the reliability and validity of even structured mental status exams is often lacking in the research literature (Anderson, Burton, Parker, & Godding, 2001).

Further refinement in mental and emotional status and interviewing techniques and measures is clearly merited, especially regarding neurological and psychosocial

concerns related to a history of brain injury. Future methods of assessing emotional status in individuals with a history of brain injury will need to be particularly sensitive to changes in mood state, as depression was found in 14% of a sample by Deb, Lyons, Koutzoukis, Ali, and McCarthy (1999). Symptoms of anxiety were found in 28% of individuals within a year of a traumatic brain injury (Deb, Lyons, Koutzoukis, Ali, & McCarthy, 1999), and other studies have identified symptoms resembling post-traumatic stress disorders in individuals with a history of brain injury (Bryant, Marosszeky, Crooks, Baguley, & Gurka, 2001). Individuals with neurological impairment also commonly exhibit problems with executive dysfunction (Thomas, Rosenthal, & Barone, 2001). The Dean-Woodcock Emotional Status Exam is a structured interview and assessment of emotional status that was found by Galloway-Sharp (2004) to exhibit an 11-factor structure for predicting these constructs or symptoms of the aforementioned constructs, and this study will further investigate the ability of this measure to provide a valid screening of these concerns commonly linked to neurological and emotional dysfunction.

#### The Dean-Woodcock Emotional Status Exam

The Dean-Woodcock Emotional Status Exam is part of a battery of measures used to assess neuropsychological functioning. This battery also includes the Dean-Woodcock Sensory Motor Battery, which consists of 18 tests used to assess sensory and motor functioning. The DWSMB also has been found to have strong psychometric properties (i.e., CHC), including excellent rater agreement and reliability (Woodward, Ridenour, Dean, & Woodcock, 2002). The DWSMB also provides overall indices of sensory, motor, and overall neuropsychological impairment (Dean & Woodcock, 2003). The Dean-Woodcock Structured Interview is used to document identifying information,

referral information, medical history, history of psychiatric/ psychological treatment, personal and social history, and psychiatric and neurologic family history.

The D-WESE was designed to assess specific social-emotional criteria found in the Diagnostic and Statistical Manual of Mental Disorders (DSM) and consists of three components. The first section consists of a page in which there are fields in which of the patient's identifying information may be written. The following two sections are used to assess the patient's emotional status and provide the clinician's observations regarding physical and mental orientation, which includes general orientation, ability to attend, speech patterns, general comprehension of the material, and general aspects of physical appearance. The first and third sections of the D-WESE were not utilized in this study; only the second section of the D-WESE, which yields numerical subjective ratings from the user, was evaluated in comparison to scores from the MMPI.

In the second section of the D-WESE, which is the focus of this study, the patient is asked to answer 50 items pertaining to social-emotional behaviors and concerns. The patient rates each question in severity or intensity on a scale of 1 to 10, with 1 being the least intense and 10 being of the highest intensity. This measure does not include items that directly assess cognitive ability or sensory motor functioning, as other measures included within the Dean Woodcock Assessment System (Dean & Davis, 2008) address these areas. Thus, the D-WESE does not involve specific items or elements to assess cognitive functioning as a mental status exam often does given that the D-WESE is typically accompanied by a full cognitive and neuropsychological evaluation, as well as a structured diagnostic interview. The D-WESE directly addresses social-emotional functioning and can therefore be easily compared directly to more in-depth, formal, and

standardized measures that also address social-emotional functioning, such as the MMPI. Widiger and Axelrod (1995) noted that interviews should be complimented when possible by a self-report measure to provide a more accurate assessment, particularly regarding personality disorders.

The 50-item questionnaire component of the D-WESE is used to assess several specific aspects of social-emotional functioning. These classifications include mood symptoms, anxiety symptoms, cognitive functions, psychotic symptoms, somatic symptoms, executive functioning, attention and vigilance, behavioral control, asocial behavior, and personality features. The items are phrased in easy to understand language and ask the patient whether he or she has experienced a behavior, difficulty, or problem recently and is then asked to rate the intensity of the severity of the behavior or problem on a scale of 1 to 10, with 1 being the least intense and 10 being the most severe (Dean & Woodcock, 2003). This measure may be completed within a few minutes and can be used to quickly assess commonly occurring social, emotional, and behavioral disturbances the individual may currently be experiencing.

### The Minnesota Multiphasic Personality Inventory

#### *Overview of the MMPI*

A need for the inventories was apparent during World War I in order to assess large numbers of soldiers exposed to harsh environments (Greene, 2000). Early objective personality assessment measures, such as the Woodworth Personal Data Sheet (Woodworth, 1917), were brief self-report measures that required a “yes or no” response. A positive response to an item or items was suggestive of psychological distress or psychopathology and prompted further evaluation by a psychiatrist and was useful in



identifying recruits who were “emotionally unsuitable for service in the army under wartime conditions,” (Greene, 2000, p. 2).

Although early personality and social-emotional assessment measures were useful in screening individuals for psychopathology, these measures were plagued with numerous psychometric problems and were often found to not be useful outside of wartime situations (Greene, 2000). The MMPI was devised by Hathaway and McKinley in 1940 and was used to identify a broad array of personality characteristics and types of psychopathology (Greene, 2000). The MMPI and MMPI-2 have become the most widely used measure of emotional dysfunction and personality assessment in clinical psychology (Lubin, Larsen, Matarazzo, & Seever, 1985). The MMPI-2, the first revision of the original MMPI, was published in 1989 and addressed concerns with the wording of certain questions, such as items containing gender biased phraseology or the use of outdated language (Levitt, 1990). However, a comparison revealed that most of the items and special scales in the MMPI-2 remain intact from the original MMPI (Levitt, 1990), and both versions were found to yield similar profiles (Edwards, Morrison, & Weissman, 1993; Tellegen & Ben-Porath, 1993; Staal & Greene, 1998).

The MMPI was developed in a manner that utilized an actuarial approach rather than through typical questions designed for an interview that have high face validity. That is, the questions that were developed did not necessarily overtly appear to be related to a particular personality trait or social-emotional (e.g., the Beck Depression Inventory) disturbance to the examinee. Rather, the method of construction of the MMPI, and later the MMPI-2, was to contrast responses of criterion groups with non-clinical groups;

items utilized in the measure were found to be keyed for each criterion of the scales (Helmes & Ben-Porath, 1993).

Numerous ambiguous questions were developed and posed systematically to groups of individuals who were known to be experiencing various forms of psychopathology and difficulties (Greene, 2000). Only questions that differed in response pattern by individuals in those groups from the control group were ultimately retained. Thus, items were found to be keyed on response pattern differences despite often appearing to be ambiguous and unrelated to psychopathology. This design could be viewed as both a strength and a weakness. A key advantage of this approach is that it is rather difficult for an individual to feign a psychological disturbance, and if this is attempted it may be identified with the validity scales, which are related to items keyed on unusual response patterns and responses. This approach could be seen as a disadvantage with patients who might view the individual items as being meaningless and obscure and may be less motivated to answer the items honestly and with maximum effort and focus. Critics of items with limited face validity, commonly referred to as "subtle" items, were found by Seeman (1952) to be substantially more difficult for undergraduate and graduate participants with at minimum a basic grounding in abnormal psychology to interpret and classify by perceived keyed psychopathology.

Cronbach (1970) suggested that separate scoring of subtle and obvious items may be necessary, and critics of subtle items such as Duff (1965) suggested that subtle keys may contribute little valuable information. However, Burkhart, Christian, and Gynther (1978) noted that subtle items are highly resistant to faking or malingering by examinees, which has been further investigated in subsequent studies (Kelly & Greene, 1989;

Woychyshyn, McElheran, & Romney, 1992), as well as sensitivity to incomplete effort by individuals with a history of mild head injury (Ross, Millis, Krukowski, Putnam, & Adams, 2004).

### *Structure of the MMPI*

The MMPI contains 566 true or false statements and was designed to assess social-emotional functioning. This measure is completed by adolescents and adults and requires the individual to have a 6<sup>th</sup> grade reading level proficiency. Certain groups of statements in the MMPI are associated with specific scales of various types. Statements associated with specific scales yield T-scores, which are used to compare the response pattern of the individual to responses of individuals in the normative sample with and without various types of personality characteristics and types of psychopathology (Greene, 2000).

Interpretation of each individual T-score differs by scale; that is, where each score falls within a scale is associated with unique feelings, behaviors, and personality traits. In general, T-scores that fall within the range of 45 to 57 tend to be considered within normal limits for a clinical scale, and scales that fall significantly above or below that tend to have unique interpretations for that scale. In clinical practice, the individual scales are not interpreted individually. That is, if a scale associated with feelings with depression is elevated one does not necessarily immediately label the individual as “depressed” regarding the patient’s personality and social-emotional profile. Rather, the highest elevations are typically used to determine the individual’s “codetype,” which represents the individual’s an overall personality profile (Greene, 2000). A more detailed description of codetypes will be provided later in this chapter.

This study will utilize scores from two sets of scales, the Validity Scales and the Clinical Scales. These groups of scales are listed below:

**Scales of the MMPI**

*Validity Scales*

? (Cannot Say)

L (Lie)

F (Infrequency)

K (Correction)

*Clinical Scales*

1 (Hypochondriasis)

2 (Depression)

3 (Hysteria)

4 (Psychopathic Deviate)

5 (Masculinity-Femininity)

6 (Paranoia)

7 (Psychasthenia)

8 (Schizophrenia)

9 (Hypomania)

0 (Social Introversion)

*Validity Scales*

The Validity Scales provide the examiner with information about the examinee's response pattern, such as concerns with consistency, defensiveness, or other unusual patterns of responses. The Lie (L) scale is used to identify items that are unlikely to be answered in a favorable direction (Cloak & Kirklen, 1987); items on this scale are used to determine whether the individual answers in a manner that suggests the measure was completed honestly. The Infrequency (F) scale on the MMPI is used to identify the admission of experiencing unusual thoughts or experiences (Cloak & Kirklen, 1987). Items on this scale may suggest errors in scoring, unconventionality, or malingering (Cloak & Kirklen, 1987).

The Defensiveness (K) scale may indicate the minimization or exaggeration of problems (Cloak & Kirklen, 1987) and may indicate whether the individual answered in an open and honest manner. It should be noted that the validity scales are not infallible and may be interpreted with caution. For example, mentally healthy college students have been found to answer in a manner that suggests elevated K scores and low L and F scores (Duckworth & Anderson, 1986).

In addition, the L, F, and K scale scores are generally interpreted together if they form specific validity configurations (Greene, 2000). The F Scale may also be elevated in individuals with a history of brain injury (Wooten, 1983) or in individuals experiencing a high degree of psychological distress (Greene, 2000). The Cannot Say (?) scale refers to items omitted or left blank by the examinee because the examinee did not understand the question, felt he or she could not answer the question, or did not wish to complete the item (Greene, 2000).

*Clinical Scales*

The clinical scales consist of 10 scales pertaining to specific types of personality traits or impairments of social-emotional functioning. Some elevated Clinical Scales may be further investigated by evaluating the Subscale Scores pertaining to the Clinical Scales, which provide information about the various types of social-emotional impairments found within an individual clinical scale. It should also be noted that configurations of elevated scores may form “codetypes,” general profiles of personality characteristics and social-emotional difficulties. If a codetype is identified, the codetype may be interpreted rather than each scale individually (Greene, 2000).

Scale 1, also referred to as Hypochondriasis, tends to be elevated in individuals who are experiencing a wide variety of vague and nonspecific concerns about bodily functioning. Although the possibility of a medical disorder cannot be dismissed, individuals with high elevations in this scale typically have higher scores than individuals with legitimate, identifiable medical concerns. Individuals with high scores on this scale may attempt to use their vague physical symptoms to attempt to control or manipulate others. They typically complain of chronic fatigue, pain, and weakness (Graham, 1987). Individuals with high scores on this scale often tend to handle their anger by making others around them miserable (Friedman, Webb, & Lewak, 1989). Individuals with high scores in this scale are common in individuals with a history of brain injury (Wooten, 1983). Individuals with low scores on this scale tend to be optimistic, sensitive and insightful (Graham, 1987), which are common in individuals in helping professions and for children of hypochondriacal parents (Greene, 2000).

Elevations in Scale 2, also referred to as the Depression scale, may suggest feelings of depressed mood. Elevated scores within this scale may be further investigated via evaluation of the five Subscales within Scale 2. Elevations in this scale are among the most commonly identified in individuals with a history of brain injury (Warriner, Rourke, Velikonja, & Metham, 2003). Elevations in this scale are also common in individuals who have been previously diagnosed with posttraumatic stress disorder (Lyons & Wheeler-Cox, 1999). Scores on this scale may be somewhat susceptible to changes in current mood (Friedman, Webb, & Lewak, 1989). Low scores to normal scores for this scale suggest that the individual tends to be comfortable in social situations (Graham, 1987) and is alert, cheerful, and self-confident (Friedman, Webb, & Lewak, 1989).

High scores in Scale 3, or Hysteria, suggest a possible lack of insight in the behavior of others or one's own behavior. Such individuals typically deny any psychological problems, but specific physical manifestations of symptoms will generally appear when the individual is under distress, and the somatic symptoms tend to subside after the emotional distress subsides (Graham, 1987). They may often attempt to use complaints of illness as excuses to avoid responsibilities or escape undesirable situations (Friedman, Webb, & Lewak, 1989). Individuals with low scores on this scale may be caustic, sarcastic, or isolate themselves socially. They may also have a narrow range of personal interests and exhibit conventional and conforming patterns of social behavior (Graham, 1987).

Elevations on Scale 4, also termed Psychopathic Deviate, which refers to rebellious and antisocial personality features rather than general psychopathology, may

be rebellious against members of their family or authority figures. Such individuals are likely to be unreliable, egocentric, and irresponsible. They tend to frequently struggle with interpersonal conflicts and may have a history of legal problems or struggle with addictions (Graham, 1987). Elevations in this scale are also common in individuals with a history of brain injury (Warriner, Rourke, Velikonja, & Metham, 2003). Low scores on this scale tend to be passive and conventional (Friedman, Webb, & Lewak, 1989).

Scale 5, or Masculinity-Femininity, suggest the acceptance of individuals in society's traditionally assigned gender roles. Interpretation of males and females of these scales are separate and distinct. In general, individuals who score low on this scale closely identify with society's traditionally established gender roles, whereas individuals who score high on this scale tend to have interests and attitudes that run counter to society's traditional gender roles (Graham, 1987).

Elevations in Scale 6, or Paranoia, may be sensitive to criticism from others and may be skeptical of the intentions or behaviors of others. High elevations in this scale may also accompany psychotic thought (Graham, 1987), as identified by high scores in Scale 8. Psychotic symptoms are less common with moderate scores on this scale. Low scores on this scale tend to be conventional, trusting, and naive (Friedman, Webb, & Lewak, 1989).

Elevations in Scale 7, also referred to as Psychasthenia, may suggest anxiety, high tension, and indecisiveness and general psychological turmoil and discomfort (Graham, 1987). High elevations may suggest ruminations and obsessions or feelings of guilt. They may be highly self-critical and are often insecure or feel inadequate (Friedman, Webb, & Lewak, 1989). Individuals with low scores on this scale tend to be relaxed, self-confident,



comfortable, have a wide range of interests (Graham, 1987) and experience minimal emotional distress (Friedman, Webb, & Lewak, 1989).

Scale 8, also called the Schizophrenia Scale, refers to experiencing feelings of confusion or distorted thought. Elevations on this scale does not necessarily indicate psychosis or psychotic thought, although it may merit investigation of psychotic thoughts in high to extreme elevations on this scale. Individuals with extreme scores on this scale are typically not psychotic and may be experiencing high levels of acute distress, although they may also be experiencing a brief psychotic episode (Graham, 1987).

Elevation of Scale 8 may be suggestive of confusion and disorganized thought, such as in individuals experiencing high levels of distress. Elevation in this scale may also be due to strong feelings of confusion or difficulty thinking as a result of a brain injury (Wooten, 1983; Warriner, Rourke, Velikonja, & Metham, 2003). Individuals with low scores on this scale tend to be less intellectual, unimaginative, and more concrete in their thinking (Graham, 1987).

Elevations in Scale 9, or Hypomania, may be highly energetic, outgoing, and may have difficulties working, sleeping, or interacting with others due to their elevated mood. Very high scores may suggest a manic episode (Graham, 1987). Agitation, impatience, or frustration may be evident when conflicts or difficulties emerge. Elevations in this scale are also common in individuals with a history of brain injury (Wooten, 1983; Warriner, Rourke, Velikonja, & Metham, 2003). Low scores on this scale tend to suggest a lack of drive, low energy level, or apathy. Very low scores may suggest concerns with depression (Friedman, Webb, & Lewak, 1989).

Finally, elevations on Scale 0, or Social Introversion, may suggest the individual prefers to be alone or with small groups. Individuals with moderately high scores tend to have the ability to interact effectively with others but prefers to avoid large gatherings. Extreme examples tend to be highly introverted, shy, insecure, and may withdraw themselves socially. They may prefer being alone rather than with others (Friedman, Webb, & Lewak, 1989). Individuals with low scores may be extroverted and gregarious. They may tend to have difficulty with impulsive behavior and act out without considering the consequences for their behavior (Graham, 1987).

### *Codetypes*

As previously noted, the MMPI is interpreted by a combination of scores forming a "codetype" rather than separate interpretations of individual clinical scales. The highest elevated scales are used to determine the individual's codetype, which represents the individual's an overall personality profile. A two-point code type is a personality profile denoted by the two highest clinical scale elevations, such as a 4/8 codetype in which scales 4 and 8 were the highest elevations in a profile (Graham, 1987). A "well-defined codetype" consists of a codetype in which the two highest clinical scales are at least 5 T points above the remaining scales in the profile (Greene, 2000).

An example of a well-defined codetype would be a profile in which scales 6 and 8 are both significantly elevated and are 5 T points above the other scores in the profile. The codetype would therefore be analyzed as a 6/8 (or 8/6) codetype, (Greene, 2000). Codetypes that are not well-defined have three or more highest clinical scales within a range of 5 T points, (Greene, 2000). An example of a codetype that is not well defined would be a codetype in which scales 1, 2, and 3 are all significantly elevated and within a

range of 5 T points. Two-point well-defined codetypes are generally considered to provide the most accurate representation of a personality and social-emotional profile (Greene, 2000).

A variety of studies have utilized and analyzed MMPI codetypes. Lewandowski and Graham (1972) found that only 19 frequently occurring codetypes were able to account for 84% of the 588 individuals in their samples in a psychiatric setting, indicating that a relatively few number of codetypes can classify the majority of psychiatric patients. Winters, Weintraub, and Neale (1981) compared the diagnostic utility of MMPI codetypes in identifying disorders. They found that the MMPI codetypes were useful in identifying disorders according to the DSM-II classification of schizophrenia and depression but were not valid in identifying schizophrenia according to the DSM-III.

Studies evaluating MMPI codetypes have also focused on specific codetypes, disorders, or behavioral problems. For example, Persons and Marks (1971) found that inmates with a 4/3 codetype to be especially prone to acts of violence, even compared to individuals exhibiting a wide variety of other codetypes within this setting. Rader (1977) found 4/9, 4/8, and 4/3 codetypes to be the most prevalent in a sample of individuals with a history of violent crimes. Erickson, Luxenberg, Walbek, and Seely (1987) noted that a sample of sex offenders most frequently exhibited 4/5 and 4/8 profiles. Zuckerman, Sola, Masterson, and Angelone (1975) found that individuals with a history of substance abuse problems showed a 4/9 or 9/4 pattern, which are often used interchangeably and interpreted in a similar, although some exceptions have been noted regarding the higher elevated scale (Graham, 1987), and such differences are often noted in "cookbook" interpretive manuals. Sutker, Brantley, and Allain (1980) focused primarily on

individuals with a history of alcohol consumption and related driving offenses and found that the 2/4 codetype was particularly prominent. Similarly, studies utilizing MMPI codetypes to investigate emotional dysfunction and other concerns have been conducted.

### *The MMPI and Neuropsychology*

A great deal of research pertaining to neuropsychology has been carried out using the MMPI to assess symptoms commonly associated with brain injury. For example, researchers have attempted to use the MMPI to establish a “neurocorrection” or “head injury profile,” a profile representing brain-injured individuals’ social-emotional functioning (Gass & Wald, 1997). They hoped that such a profile could be used to identify individuals with brain injury. However, such techniques were criticized and ultimately found to be limited in effectiveness (Edwards et al., 2003), although LaChapelle and Alfano (2005) have continued to explore the development of a scales that are sensitive to neurological dysfunction. Other studies (Alfano, Finlayson, Stearns, & Nielson, 1990; Alfano, Finlayson, Alan, Sterns, MacLennan, 1991) utilized items from the MMPI to identify neurologic dysfunction and were able to utilize items of MMPI to correctly classify individuals with neurologic damage and related cognitive impairments, suggesting specific items and groups of items of the MMPI and MMPI-2 are indeed sensitive to neurological impairment.

Warriner, Rourke, Velikonja, and Metham (2003) found that averaging the scale scores of the MMPI of individuals with a history of traumatic brain injury (TBI) resulted in no significant average scale elevation, concluding that neuropsychological difficulties associated with TBI are too complex to detect with a single “head injury” profile. Warriner et al. (2003) subsequently used cluster analysis to compare the MMPI profiles

of individuals with a history of traumatic brain injury (TBI). Their study yielded six-cluster solution consisting of (1) individuals with no social-emotional complaints, (2) individuals with somatic and pain complaints, (3) individuals with mild internalizing difficulties, (4) individuals with marked disinhibition and externalizing behavioral problems individuals, (5) individuals with severe internalizing difficulties, and (6) individuals with marked somatic, internalizing, and externalizing difficulties. Their findings suggested that even within the areas of personality assessment and social-emotional functioning, a TBI can produce a wide variety of social-emotional differences, ranging from no significant social-emotional impairment to severe social-emotional impairment in a variety of ways.

Although certain scales on the MMPI have been found to be elevated more frequently in individuals with brain injury (Cullum & Bigler, 1988; Warriner et al., 2003), it is clear that the MMPI alone is not adequate in either identifying neuropsychological impairment or as a method of comprehensively studying the emotional effects of individuals with a history of brain injury. That is, to examine personality and social-emotional differences found in individuals with a history of brain injury, measures such as the MMPI must be used in conjunction with other measures used for neuropsychological functioning. Thus, researchers must rather attend to commonly identified elevations in difficulties or impairments in areas that are commonly noted as social-emotional functioning associated with brain injury rather than focus on a unique “brain injury” profile.

Studies have also focused on the identification of specific codetypes that occurred commonly with individuals with a history of brain injury. The two-scale elevations

selected for this study was selected from codetypes that have been identified in studies to occur frequently in samples of individuals with a history of brain injury. The following codetypes of the MMPI were found by Wooten (1983) to commonly be identified in individuals with a history of brain injury: 8/9, 1/2, 1/3, 4/9, 2/3, 2/8, 6/8, 2/4, 7/8, and 2/9. Gass and Lawhorn (1991) also found that the following two-point codetypes were most commonly identified in a sample of individuals who had suffered a stroke: 1/2, 1/3, 2/7, and 3/8. Similar combinations of clinically significant elevations of averages of scales were also identified more recently by Warriner et al. (2003) using the MMPI-2. The present study will focus on implications of commonly identified two-scale combination scores identified in neuropsychological evaluations and how they compare to information obtained in an emotional status exam. Two-scale combination scores used in this study were selected based upon the findings of commonly occurring codetypes in samples with a history of head injury by Wooten (1983) and Gass and Lawhorn (1991).

#### *Reliability and Validity of the MMPI and MMPI-2*

The MMPI has been found to be useful in diagnosing psychopathology (Meehl & Dahlstrom, 1960), although the most appropriate use of the measure is within the context of a complete and thorough evaluation that measures a broad range of areas of functioning. The MMPI, and the MMPI-2, have been the most widely used and researched objective measure of personality assessment. In the newer revision of the measure, 83.6% of items on the MMPI-2 were retained from the original MMPI (Levitt, 1990). Important changes were made in the most recent edition, including eliminating items with outdated content or items that may have been phrases that were deemed offensive or sexist and utilizing a more diverse normative and broadly representative

normative sample (Butcher, Graham, Dahlstrom, & Bowman, 1990). In general, studies have found that most of the items and special scales in the MMPI-2 remain intact from the MMPI (Levitt, 1990).

The MMPI and MMPI-2 have been found to be effective instruments to evaluate a wide variety of disorders and clinical concerns since the inception of the MMPI. For example, Hoyt and Sedlacek (1958) examined the ability of the MMPI to predict chronic alcohol abuse, noting that a scale developed during the study was able to correctly identify 75% to 80% of alcoholics and normals. Efforts to assess substance abuse in patients has been further refined over time into additional scales, such as the MAC-R, APS, and AAS scales utilized in the MMPI-2, all of which have been found to be effective screening tools used to predict substance abuse problems (Rouse, Butcher, & Miller, 1999).

Talbert et al. (1994) compared the ability of the MMPI to assess post-traumatic stress disorder. Forty-seven Vietnam veterans diagnosed with post-traumatic stress disorder (PTSD). Certain elevations of the clinical scales differed significantly between the MMPI-2 than MMPI, including as scales 1, 2, 4 5, 8, and 9. However, the results of both measures were very similar overall. The authors also noted that validity scales F and K differed significantly, whereas scale L did not differ significantly. Overall, the measures appeared to be comparable, although differences in certain scales should be noted. Guthrie and Mobley (1994) compared the MMPI, the Millon Clinical Multiaxial Inventory-II (MCMI-II) and the Personality Disorder Questionnaire-Revised regarding differential diagnostic efficiency. Each instrument was found to have clinical utility,

although the authors noted some of the psychometric limitations of the measures may pertain to problems with the DSM-III-R rather than the measures themselves.

Gross, Keyes, and Greene (2000) compared the ability to assess depression with the MMPI and MMPI-2 and found both measures to be moderately accurate in predicting feelings of depression. The study focused on the second scale, or D scale, in which elevations tend to suggest the presence of feelings of depression or behaviors associated with depression. The study also evaluated the DEP supplemental scale, which was not found to exceed the efficiency of the D clinical scale. In general, both versions of the MMPI were found to be similarly effective in predicting depression.

Regarding the validity of MMPI codetypes specifically, the MMPI and MMPI-2 were evaluated by Edwards, Morrison, and Weissman (1993), who determined that the concordance rate between elevated and well-defined codetypes between the measures was 72%. However, concordance rates of codetypes of the two measures declined with codetypes that were not well-defined or elevated. For elevated codetypes, the concordance rate was 58%. Thus, the precision at which one can compare codetypes depends largely on how closely the profile meets the criteria of the given codetype.

Test-retest reliability of codetypes has been found to only be moderate (Graham, Smith, & Schwartz, 1986), which may reflect changes in the emotional state or treatment in individuals over time. However, certain specific codetypes have been found to be quite stable over time, as studies have shown that codetypes such as 2/4, 2/7, and 6/8 remained similar over decades (Pancoast & Archer, 1989; Greene, 1990), suggesting that stability may vary by individual codetype. The original and revised MMPI were also found to



have found to yield similar profiles (Ben-Porath & Butcher, 1989; Harrell, Honaker, Parnell, 1992; Edwards, Morrison, & Weissman, 1993; Staal & Greene, 1998).

### *Criticisms of the MMPI*

Despite being widely respected as the “gold standard” to which other objective social-emotional measures are typically compared (Kendall & Norton-Ford, 1982), a variety of criticisms of the MMPI exist. First, the measure consists of 566 items and is very time intensive compared to many other forms of personality and social-emotional assessment. Thus, the MMPI may be very taxing for individuals with difficulties with inattention and distractibility, a common symptom identified in neuropsychological evaluations. Thus, a cognitive or verbal deficit could impact performance on this measure (Chelune, Heaton, Lehman, & Robinson, 1979).

Many individuals seeking a neuropsychological evaluation also have medical injuries or significant social-emotional disturbance (Gasonique, 1997; Mamelak, 2000). Therefore, the process of completing the MMPI may be an unpleasant experience for the individual, particularly those with an impairment of attention or with a medical condition or depressed mood who may as a result have low motivation and energy levels. Clinicians may also need to be wary of influences and interactions with additional presenting concerns, which include chronic pain (Love & Peck, 1987), cognitive impairments and head injuries (Landre, Poppe, Davis, Schmaus, & Hobbs, 2006), or other conditions that could influence test performance.

The measure may also be viewed as having an adverse effect on practitioner-examinee rapport, as the completion of the lengthy form of ambiguous questions is rarely viewed as a pleasant experience. The ambiguous nature and often peculiar content of the

statements also may pose a challenge for the examinees or provide questionable contributions (Duff, 1965; Koss & Butcher, 1973) and the patient may not be highly motivated to complete the items with maximal effort and honesty (Ross, Millis, Krukowski, Putnam, & Adams, 2004), although the validity scales and other scales help minimize the impact of such problems (Greene, 2000; Ross, et al., 2004).

Also, one cannot simply diagnose a problem or disorder with the scores or codetype alone. That is, one needs to carefully administer and interpret within the means and intentions of the measure. Dahlstrom (1992) and Tellegen and Ben-Porath (1993) called for further examination of code patterns and a greater reliance on utilizing homogeneous codetypes. In addition, it is possible that individuals with severe disturbances or personality disorder could produce a profile that is within normal limits. Tellegen and Ben Porath (1993) also suggested that the investigation of additional alternative predictive models may be useful. Another concern by clinicians is that the MMPI is derived statistically rather than a theoretical orientation (Helmes & Reddon, 1993), which may be viewed as undesirable by clinicians who follow a specific theoretical model. Despite the wealth of research that has already been conducted over the course of the past six decades, studies designed to address the aforementioned problems and continue to improve this measure is ongoing.

### Rationale for Study

This study will be to further evaluate the factor structure of the D-WESE and examine ability of the Dean-Woodcock Emotional Status Exam and its ability to predict personality and social-emotional functioning represented by researched two-point MMPI codetypes.

CHAPTER III  
METHODOLOGY

Participants

The participants were 207 patients were administered a neuropsychological assessment. The patients (82 male and 125 females) ranged from 13 to 96 years of age ( $M = 56.53$ ;  $SD = 21.04$ ). Seven patients were removed from the sample because validity scores were grossly elevated and exceeded criteria utilized for inclusion in the study ( $F < 100$ ;  $L < 80$ ;  $K < 80$ ). All patients were randomly chosen from referrals assessed at Midwest Neurology Institute, a large neurology practice located in the Midwestern United States. The participants in this study were randomly chosen and varied in diagnoses and level of impairment.

All patients were administered the Dean-Woodcock Neurological Assessment System by a licensed psychologist and a technician supervised by a licensed psychologist. All patients gave approval for use of assessment data gathered from evaluations.

Procedure

An emotional status exam, assessments of neuropsychological functioning, social-emotional functioning, and cognitive ability were administered during each evaluation. In order to maintain patient confidentiality, identifying information of patients was replaced

with identification numbers. No identifying information of patients was included in this study.

*Dean-Woodcock Emotional Status Exam (D-WESE)*

All participants were evaluated using the D-WESE, a structured measure used to assess examine social, behavioral, and emotional functioning. The D-WESE was developed in 1994 and later revised 1998 to include items used to inquire about executive functioning and insure that all items corresponded with criteria from criteria of the DSM IV (Dean, 1998). The D-WESE was administered by a technician. Interrater reliability for this measure has been found to be high (Woodward, Ridenour, Dean, & Woodcock, 2002). The D-WESE consists of 50 items written in common language that is easily understood by individuals from a broad range of educational backgrounds. The items may be posed to the patient or to an informant. However, no informants were used and only the English version was utilized in this study. The items on this structured interview are used to identify and assess the severity of a wide variety of psychiatric signs or symptoms. The patient was asked about the severity of the difficulty or impairment based on a 1 to 10 scale, with 1 being the least severe and 10 being the most severe.

*The Minnesota Multiphasic Personality Inventory (MMPI)*

The MMPI was developed in 1940 by Hathaway and McKinley. The measure is a 566-item “true or false” inventory initially designed to assess emotional dysfunction. The MMPI was used because of its considerable background and wealth of empirical support. MMPI data utilized in this study were consisted of two-scale combinations representative of codetypes derived from the Clinical Scales of the MMPI. Codetypes have a long history and wealth of empirical support. The 10 Clinical Scales of the MMPI were

designed to identify specific types or symptoms of emotional dysfunction, (e.g., symptoms of depression, anxiety, or confusion). In clinical practice scales are often combined and are referred to as “codetypes,” which has been shown to improve diagnosis (Meehl, 1956). Thus, the individual’s overall profile rather than individual scales are interpreted. Two-point combinations of t-scores representing codetypes found to commonly occur in neurological samples were used in this study to provide a more accurate reflection of an emotional profile used to interpret the results of this measure.

### Design

Previously, Galloway-Sharp (2004) offered a factor structure of the Dean-Woodcock Emotional Status Exam. The analysis identified an 11-factor model. However, the theoretical model utilized to actually formulate the items in the measure has not been analyzed or compared to other models. The theoretical model used by the author of the D-WESE to create the 50-items of the measure was classified into 10 domains and are presented in the following chart.

Table 1  
*Theoretical Classification of the D-WESE*

Items of Emotional Status	Mood Symptoms	Anxiety Symptoms	Cognitive Functions	Psychotic Symptoms	Somatic Symptoms	Executive Planning	Attention Vigilance	Behavior Control	Asocial Behavior	Personality Features
1 Present Depression	X									
2 Depression for 2 Weeks	X									
3 Suicidal Thoughts	X									
4 Hyper/Motor Behavior	X	X						X		
5 Euphoric Feelings	X							X		
6 Low Energy	X				X					
7 Change in Appetite/ Weight	X				X					
8 Sleep Disturbance	X	X			X					
9 Self-Deprecatory Thoughts	X									X
10 Distractibility	X		X				X			

11 Inattention	X		X			X	X			
12 Impulsivity			X			X	X	X		
13 Poor Concentration	X		X				X			
14 Confusion			X	X		X	X			
15 Obsessive Thoughts		X								
16 Antisocial Behaviors									X	X
17 Compulsive Behavior		X								
18 Fears/Phobias		X								
19 Free Floating Anxiety		X								
20 Racing Thoughts		X								
21 Panic Attacks		X								
22 Anxiety /Nervousness		X								
23 Memory Impairment			X							
24 Gastrointestinal Problems					X					
25 Anger								X		
26 Homicidal Thoughts									X	
27 Somatic Concerns					X					X
28 Recent Headaches					X					
29 Aggressive Behavior								X	X	
30 Problems with the Law									X	
31 Alcohol Use									X	
32 Drug Use									X	
33 Tobacco Use									X	
34 Sexual Problems					X					
35 Personality Changes										X
36 Introversion/ Shy										X
37 Paranoid Thoughts				X						X
38 Delusional Thinking				X						
39 Hallucinations				X						
40 Depersonalization				X						
41 Ideas of Reference				X						
42 Abuse History										X
43 Running Away									X	
44 Oppositional Defiant								X	X	
45 Decision Making	X		X							
46 Planning Ability			X			X				
47 Confabulation						X				
48 Affect Response						X				

49 Disinhibition	X					X		X	X	
50 Utilizing Feedback			X			X				

In the present study, exploratory factor analysis was utilized to compare the theoretical constructs used to formulate the items of the D-WESE (Table 1) and compared how the items are categorized in each model. The results were used to identify which domains were accurately categorized by the corresponding original table of theoretical classification.

In addition, Likert-type ratings of severity for individual items from the D-WESE were used to predict elevations of two-scale codetype combinations of the MMPI, which denote the emotional profile of a patient in clinical practice used to identify personality traits and emotional dysfunction. The twelve two-scale combination scores were derived from the Clinical Scales of the MMPI.

Table 2

*Descriptive Statistics of MMPI Scales*

MMPI Scales	Mean	Standard Deviation
1	72.2	14.8
2	72.3	14.0
3	68.2	11.9
4	63.1	12.4
5	55.5	11.1
6	61.1	11.9
7	67.2	13.7
8	69.7	16.0

9	55.6	12.2
0	61.3	8.5

Each codetype combination score was comprised of the two clinical scale scores of the codetype combined into single numerical scores, an average of the two Clinical Scale t-scores corresponding to the 12 codetypes included in the study. Two-scale combination criteria implemented in this study were more lenient in requirements than those outlined by Greene (2000) for “well-defined” MMPI codetypes due to the limitation of sample size in the data set. Scores of t-scores from two MMPI Clinical Scales were converted into a single score representing 12 codetypes.

The present study utilized the following 12 two-point combinations: 1/2, 1/3, 2/3, 2/4, 2/7, 2/8, 2/9, 3/8, 4/9, 6/8, 7/8, and 8/9, which were identified in studies by Wooten (1983) and Gass and Lawhorn (1991) to be among the most commonly occurring two-point codetypes in individuals with a history of brain injury.

Table 3

*Descriptive Statistics of MMPI Codetype Combination Scores*

Codetype Combinations	Mean	Standard Deviation
1/2	71.3	12.8
1/3	69.2	12.8
2/3	70.2	11.4
2/4	67.7	11.3
2/7	69.7	13.0



2/8	71.0	13.7
2/9	64.0	9.8
3/8	69.0	11.9
4/9	54.9	10.0
6/8	65.4	12.7
7/8	68.4	14.2
8/9	62.7	12.2

The focus of this study was to examine the information obtained in the D-WESE and evaluate the association of this information with commonly identified two-scale combination average scores from neuropsychological samples.

## CHAPTER IV

### RESULTS

This study focused upon the validity of the D-WESE. The theoretical constructs from the D-WESE were compared to the factors derived from the D-WESE structured interview. Using a predictive approach, the items of the measure were regressed upon using MMPI codetype combinations for a neurological sample. First, results from an exploratory factor analysis of the D-WESE was used to evaluate the model to the original 10-category theoretical model, which was used to develop scales of the D-WESE of disorders from the DSM-IV. Previously, Galloway-Sharp (2004) utilized an exploratory factor analysis to develop an 11-factor model representing constructs of the D-WESE. However, the subscales of the D-WESE were not considered in previous studies. Further investigation of the factor structure of the D-WESE was thought to provide additional insights into the clinical utility of the D-WESE, as well as suggests possible revisions and refinements that may be made to the measure in the future.

The study also analyzed the individual items of this measure in predicting representations of two-point MMPI codetypes, scores derived from two-scale average scores from the t-scores of the Clinical Scales found to commonly occur in neurological samples. These analyses demonstrate the ability of the items of the measure to best predict representations of 12 commonly occurring codetypes in neurological patients and

denotes the contribution of individual items in prediction of symptoms found in MMPI codetypes.

### Exploratory Factor Analysis

An exploratory factor analysis utilizing principal axis factoring and an oblique, promax rotation yielded an 11-factor model with eigenvalues greater than 1.0. The 11-factor model accounted for 67% of the total variance, with individual factors each ranging in from 25% to 2% (Table 4).

The minimum number of subjects recommended by Hutcheson and Sonfroni (1999; 150 subjects) and by Guilford (1954; 200 subjects) was met. However, higher minimum numbers have been suggested, such as Cattell (1978; 250 subjects), suggesting the results should be interpreted with some caution due to potential error and size of the data set. Similarly, the minimum criterion of subjects-to-variables ratio suggested by Kline (1979; 2-to-1 ratio) was met, although others have suggested a higher minimum subject-to-variable ratio may be preferable (Gorsuch, 1983).

Table 4

*Eigenvalues of Exploratory Factor Analysis of the D-WESE*

Factor	Initial Eigenvalues			Extraction Sums of Squared			Extraction SoS	Rotation SoS
	Total	% of Var.	Cumulative %	Total	% of Var.	Cumulative %	Total	
1	12.037	24.566	24.566	11.678	23.833	23.833	8.668	
2	5.387	10.994	35.560	4.998	10.200	34.033	8.427	
3	3.272	6.678	42.238	2.891	5.901	39.933	4.925	
4	2.411	4.921	47.159	2.011	4.104	44.037	5.017	
5	1.956	3.993	51.151	1.527	3.116	47.153	3.441	
6	1.734	3.539	54.690	1.321	2.695	49.848	8.267	
7	1.512	3.086	57.777	1.029	2.099	51.948	4.843	
8	1.331	2.715	60.492	.894	1.824	53.772	5.274	
9	1.263	2.577	63.096	.751	1.532	55.304	1.838	
10	1.087	2.218	65.287	.627	1.279	56.582	2.439	
11	1.052	2.147	67.434	.567	1.158	57.740	2.152	

Item 26, used to assess Present Homicidal Thoughts, was not endorsed and thus was excluded from the data analyses in this study. Items 14, 23, and 47, representing Confusion, Memory Impairment, and Confabulation, did not load significantly on any factor. A single item, question 29, representing Aggressive Behavior, loaded on two factors, factors 1 and 7. All other items were found to load significantly on a single



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Anxiety/Nervousness	.547	
Compulsive Behavior	.533	
Alcohol Use	.887	
Tobacco Use	.790	
Problems with Law	.765	
Antisocial Behavior	.654	
Aggressive Behavior	.645	.396
Drug Use	.629	
Anger	.489	
Suicidal Thoughts	.743	
Present Depression	.701	
History Depression	.597	
Introversion/Shyness	.535	
Self-Deprecatory	.418	
Somatic	.865	
28Recent Headaches	.850	
Gastrointestinal	.816	
Inattention	.893	
Impulsivity	.744	
Distractibility	.663	
Poor Concentration	.531	
Periods of Euphoria	.626	

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Ideas of Reference	.622	
Hallucinations	.434	
History of Abuse	.595	
Depersonalization	.577	
Sexual Problems	.413	
Low Energy Level		-.636
Hyperactive Behavior		.440
Sleep Disturbance		.764
Appetite or Weight		.399
Oppositional-Defiant		.477
Running Away		.469

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Factor loadings were compared to the theoretical constructs utilized to develop the individual items of the D-WESE. The results are outlined in Table 6, which provides an illustration of the factors classified by the exploratory factor analysis and theoretically hypothesized classifications.

Table 6

*Theoretical and Statistical Classification of Items of the D-WESE*

Factor	Factor Name	Item Number	Item Construct	Theoretical Category
1	Intellectual/ Executive Functioning	46	Planning Ability	Cog. Funct./ Exec. Planning

		45	Decision-Making	Mood/Cog. Funct./ Personality Feat.
		37	Paranoid Thoughts	Psychotic Sympt./ Personality Feat.
		48	Affect Response	Executive Planning
		35	Recent Personality Changes	Personality Features
		50	Utilizing Feedback	Cog. Funct./ Executive Planning
		38	Delusional Thoughts	Psychotic Symptoms
		49	Disinhibition	Mood/ Exec. Planning
2	Anxiety Symptoms	15	Obsessive Thoughts	Anxiety
		18	Fears/ Phobias	Anxiety
		21	Panic/ Anxiety Attacks	Anxiety
		19	Free Floating Anxiety	Anxiety
		20	Racing Thoughts	Anxiety
		22	Anxiety/ Nervousness	Anxiety
		17	Compulsive Behavior	Anxiety
3	Asocial Behaviors	31	Alcohol Use	Asocial
		33	Tobacco Use	Asocial
		30	Problems with the Law	Asocial



		16	Antisocial Behavior	Asocial/Personality
		29	Aggressive Behavior	Beh. Control/ Asocial
		32	Drug Use	Asocial
		25	Anger	Behavioral Control
4	Depressive Features	3	Present Suicidal Thoughts	Mood
		1	Present Depression	Mood
		2	History of Depression	Mood
		36	Introversion/Shyness	Personality
		9	Self-Deprecatory Thoughts	Mood/ Personality
5	Somatic Symptoms	27	Somatic Concerns	Somatic/ Personality
		28	Recent Headaches	Somatic/ Personality
		24	Gastrointestinal Problems	Somatic
6	Inattention	11	Inattention	Mood/ Cognitive Funct./ Exec. Planning/ Atten. Vigilance
		12	Impulsivity	Cog. Funct./ Exec. Planning/ Atten. Vigilance
		10	Distractibility	Mood/ Cognitive

				Funct./ Exec. Planning/ Atten. Vigilance
		13	Poor Concentration	Mood/ Cognitive Funct./ Atten. Vigilance
7	Unstable Mood/ Psychotic Symptoms	5	Euphoric Feelings	Mood/ Beh. Control
		41	Ideas of Reference	Psychotic Symptoms
		39	Hallucinations	Psychotic Symptoms
		29	Aggressive Behaviors	Beh. Control/ Asocial
8	Posttraumatic Symptoms	42	History of Abuse	Personality
		40	Depersonalization	Psychotic
		34	Sexual Problems	Somatic
9	Energy Level	6	Low Energy	Mood/ Somatic
		4	Hypermotor Behavior	Mood/ Anxiety/ Beh. Control
10	Appetite/ Sleep	8	Recent Sleep Disturbance	Mood/ Anxiety/ Somatic
		7	Change in Appetite or Weight	Mood/ Somatic

11	Rebelliousness	44	Oppositional Defiant	Beh. Control/ Asocial
		43	Running Away	Asocial

Regression Analyses

Twelve regression analyses (Appendix C) were conducted to predict representations of MMPI codetypes commonly identified in neurological samples. The data suggested that the items of the D-WESE were generally effective in predicting two-scale averages representing MMPI codetypes frequently identified in neurological samples. Glantz and Slinker (1990) defined adjusted R-squared values below 25% to be “poor,” values between 25% to 50% as “fair,” values between 50% to 75% as “good,” and values of 75% and above as very good. In general, the D-WESE predicted most two-scale combination MMPI averages within the “good” range, ranging from 59% to 75%. Items 10, 11, 12, and 46 were also noted to exhibit concerns with collinearity (O’Brien, 2007). Concerns with normality of 1/3 and 2/3 were also noted.

Table 7

*Prediction of Two-Point Codetype Combinations of the MMPI by the D-WESE*

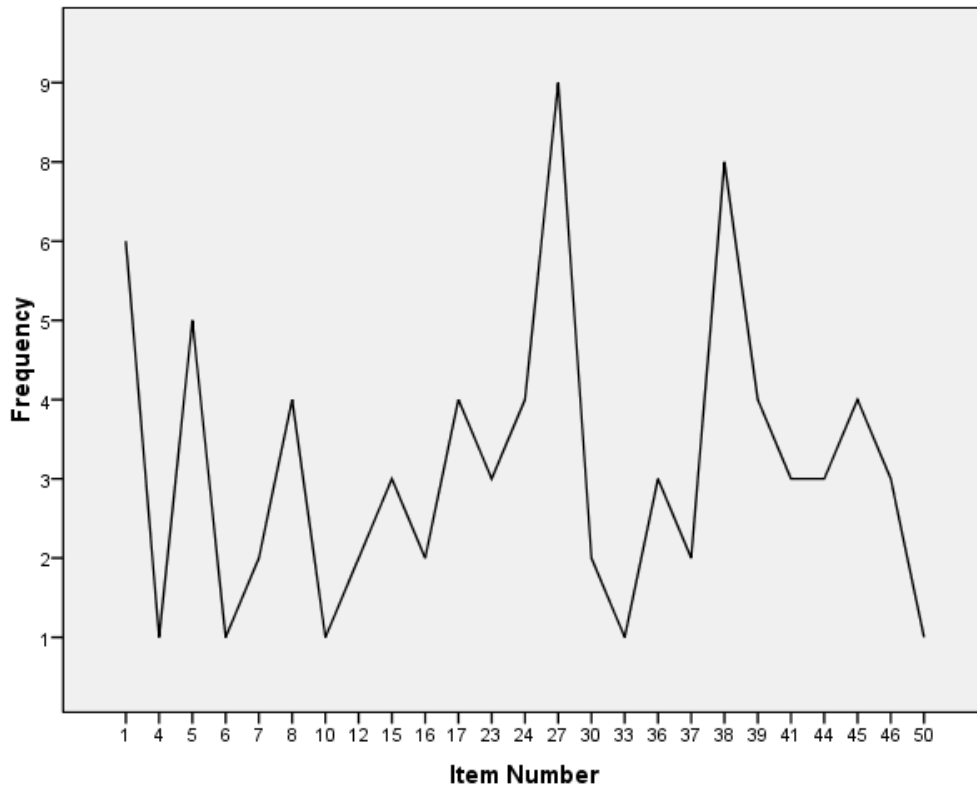
Two-Point Codetype Combinations	Codetype Features (Duckworth & Anderson, 1995)	Adjusted R <sup>2</sup>	Significantly Contributing Items
1/2	Somatic preoccupation, depressed mood, worrying, immature and dependent	.667	1, 27, 38, 46
1/3	Conversion of emotional distress, pessimistic, somatic preoccupation, limited insight, rigidity, confusion	.602	27, 38, 46, 50

2/3	Overcontrolled, lack of motivation, depressed mood, low energy/ activity, poor relationships, socially isolated, disorganized	.647	1, 27, 46
2/4	Anger, depression, behavioral problems, poor under pressure, depression and suicidal ideation, argumentative, susceptible to substance abuse, impulsive, feelings of guilt	.730	1, 6, 7, 10, 15, 16, 23, 24, 27, 30, 39, 44
2/7	Anxious, depressed, feelings of worthlessness and hopelessness, lack confidence, somatic complaints, history of success in field, agitation, perfectionistic/ unrealistic, passive	.728	1, 23, 27, 39, 44
2/8	Depressed, anxious, somatic symptoms, feelings of worthlessness, agitation, inefficient, avoids of close relationships, disruptive thoughts	.750	1, 5, 24, 27, 37, 38, 39, 44, 45
2/9	Agitation, depression, euphoria and high energy, feelings of inadequacy and worthlessness, grandiosity, alcohol abuse/ dependence, aggressive	.639	1, 5, 12, 36, 38
3/8	Confused, depressed, delusional thinking, somatic concerns, difficulty with decision making, psychotic symptoms, apathetic, immature, dependent	.675	17, 27, 38, 41, 45
4/9	Angry/ irritable, sensation seeking, aggressive, history of violence or legal problems, charismatic, high energy, egocentric, manipulative, history of substance abuse	.590	4, 5, 7, 8, 12, 16, 30, 36, 41
6/8	Feelings of inferiority and insecurity, unstable relationships, frequent complaints, angry, hostile, history of psychotic symptoms and paranoia, disordered thinking, rumination, history of drug abuse	.681	8, 15, 17, 24, 27, 37, 38, 39, 41, 45
7/8	Introverted, worrying, turbulence, feelings of inadequacy, indecisiveness, confusion, unusual speech patterns, psychotic symptoms, introversion, history of substance abuse	.735	5, 8, 15, 17, 23, 24, 27, 33, 38, 44, 45
8/9	Confusion, anxious, emotionally unstable, hyperactive, lack of achievement, hostility, psychotic symptoms, paranoia, rapid speech, history of drug abuse/ dependence	.676	5, 8, 17, 36, 38

Twenty-five of the items were found to be significant predictors of the 12 codetype combinations included in this study. Some of the items were found to reach significance in predicting multiple codetype combinations, including item 27 reaching significance nine times and item 38 reaching significance eight times. Other items were only found to be significant in predicting a single codetype combination, including items 4, 6, 10, 33, and 50. The frequency of items reaching statistical significance in the prediction of two-point codetypes was displayed in Table 8.

Table 8

*Frequency of Two-Point Codetype Combinations Predicted by D-WESE*



Item ratings of the D-WESE used to predict two-scale average scores representative of the 1/2 MMPI codetype combination accounted for approximately 67%

of the variance ( $\text{Adj. } R^2 = .667$ ). Items 1, 27, 38, and 46 were found to account for the most significant contributions to the model, although concerns with collinearity for item 46 were noted. Item ratings of the D-WESE used to predict two-scale averages representing the 1/3 codetype accounted for 60% of the variance ( $\text{Adj. } R^2 = .602$ ). Items 27, 38, 46, and 50 were found to provide the strongest contributions to the model, which was unsurprisingly similar to items associated with the 1/2 codetype combination score, as they both share scores from Scale 1 of the MMPI Clinical Scales.

Items found to predict two-scale averages representing MMPI codetype 2/3 accounted for 65% of the variance ( $\text{Adj. } R^2 = .647$ ) despite yielding significance on only three items, 1, 27, and 46. Items found to predict two-scale averages representative of codetype 2/4 accounted for 73% of the variance ( $\text{Adj. } R^2 = .730$ ), demonstrating a strong association with items of the D-WESE and averages of the 2 and 4 scales. Items 1, 6, 7, 10, 15, 16, 23, 24, 27, 30, 39, and 44 were all found to contribute significantly to the model.

Items from the D-WESE used to predict two-point averages representing codetype 2/7 accounted for 73% of the variance ( $\text{Adj. } R^2 = .728$ ). Items 1, 23, 27, 39, and 44 were found to provide significant contributions to the model. Item ratings from the D-WESE used to predict two-point representations of codetype 2/8 accounted for 75% of the variance ( $\text{Adj. } R^2 = .750$ ). Items 1, 5, 24, 27, 37, 38, 39, 44, and 45 were found to provide significant contributions to the model.

Items ratings utilized to predict two-point representations of the 2/9 codetype accounted for 64% of the variance ( $\text{Adj. } R^2 = .639$ ). Items 1, 5, 12, 36, and 38 were found to provide significant contributions to the model. D-WESE item ratings used to predict

two-point representations of the 3/8 codetype accounted for 68% of the variance ( $\text{Adj. } R^2 = .675$ ). Items 17, 27, 38, 41, and 45 were noted to contribute significantly to the model. These items suggested symptoms of repetitive behaviors, somatic concerns, thought disturbance, ideas of reference, and difficulty with decision-making.

Items ratings used to predict two-point representations of the 4/9 codetype accounted for 59% of the variance ( $\text{Adj. } R^2 = .590$ ). Items contributed significantly 4, 5, 7, 8, 12, 16, 30, 36, and 41. D-WESE items ratings used to predict two-point representations of the 6/8 codetype accounted for 68% of the variance ( $\text{Adj. } R^2 = .681$ ). Items 8, 15, 17, 24, 27, 37, 38, 39, 41, and 45 were found to contribute to the model significantly. Item ratings from the D-WESE used to predict two-point representations of codetype 7/8 accounted for 74% of the variance ( $\text{Adj. } R^2 = .735$ ). Items 5, 8, 15, 17, 23, 24, 27, 33, 38, 44, and 45 were noted to contribute significantly to the model. Item ratings of the D-WESE used to predict two-scale average scores representative of the 8/9 MMPI codetype accounted for approximately 68% of the variance ( $\text{Adj. } R^2 = .676$ ). Items 5, 8, 17, 36, and 38 were found to account for the most significant contributions to the model.

## CHAPTER V

### DISCUSSION

A major objective of this study was to consider the construct validity of the D-WESE. To this end, the factor structure of the D-WESE structured interview derived in a previous study by Sharp-Galloway (2004) was compared to the original theoretical model used to develop the D-WESE. Exploratory factor analysis suggested that the theoretical model offered for the D-WESE was generally effective in classifying clinical diagnostic groups, although the factor structure suggested certain domains may benefit from revision. Indeed, as recent research suggests the overlap or comorbidity for many disorders is greater than previously thought. The study also examined the ability to predict representations of two-point MMPI codetypes, which may be beneficial regarding clinical practice as a screening tool and provide additional structure and organization to the interview process. The regression analyses indicated moderate to strong power in predicting two-scale representations of commonly occurring MMPI profiles. The implications of the results, limitations of the study, and suggested areas of focus for future studies are discussed in this chapter.

#### Factor Structure

Overall, the theoretical model was found to be effective in categorizing items by constructs of psychopathology. Items used to assess anxiety, depressed mood, somatic



symptoms, and inattention and distractibility were found to load “cleanly” on well-defined factors. Only loadings of .4 and above were considered to be large enough to be included in the factor.

Factor 1, which represented items eight items associated primarily with cognitive functioning and executive planning, also contained three items from other theoretical constructs, including psychotic symptoms, mood symptoms, and personality features. Although some constructs such as Affect Response and Disinhibition may be implicated in a variety of DSM disorders, items in Factor 1 did not appear to be as well-defined the majority of other factors in the model, especially compared to well-defined as other factors in the model found to be associated with anxiety, depressed mood, asocial behavior, or somatic symptoms. Thus, items loading significantly on Factor 1 may require revision in future editions of the D-WESE in order to better assess individual symptoms and more accurately assess and categorize constructs in various classifications of psychopathology. Future revisions of the D-WESE may need to include items that more clearly differentiate executive functioning and cognitive functioning from psychotic, mood, and personality dysfunction. However, items included in Factor 1 did account for a substantial component of the total variance and may provide strong clinical utility individually for symptoms commonly associated with neurological impairment, such as difficulties with inattention and disordered thinking.

All seven items in Factor 2 were found to be associated with the theoretical classification of Anxiety Symptoms. Factor 2 was among the most well-defined factors in the model. No other theoretical constructs were found to be associated with the items in Factor 2, suggesting that these items are quite strong at predicting symptoms and features

of anxiety specifically. It should be noted that the two items in the theoretical model that did not yield significant loadings for Factor 2, items used to assess hyperactive motor behavior and recent sleep disturbance, were both hypothesized to be associated with multiple constructs, whereas the seven items included in Factor 2 were hypothesized to be associated with only Anxiety Symptoms. It is also important to note that symptoms of anxiety may be identified in a wide variety of other types of disorders or conditions. The results suggest that the D-WESE is quite effective in distinguishing symptoms of anxiety from other types of psychopathology, which has been found to be challenging in assessment given the high frequency of comorbidity and overlap of symptoms with other types of psychiatric disorders.

Factor 3 identified classified seven items that were hypothesized to be associated with Asocial Behavior and difficulties with Behavioral Control. These items were associated with constructs such as substance abuse, legal problems, difficulty controlling anger, and antisocial and aggressive behaviors. The classification of these items suggested that the theoretical constructs of Behavioral Control and Asocial Behavior may represent the same underlying factor. Asocial Behavior is of particular concern regarding patients with a history of legal or behavioral difficulties or recent change in personality following a head injury. Identification of such concerns may strongly suggest additional assessment of personality and antisocial attitudes with measures such as the MMPI may be merited.

Factor 4 was found to consist of five items associated with the theoretical constructs Mood Symptoms and Personality Features. The factor analysis suggested that there may be a distinction between items used to assess depressed mood and other

symptoms of mood dysfunction, such as Euphoric Feelings and Aggressive Behaviors, which loaded significantly within Factor 7. When items in Factor 4 were viewed as constructs associated specifically with the assessment of depressive features, Factor 4 was quite well-defined.

Factor 5 was classified three items associated with Somatic Symptoms. Similar to the pattern of classification of Factor 2, the majority of items hypothesized to be associated with only with Somatic Symptoms were loaded on Factor 5, whereas most of the items hypothesized to be associated with multiple constructs were found to be more closely associated with other factors (items associated with low energy level, recent change in appetite or weight, recent sleep disturbance, and sexual problems). Although only three items loaded on this factor, this factor was generally well-defined. However, clinicians may wish to use caution in the assessment of somatic symptoms with patients referred for a neuropsychological evaluation, as individuals in this population will often have a history of medical problems and physical injuries.

Factor 6 classified four items hypothesized to be associated with the constructs Attention/Vigilance, Executive Planning, and Cognitive Functioning. Items associated with distractibility, inattention, and poor concentration were also associated with the theoretical construct of Mood Symptoms. The items within this factor were all common symptoms or difficulties with inattention and executive dysfunction. However, clear classification of these items into disparate constructs is complicated considerably by the fact that the constructs represented are often present in a wide variety of DSM diagnoses and forms of psychopathology, including executive dysfunction associated with neurological impairment, which is likely to be quite prevalent in the data set utilized in

this study. In addition, items within this factor were theoretically classified with many of the items to load in Factor 1 rather than Factor 6. Mental health clinicians working with individuals with a history of neurological injury or illness may find items within this factor to be particularly useful clinically, as symptoms of inattention and distractibility are present in most patients with a history of brain injury. The theoretical and statistical classification of these items in Factors 1 and 6 suggest that the D-WESE is quite sensitive to executive dysfunction and difficulties with inattention and distractibility.

Items in Factor 7 included four items used to assess constructs associated with unstable mood and psychotic symptoms (i.e., items that assessed aggression, euphoria, ideas of reference, and hallucinations). Items associated with periods of euphoria and aggressive behavior were also hypothesized to be associated with the domain Behavioral Control. Items within Factor 8, items associated with sexual problems, depersonalization, and history of abuse, were not consistent with their theoretical classifications, which included Somatic Symptoms, Psychotic Symptoms, and Personality Features. In general, these items were noted to be common symptoms of posttraumatic stress, although these symptoms may also appear in other forms of psychopathology.

Factor 9 consisted of two items hypothesized to be associated with multiple constructs, including Mood Symptoms, Somatic Symptoms, and Behavioral Control. Overall, the items suggested a general theme of disruption of energy level, which may be present in individuals struggling with mood dysfunction, medical conditions, complications with medication, and other forms of psychopathology. It was noted that item 6, Low Energy Level, demonstrated a negative loading, which was inversely related in content to item 4, Hyperactive Motor Behavior.

Items in Factor 10 were hypothesized to be associated with Mood Symptoms, Anxiety Symptoms, and Somatic Symptoms. Both items were associated with multiple constructs, and as in Factor 9, the symptoms included within this factor are commonly associated with a wide variety of medical and mental health conditions. Finally, Factor 11 included two items associated with running away and oppositional-defiant behavior, which were hypothesized to be associated with Asocial Behavior. Item 44, used to assess oppositional-defiant behavior, was also hypothesized to be associated with Behavioral Control.

Overall, the exploratory factor analysis demonstrated a strong support for the D-WESE and those from the theoretical model outlined in Table 1, particularly regarding Factors 2, 3, 4, 5, and 6. Factor 1 represented 25% of the variance of the model and may represent more than one domain of social-emotional functioning that is not separated by the current items contained within this factor. Factors 7 through 11 each accounted for 2% to 3% of the variance and were not as well-formed factors, although they tended to demonstrate identifiable themes of psychopathology and emotional dysfunction. Items associated with confusion, memory impairment, and confabulation were not classified into any factor. Item 26, representing Homicidal Ideation, was excluded from the analysis due to lack of endorsement or acknowledgment by patients, which was unsurprising given the severe implications of this concern in clinical practice.

Overall, the comparison of statistical and theoretical classification indicated that the D-WESE is surprisingly effective in identifying symptoms of psychopathology given the brevity of the measure. The results provide insights regarding the way items classify various forms of pathology, including forms of pathology commonly assessed with far

more lengthy and time intensive measures. In addition to demonstrating a high level of agreement and overlap between theoretical and statistical classification of psychopathology, the results also suggest that items of the D-WESE are effective in assessing many of the discrete components of psychopathology commonly assessed in clinical practice by more complex and lengthy measures, such as the MMPI.

### Predictive Validity

The ability of the items of the D-WESE to predict two-scale average scores representing MMPI codetype was also promising, which suggests important implications regarding test development, research, and clinical practice. The findings of this study suggest that the relatively brief, 50-item D-WESE is sensitive to representations of two-point MMPI codetypes frequently identified in individuals with a history of neurological injury or impairment. The data suggests that the D-WESE may be useful in predicting emotional disorders and symptoms represented by two-point codetypes of the much more lengthy MMPI, although the results may be interpreted with some caution when directly applied to clinical practice given the somewhat limited sample size of the data set.

Items of the D-WESE were found to predict the 1/2 codetype combination included themes pertaining to mood dysfunction, somatic concerns, planning, and thought disturbance. Items found to predict two-scale combination 1/3 were used to assess somatic concerns, delusional thoughts, planning ability, and utilization of feedback. Codetype combination representations of 1/2 and 1/3 were found to be associated with many of the same items, and construct themes of the contributing items were generally consistent with features noted in descriptions of the corresponding MMPI codetype by Graham (1987). Three of the four items found to significantly contribute to

each model were shared between these codetype combinations, items representing somatic concerns, delusional thoughts, and planning ability. Both codetype combinations were unsurprisingly similar in predictive power. In addition to symptoms identified by the D-WESE, Duckworth and Anderson (1995) noted themes of immaturity and dependence for the 1/2 codetype and themes of rigidity, limited insight, and pessimism. The D-WESE was surprisingly adept at identifying some key components noted to be associated with these codetypes, although clinicians will likely need to supplement the information gathered through the D-WESE with interviews, a records review, and other components of the assessment, which may also include additional emotional and personality assessment.

Codetype combination 2/3 was represented by only three items, yet it was found to account for 65% of the variance. These items are used to assess present depression, somatic concerns, and planning ability. These items represented some symptoms noted by Friedman, Web, and Lewak (1989) and Duckworth and Anderson (1995), although a total of only three items were found to contribute to the model significantly. Additional features commonly associated with the 2/3 codetype include difficulty maintaining relationships and overcontrolled hostility. Codetype combination 2/4 was predicted primarily by 10 items, which represented slightly greater than one-fifth of the items of the D-WESE included in this study. Items found to demonstrate significant predictive power of the 2/4 codetype combination accounted for 73% of the variance, which was among the strongest in the study. Items noted to contribute significantly to the model encompassed themes of depressed mood, fatigue, changes in weight and appetite, difficulties with attention and memory, repetitive thoughts, difficulties with interpersonal

interaction, somatic concerns, and possible psychotic symptoms. In addition, individuals with this personality profile were noted to struggle with feelings of guilt and may be highly susceptible to substance abuse problems (Duckworth & Anderson, 1995).

Codetype combination 2/7 was predicted primarily by five questions, items 1, 23, 27, 39, and 44. The items of the D-WESE accounted for 73% of the variance. Items found to significantly predict the 2/7 codetype combination identified themes of mood dysfunction, impairment of memory, somatic complaints, rebellious behavior, and possible psychotic symptoms, which demonstrated a moderate level of consistency with MMPI codetype descriptions provided by Graham (1987) and Duckworth and Anderson (1995). Individuals with this MMPI codetype have also been noted to have a history of success in their field, often lack self-confidence, and may tend to strive for perfection.

Nine items contributing significantly to the prediction of codetype combination 2/8 yielded the strongest predictive power of the analysis, accounting for 75% of the variance. Items that reached statistical significance are used to assess symptoms of mood dysfunction, gastrointestinal problems and somatic complaints, paranoia, thought disturbances, and difficulties with social conformity and judgment. The identified symptoms are consistent with Graham's (1987) description of depressive and somatic symptoms commonly observed in individuals with this personality profile, and such individuals may also frequently struggle with inefficiency, guilt, and social withdrawal.

Five items ratings were found to contribute significantly in the prediction of codetype combination 2/9, representing 64% of the variance. Items used to predict this codetype combination included themes of depressed mood, euphoria, impulsivity, introversion, and delusional thinking. The significantly contributing items suggested a



moderate level of consistency with the corresponding MMPI codetype, but they did exhibit sensitivity to perhaps the most crucial component of social-emotional assessment for his codetype, elevated and depressed mood often noted in individuals with a history of hypomanic or manic episodes or brain injury. Individuals with this profile may also struggle with substance abuse problems and alternating feelings of grandiosity and inadequacy also associated with unstable mood.

Items found to contribute significantly to predict the 3/8 codetype combination accounted for 68% of the variance. These items represent themes of elevation and depression of mood, impulsivity, introversion or social withdrawal, and thought disturbance. Themes identified in items found to contribute significantly to the prediction of the 3/8 codetype combination included emotional instability and symptoms commonly associated with mood dysfunction, including social withdrawal and impulsivity (Friedman, Web, and Lewak (1989). Themes of apathy, confusion, and psychotic symptoms have also been noted to be associated with this codetype (Duckworth & Anderson, 1995).

Nine items found to significantly contribute to the prediction of the 4/9 codetype combination accounted for 59% of the variance, the weakest predictive power of the analyses. These items are used to assess symptoms of hypermotor behavior, euphoria, recent changes in weight or disturbance of sleep, antisocial behavior, legal difficulties, introversion, and ideas of reference. Graham (1987) also suggested individuals with a 4/9 personality profile are likely to exhibit antisocial attitudes, a history of legal difficulties, and mood dysfunction, although other items suggestive of sleep disturbance or changes in weight may be related to a variety of other forms of psychopathology.

Codetype combination 6/8 was predicted significantly by 10 items and accounted for 68% of the variance overall. These items suggested themes of sleep disturbance, obsessive thoughts, compulsive behavior, obsessive thoughts, somatic concerns, paranoia, psychotic symptoms, and difficulties with decision-making. There was moderate overlap in themes identified by questions found to significantly predict the 6/8 codetype combination and the themes noted in features of the 6/8 codetype (Graham, 1987). Duckworth and Anderson (1995) also noted individuals with a 6/8 codetype commonly experience feelings of inferiority and insecurity and may have a history of substance abuse problems.

Prediction of codetype combination 7/8 accounted for 74% of the variance in the model, with 11 items contributing to the model significantly. These items suggested themes of euphoria, sleep disturbance, obsessive thoughts and compulsive behaviors, impairment of memory, somatic concerns, tobacco use, delusional thoughts, rebellious behavior, and difficulties with decision-making. In addition, Duckworth and Anderson (1995) indicated individuals with a 7/8 codetype tend to exhibit unusual speech patterns and tend to struggle with social interaction.

Item ratings of the D-WESE used to predict two-scale average scores representative of the 8/9 MMPI codetype accounted for approximately 68% of the variance, with five items providing significant contributions to the model. These items are used to assess themes of feelings of euphoria, sleep disturbance, compulsive behavior, introversion, and delusional thoughts. In general, the items that contributed significantly to the model were consistent with themes often identified in individuals with this personality profile (Duckworth & Anderson, 1995). However, only one item used to

assess psychotic symptoms that was found to contribute significantly was item 38, which was used to assess delusional thinking. Descriptions of the 8/9 codetype by Graham (1987) and Duckworth and Anderson (1995) suggested prominent themes of disordered thinking and psychotic symptoms may be present in individuals with this codetype.

It is important to note that some items were found to be significant predictors for multiple codetype combinations, which was expected given the codetype combination scores shared some scales and DSM criteria and symptoms are often shared by disparate disorders. This also supports research demonstrating a high frequency of comorbidity of symptoms of anxiety and depression, including within neurological samples (Keller et al., 2000). Also, despite reaching statistical significance, the predictive power of some items may be questionable.

For example, as previously noted, item 27 was found to reach significance in 9 of the 12 codetype combinations. This item is used to assess Somatic Concerns, which is likely to be endorsed with a greater frequency and severity in a neurological sample than the general population, including individuals who may not exhibit neurological or cognitive impairment or emotional dysfunction. That is, individuals who receive a neuropsychological evaluation have commonly suffered injuries such as in a car accident or other trauma, which is highly likely to increase the endorsement of items used to assess health concerns such as item 27. The frequency of items associated with symptoms commonly associated with neurological dysfunction, such as mood dysfunction and inattention, were also likely to be related to themes associated with codetypes chosen for this study. That is, the codetypes included in this study were found to be among the most common in neurological samples, and items used to predict symptoms associated with

brain injury tended to be frequently represented in the prediction of codetype combinations.

Despite concerns about the limitations associated with the available data set, the items of the D-WESE were quite effective in predicting many of the symptoms commonly associated with specific MMPI codetypes. The results suggest that this measure can serve as a valuable instrument for clinicians in the interview process to help identify pathology and as a screening tool for identifying psychopathology and guiding more comprehensive assessment of mood dysfunction. The effectiveness of the D-WESE in assessing discrete forms of psychopathology and predicting multiple symptoms commonly associated with MMPI codetypes would be of particular interest to clinicians, especially clinicians who frequently work with individuals with a history of neurological injury or illness.

#### Limitations and Future Research

Some key limitations of the study were noted. First, the data sample was somewhat limited in size ( $N = 200$ ) and therefore may be vulnerable to limited representation and potential problems with homogeneity. Demographic data included in the dataset was rather limited, and the data were gathered from a single geographical region. An archival data sample used due to limited availability of neuropsychological evaluation data that included both the MMPI and D-WESE, a relatively new measure. Also, items used to assess severe symptoms of psychopathology, particularly item 26, which was used to assess homicidal ideation and was excluded due to lack of variance, would likely require an enormous dataset to evaluate statistically due to the very low rate of endorsement. However, inclusion of such items in the measure are vital, as assessment

of rarely occurring but severe symptoms are crucial for safety of patients, clinicians, and the community. Evaluation of the risk of violent behavior is also expected from mental health clinicians (McNiel et al., 2008).

Another limitation of the study concerns generalization of the findings. Due to the limited availability of demographic information contained in the dataset, it was not possible to account for potential interactions or effects of race or level of education. Future studies would benefit from cataloging and analyzing differences in response patterns and account for complications associated with demographics. The inclusion of patient diagnosis and analyses incorporating ratings from the D-WESE may also be of benefit in future research, although this information was not available for this study. Future studies may benefit from incorporating more complex analyses of the factor structure, including prediction of identified factors of the D-WESE to predict MMPI codetypes. Future studies may also benefit from incorporating additional codetypes not included in this study.

In addition, other components of testing data, such as cognitive ability, were not catalogued in the dataset. Future evaluations of the D-WESE may benefit from developing a larger dataset from multiple regions in order to expand generalizability of the results and ensure that a broad range of ethnic groups are adequately represented. In addition, the dataset utilized in this study was also examined in a previous study by Galloway-Sharp (2004), and the results identified between these studies may therefore be influenced by potential idiosyncrasies of this dataset.

This study also utilized the MMPI rather than the more recent revision of the measure, the MMPI-2, which at the time of data collection was gradually being adopted

by clinicians to replace the most widely used and researched objective measure of personality (Piotrowski & Keller, 1989). However, the specific scales utilized in this study, the Clinical Scales, share the vast majority of items between the MMPI and MMPI-2 (Levitt, 1990). Another distinction between the editions of the MMPI is that the MMPI-2 was normed with “normals” unlike the original MMPI. However, no datasets with adequate sample size including the MMPI-2 and the D-WESE were available at the time of this study. Future studies should attempt to utilize the MMPI-2, a measure now more commonly utilized.

Another limitation of the study predicated by the limited size of the dataset was the utilization of two-scale averages rather than "well-defined codetypes" described by (Greene, 2000), which consists of a codetype in which the two highest clinical scales are at least 5 T points above the remaining scales in the profile. Restriction to well-defined codetypes would have prohibitively decreased the sample size, and average scores of the two scales of each codetype were adopted to represent codetypes commonly identified in neurological samples. Future studies may wish to utilize more rigid guidelines for codetypes as utilized in clinical interpretation when a larger sample size has been obtained. Future studies may also benefit from including additional instruments for comparison, including other structured interviews and objective personality measures. In addition, future studies may wish to further investigate DSM criteria and various types of neurological disorders or conditions.

### Summary

The comparison of the theoretical categorization and the statistically classified domains of the D-WESE offer important insights for clinicians and researchers. Future

studies may wish to further investigate Factor 1 in particular, which appeared to represent multiple domains. Continued scrutiny and statistical evaluation may lead to revisions that better discriminate symptoms and markers of psychopathology into disparate categories. The comparison also demonstrated the strength of the measure in classifying particular forms of psychopathology, especially depressed mood, anxiety symptoms, antisocial behavior, somatic concerns, and inattention and difficulties with concentration.

Regression analyses demonstrated an important strength of the measure in predicting representations of commonly occurring MMPI codetypes in neurological samples. Given the considerably shorter length of the 50-item D-WESE compared to the lengthy 566-item MMPI and strength of the predictions, the D-WESE may eventually provide clinicians with a useful instrument to indicate whether more extensive social-emotional and personality testing may be merited. Empirical validation of the D-WESE is also of great interest to clinicians, who face growing pressure to provide more cost effective and efficient and empirically validated treatment (Cantor & Fuentes, 2008; Sanderson, 2003) and would greatly benefit from including an effective instrument for screening psychopathology.

The D-WESE may be especially useful to clinicians in situations in which the patient has difficulty with reading written items, as they can be presented verbally by the clinician, or in situations in which the patient struggles with language and communication to the extent that data must be gathered from an informant. The primary focus of these analyses on predicting representations of codetypes rather than individual scales also provided greater insight into the ability of the instrument to predict personality profiles, the method typically used in a clinical setting that has demonstrated remarkable stability

and clinical utility over time (Greene, 1990), rather than predicting elevations of individual scales.



## References

- Albrecht, N.N., Talbert, F.S., Albrecht, J.W., Boudewyns, P.A., Hyer, L.A., Touze, J., & Lemmon, C.R. (1994). A comparison of MMPI and MMPI-2 in PTSD assessment. *Journal of Clinical Psychology, 50*(4), 578-585.
- Alfano, D.P., & Finlayson, M.A.J. (1987). Comparison of standard and abbreviated MMPIs in patients with head injuries. *Rehabilitation Psychology, 32*(2), 67-76.
- Alfano, D.P., Finlayson, M.A.J., Stearns, G.M., & MacLennan, R.N. (1991). Dimensions of neurobehavioral dysfunction, *Neuropsychology, 5*(1), 35-41.
- Alfano, D.P., Finlayson, M.A.J., Stearns, G.M., & Nielson, P.M. (1990). The MMPI and neurologic dysfunction: Profile configuration and analysis. *The Clinical Neuropsychologist, 4*, 69-79.
- Anderson, D.A., Burton, D.B., Parker, J.D., & Godding, P.R. (2001). A confirmatory factor analysis of the cognitive capacity screening examination in a clinical sample. *International Journal of Neuroscience, 111*, 221-233.
- Arbisi, P.A., Ben-Porath, Y.S., & McNulty, J.L. (2003). Empirical correlates of common MMPI-2 two-point codes in male psychiatric patients. *Assessment, 10*(3), 237-247.
- Ashman, T.A., Gordon, W.A., Cantor, J.B., & Hibbard, M.R. (2006). Neurobehavioral consequences of traumatic brain injury. *Mt. Sinai Journal of Medicine, 73*(7), 999-1005.
- Barber, J.P., & Morse, J.Q. (1994). Validation of the Wisconsin Personality Disorders Inventory with the SCID-II and PDE. *Journal of Personality Disorders, 8*(4), 307-319.

- Barber, W.H., Rigby, M.K., & Napoli, J.G. (1962). The clinical interview revisited. *Journal of Clinical Psychology, 18*(3), 282-286.
- Ben-Porath, Y.S., & Butcher, J.N. (1989). The comparability of the MMPI and MMPI-2 scales and profiles. *Psychological Assessment, 1*(4), 345-347.
- Boll, T.J. (1976). Clinical neuropsychology. *Journal of Pediatric Psychology, 1*(3), 63-66.
- Borke, H., & Fiske, D.W. (1957). Factors influencing the prediction of behavior from a diagnostic interview. *Journal of Consulting Psychology, 21*(1), 78-80.
- Briere, J. (1997). *Psychological Assessment of Traumatic Events*. Washington, DC: American Psychological Association.
- Bryant, R.A., Marosszeky, J.E., Crooks, J., Baguley, I., & Gurka, J. (2001). Post-traumatic stress disorder and psychosocial functioning after severe traumatic brain injury. *Journal of Nervous and Mental Disease, 189*(2), 109-113.
- Burdock, E.I., & Hardesty, A.S. (1968). Psychological test for psychopathology. *Journal of Abnormal Psychology, 73*(1), 62-69.
- Burkhart, B.R., Christian, W.L., & Gynther, M.D. (1978). Item subtlety and faking on the MMPI: A paradoxical relationship. *Journal of personality assessment, 42*, 76-80.
- Butcher, J.N., Graham, J.R., & Ben-Porath, Y.S. (1995). Methodological problems and issues in MMPI, MMPI-2, and MMPI-A research. *Psychological Assessment, 7*(3), 320-329.
- Butcher, J.N., Graham, J.R., & Dahlstrom, W.G., & Bowman, E. (1990). The MMPI-2 with college students. *Journal of Personality Assessment, 54*(1&2), 1-15.
- Butcher, J.N., & Hostetler, K. (1990). Abbreviating MMPI item administration: What can

be learned from the MMPI for the MMPI-2? *Psychological Assessment*, 2(1), 12-21.

Cantor, D.W., & Fuentes, M.A. (2008). Psychology's response to managed care. *Professional Psychology*, 39(6), 638-645.

Chelune, G.J, Heaton, R.K., Lehman, R.A.W., & Robinson, A. (1979). Level versus pattern of neuropsychological performance among schizophrenic and diffusely brain-damaged patients. *Journal of Consulting and Clinical Psychology*, 47(1), 155-163.

Clavelle, P.R. (1992). Clinician's perceptions of the comparability of the MMPI and MMPI-2. *Psychological Assessment*, 4(4), 466-472.

Clemes, S.R., & D'andrea, V.J. (1965). Patients' anxiety as a function of expectation and degree of initial interview ambiguity. *Journal of Consulting Psychology*, 29(5), 397-404.

Cloak, N.L., & Kirklen, L.E. (1987). Factor analyses of Minnesota Multiphasic Personality Inventory-1 (MMPI-1) validity scale items. *Measurement and Evaluation in Counseling and Development*, 30(1), 40-50.

Cronbach, L.J., & Meehl, P.E. (1955). Construct validity of psychological tests. *Psychological Bulletin*, 52(4), 281-302.

Cronbach, L.J. (1970). *Essentials of Psychological Testing, Third Ed.* New York: Harper and Row.

Crum, R., Anthony, J., Bassett, S., & Folstein, M. (1993). Population-based norms of the Mini-Mental State Examination by age and education level. *Journal of the American Medical Association*, 269, 2386-2391.

- Cullum, C. M., & Bigler, E. D. (1998). Short-form MMPI findings in patients with predominantly lateralized cerebral dysfunction. *The Journal of Nervous and Mental Disease*, 176, 332-342.
- Dahlstrom, W.G., Welsh, G.S., & Dahlstrom, L.E. (1975). *An MMPI Handbook: Vol. II. Research Applications* (rev. ed.). Minneapolis, MN: University of Minnesota Press.
- Doehring, D.G., & Reitan, R.M. (1960). MMPI performance of aphasic and nonaphasic brain-damaged patients. *Journal of Clinical Psychology*, 16, 307-309.
- Duckworth, J., & Anderson, W. (1986). *MMPI Interpretation Manual for Counselors and Clinicians, Third Edition*. Muncie, IN: Accelerated Development.
- Duckworth, J., & Anderson, W. (1995). *MMPI & MMPI-2 Interpretation Manual for Counselors and Clinicians, Fourth Edition*. Bristol, Pennsylvania: Accelerated Development.
- Duff, F.L. (1965). Item subtlety in personality inventory scales. *Journal of Consulting Psychology*, 29, 565-570.
- Dean, R. S., & Davis, A.S (2008). *The neuropsychology handbook (3rd ed.)*. Horton, Arthur MacNeil Jr. (Ed); Wedding, Danny (Ed); pp. 395-415. New York, NY, US: Springer Publishing Co.
- Dean, R. S., & Woodcock, R. W. (2003). *Examiners manual: The Dean Woodcock Neuropsychological Battery*. Itasca, IL: Riverside Publishing.
- Deb, S., Lyons, I., Koutzoukis, C., Ali, I., McCarthy, G. (1999). Rate of psychiatric illness 1 year after traumatic brain injury. *American Journal of Psychiatry*, 156(3), 374-378.

- Doehring, D.G., & Reitan, R.M. (1960). MMPI performance of aphasic and nonaphasic brain-damaged patients. *Journal of Clinical Psychology, 16*, 307-309.
- Edelbrock, C., Costello, C.J., Dulcan, M.K., Kalas, R., & Conover, N.C. (1985). Age differences in the reliability of the psychiatric interview of the child. *Child Development, 56*, 265-275.
- an outpatient sample: Comparisons of Code Types, Validity Scales, and Clinical Scales. *Journal of Personality Assessment, 61*(1), 1-18.
- Edwards, D. W., Dahmen, B. A., Wanlass, R. L., Holmquist, L. A., Wicks, J. J., Davis, C., & Morrison, T. L. (2003). Personality assessment in neuropsychology: The nonspecificity of MMPI-2 neurocorrection methods. *Assessment, 10*(3), 222-227.
- Einhorn, H.J., & Hogarth, R.M. (1978). Confidence in judgment: Persistence in the illusion of validity. *Psychological Review, 85*, 395-416.
- Elstein, A.S., Shulman, A.S., & Sprafka, S.A. (1978). *Medical problem solving: An analysis of clinical reasoning*. Cambridge, MA. Harvard University Press.
- Erikson, W.D., Luxenberg, M.G., Walbek, N.H., & Seely, R.K. (1987) Frequency of MMPI two-point code types among sex offenders. *Journal of Consulting and Clinical Psychology, 55*(4), 566-570.
- Erickson, R.C., & Scott, M.L. (1977). Clinical memory testing: A review. *Psychological Bulletin, 84*(6), 1130-1149.
- Faust, D. (1986). Research on human judgment and its application to clinical practice. *Professional Psychiatry: Research and Practice, 17*(5), 420-430.
- Forbey, J.D., & Ben-Porath, Y.S. (2007). Computerized adaptive personality testing: A

review and illustration with the MMPI-2 computerized adaptive version.

*Psychological Assessment*, 19(1), 14-24.

Fordyce, D. J., Roueche, J. R., & Prigatano, G. P. (1983). Enhanced emotional reactions in chronic head trauma patients. *Journal of Neurology, Neurosurgery, and Psychiatry*, 46(7), 620-624.

Friedlander, M.L., & Phillips, S.D. (1984). Preventing anchoring errors in clinical judgment. *Journal of Consulting and Clinical Psychology*, 52(3), 366-371.

Friedman, A.F., Web, J.T., & Lewak, R. (1989). *Psychological Assessment with the MMPI*. New Jersey: Lawrence Erlbaum Associates.

Galloway-Sharp, S. (2004). Utilizing the Dean-Woodcock Emotional Status Examination to predict pathology. *Dissertation Abstracts International (B): Physical Sciences and Engineering*, 65(2-b), 1027.

Ganellen, R.J. (1996). Exploring MMPI-Rorschach relationships. *Journal of Personality Assessment*, 67(3), 529-542.

Gasquoine, P. G. (1997). Affective state and awareness of sensory and cognitive effects after a closed head injury. *Neuropsychology*, 6(3), 187-196.

Gasquoine, P. G. (1997). Postconcussion symptoms. *Neuropsychological Review*, 7, 77-85.

Gass, C.S. (1991). Emotional variables and neuropsychological test performance. *Journal of Clinical Psychology*, 47(1), 100-104.

Gass, C.S., & Lawhorn, L. (1991). Psychological adjustment following stroke: An MMPI study. *Psychological Assessment: A Journal of Consulting of Clinical Psychology*, 3(4), 628-633.

- Gass, C.S., & Wald, H.S. (1997). MMPI-2 interpretation and closed-head trauma: Cross-validation of a correction factor. *Archives of Clinical Neuropsychology, 12*(3), 199-205.
- Gasquoine, P.G. (1992) Affective state and awareness of sensory and cognitive effects after closed head injury. *Neuropsychology, 6*(3), 187-196.
- Gatz, M., Popkin, S.J., Pino, C.D., VandenBos, G.R. (1985). Psychological interventions with older adults, In J.E. Birren, & K.W. Schaie (Eds.), *Handbook of the psychology of aging* (pp. 755-788). New York: Van Nostrand Reinhold.
- Gibson, D. (1994). Time for clients: Temporal aspects of community psychiatric nursing. *Journal of Advanced Nursing, 20*, 110-116.
- Gibson, C. (1998). Semi-structured and unstructured interviewing: A comparison of methodologies in research with patients following discharge from an acute psychiatric hospital. *Journal of Psychiatric and Mental Health, 5*, 469-477.
- Gilberstadt, H., & Duker, J. (1965). *A handbook for clinical and actuarial MMPI interpretation*. Philadelphia: Saunders.
- Glantz, S., & Slinker, B. (1990). *Primer of Applied Regression and Analysis of Variance*. New York: McGraw-Hill.
- Glick, T.H. (1993). *Neurologic Skills*, 105-142, Cambridge, MA: Blackwell Scientific.
- Golden, Z., & Golden, C. J. (2002). Impact of brain injury severity on personality dysfunction. *International Journal of Neuroscience, 113*, 733-745.
- Gorsuch, R.L. (1983). *Factor Analysis, Second Ed*. Hillsdale, NJ: Erlbaum.
- Gouick, J., & Gentleman, D. (2004) The emotional and behavioural consequences of traumatic brain injury. *Trauma, 6*, 285-292.

- Graham, J.R., Smith, R.L., & Schwartz, G.F. (1986). Stability of MMPI configurations for psychiatric patients. *Journal of Consulting of Clinical Psychology, 54*(3), 375-380.
- Graham, J.R. (1987). *The MMPI: A practical guide, Second Edition*. New York/Oxford: f Oxford University Press.
- Greene, R. (1990). Stability of MMPI scale scores within four codetypes across forty years. *Journal of Personality Assessment, 55*(1-2), 1-6.
- Greene, R. (2000). *The MMPI: An interpretive manual (2<sup>nd</sup> ed.)*. Needham Heights, MA: Allyn and Bacon.
- Grinker, R.R., & Saks, A.L. (1966). *Neurology, Sixth Edition*. Springfield, IL: Charles C. Thomas.
- Gross, K., Keyes, M.D., & Greene, R.L. (2000). Assessing depression with the MMPI and MMPI-2. *Journal of Personality Assessment, 75*(3), 464-477.
- Grove, W.M., & Lloyd, M. (2006). Meehl's contribution to clinical versus statistical prediction. *Journal of Abnormal Psychology, 115*(2), 192-194.
- Guba, E.G., & Lincoln, Y.S. (1981). *Effective Evaluation*. Jossey-Bass: London.
- Guilford, J.P. (1954). *Psychometric Methods Second Ed*. New York: McGraw-Hill.
- Guthrie, P.C., & Mobley, B.D. (1994). A comparison of the differential diagnostic efficiency of the three personality disorder inventories. *Journal of Clinical Psychology, 50*(4), 656-664.
- Gynther, M., Altman, H., & Sletten, I.W. (1973). Replicated correlates of MMPI two-point code types: The Missouri actuarial system. *Journal of Clinical Psychology, 29*(3), 263-289.



- Harrell, T.H., Honaker, L.M., & Parnell, T. (1992). Equivalence of the MMPI-2 with the MMPI in psychiatric patients. *Psychological Assessment, 4*(4), 460-465.
- Hartmann, G.W. (1933). The interview as a research and teaching device. *Journal of Applied Psychology, 17*(2), 205-211.
- Hedlund, J.L. (1977). MMPI clinical scale correlates. *Journal of Consulting and Clinical Psychology, 45*(5), 739-750.
- Helmes, E., & Reddon, J.R. (1993). A perspective on developments in assessing psychopathology: A critical review of the MMPI and MMPI-2. *Psychological Bulletin, 113*(3), 453-471.
- Hinkle, J.S. (1992). The mental status examination via computer: An evaluation of the mental status checklist computer report, *Measurement and Evaluation in Counseling and Development, 24*, 188-189.
- Hill, C.L., & Ridley, C.R. (2001). Diagnostic decision making: Do counselors delay final judgments? *Journal of Counseling and Development, 79*, 98-104.
- Hodges, K. (1990). Depression and anxiety in children: A comparison of self-report questionnaires to clinical interview. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 2*(4), 376-381.
- Hodges, K., & Cools, J., & McNew, D. (1989). Test-retest reliability of a clinical research interview for children: The Child Assessment Scale. *Psychological Assessment, 1*(4), 317-322.
- Hoofien, D., Gilboa, A., Vakil, E., Donovanick, P.J. (2001). Traumatic brain injury (TBI)

10-20 years later: A comprehensive outcome study of psychiatric symptomatology, cognitive abilities, and psychosocial functioning. *Brain Injury*, *15*(3), 189-209.

Hopwood, C.J., Morey, L., Grilo, C.M., Sanislow, C.A., McGlashan, T.H., Markowitz, J.C., Edelen, M.O., Shea, M.T., Daversa, M.T., Gunderson, J.G., Zanarini, M.C., & Skodol, A.E. (2008). A comparison of interview and self-report methods for the assessment of Borderline Personality Disorder. *Psychological Assessment*, *20*(1), 81-85.

Hotopf, M., Sharp, D., & Lewis, G. (1998). What's in a name? A Comparison of four psychiatric assessments. *Social Psychiatry and Epidemiology*, *33*, 27-31.

Hutcheson, G., & Sofroniou, N. (1999). *The Multivariate Social Scientist: Introductory Statistics Using Generalized Linear Models*. Thousand Oaks, CA: Sage Publications.

Jackson, D.N. (1971). The dynamics of structured personality tests: 1971. *Psychological Review*, *78*(3), 229-248.

Jones, K.D. (2010). The unstructured clinical interview. *Journal of Counseling & Development*, *55*, 220-226.

Keller, J., Nitschke, J.B., Bhargava, T., Gergen, J.A., Miller, G.A., & Heller, W. Neuropsychological differentiation of depression and anxiety. *Journal of Abnormal Psychology*, *109*(1), 2-10.

Kelly, D.B., & Greene, R.L. (1989). Detection of faking good on the MMPI in a psychiatric population. *Psychological Review*, *65*, 747-750.

Kendall, P., & Norton-Ford, I. (1982). *Clinical Psychology*. New York: Wiley.

- Kervick, R.B., & Kaemingk, K.L. (2005). Cognitive appraisal accuracy moderates the relationship between injury severity and psychosocial outcomes in traumatic brain injury. *Brain Injury, 19*(11), 881-889.
- Kici, G., & Westhoff, K. Evaluation of requirements for the assessment and construction of interview guides in psychological assessment. *European Journal of Psychological Assessment, 20*(2), 83-98.
- Kirshner, L.A., & Johnson, L. (1983). The effects of gender on inpatient psychiatric hospitalization. *The Journal of Nervous and Mental Disease, 171*, 651-657.
- Kline, P. (1979). *Psychometrics and Psychology*. London: Academic Press.
- Koss, M.P., & Butcher, J.N. (1973). A comparison of psychiatric patients' self-report with other sources of clinical information. *Journal of Research in Personality, 7*, 225-236.
- Kubinger, K.D., Wiesflecker, S., Stendl, R. (2008). A systemic-based interview guide: Its validity and economy in comparison with an unstructured interview approach — experimental results. *Journal of Psychoeducational Assessment, 26*(1), 54-68.
- Landre, N., Poppe, C.J., Davis, N., Schmaus, B., & Hobbs, S.E. (2006). Cognitive and postconcussive symptoms in trauma patients with and without mild TBI. *Archives of Clinical Neuropsychology, 21*, 255-273.
- Landry, T. H. (1997). Neuropsychological, demographic, and neurologic correlates of MMPI-2 scale scores in a group of severe closed head injured patients. *Dissertation Abstracts international: Section B: The Sciences & Engineering, 57*(8-B), 5381.
- Lang, D., Hill, S.K., & Dean, R.S. (2001). Report of normative sensory and motor

- performance in children using a standardized battery. *International Journal of Neuroscience*, *111*, 211-219.
- Levitt, E.E. (1990). A structural analysis of the impact of MMPI-2 on MMPI-1. *Journal of Personality Assessment*, *55*(3-4), 562-577.
- Lewandowski, D., & Graham, J.R. (1972). Empirical correlates of frequency occurring two-point MMPI code types: A replicated study. *Journal of Counseling and Clinical Psychology*, *39*(3), 467-472.
- Lezak, M.D. (1995). *Neuropsychological Assessment, Third Ed.* New York: Oxford University Press.
- Love, A.W., & Peck, C.L. (1987). The MMPI and psychological factors in chronic back pain. *Pain*, *28*, 1-12.
- Lubin, B., Larsen, R.M., & Matarazzo, J.D. (1985). Psychological test usage patterns in five professional settings. *American Psychologist*, *40*, 857-861.
- Lyons, J.A., & Wheeler-Cox, T. (1999). MMPI, MMPI-2, and PTSD: Overview of scores, scales, and subscales. *Journal of Traumatic Stress*, *12*(1), 175-183.
- Mamelak, M. (2000). The motor vehicle collision injury syndrome. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology*, *13*, 125-135.
- Marcelli, D., & Temey, G. (1977). Serious psychiatric disturbance following prolonged post-traumatic coma. *Annales Medico-Psychologiques*, *2*(5), 839-865 (English translation).
- Marks, P.A., & Seeman, W. (1963). *The actuarial description of abnormal personality.* Baltimore: Williams and Wilkins.
- Matazarro, J.D. (1977). Higher education, professional accreditation, and licensure.

*American Psychologist*, 32, 856-859.

McAllister, T.W. (1983). Overview: Pseudodementia. *American Journal of Psychiatry*, 140, 528-533.

McNiel, D.E., Chamberlain, J.R., Weaver, C.M., Hall, S.E., Fordwood, S.R., & Binder, R.L. (2008). Impact of clinical training of violence risk assessment. *The American Journal of Psychiatry*, 165(2), 195-200.

McFarland, R.A., & Seitz, C.P. (1938). A psycho-somatic inventory. *Journal of Applied Psychology*, 22(4), 327-339.

Meehl, P.E. (1945) The dynamics of "structured" personality tests. *Journal of Clinical Psychology*, 1, 296-303.

Meehl, P.E. (1954). *Clinical versus statistical prediction*. Minneapolis: University of Minnesota Press.

Meehl, P.E. (1959). A comparison of clinicians with five statistical methods of identifying psychotic MMPI profiles. *Journal of Counseling Psychology*, 6(2), 102-109.

Meehl, P.E. (1996). *Clinical versus statistical prediction: A theoretical analysis and a review of the evidence*. Northvale, NJ: Jason Aronson. (Original work published in 1954).

Mellsop, G., Varghese, F.T.N., Joshua, S., & Hicks, A. (1982). The reliability of Axis II of DSM-III. *American Journal of Psychiatry*, 139, 1360-1361.

Morgan, D.W., Weitzel, W.D., Guyden, T.E., Robinson, J.A., & Hedlund, J.L. (1972). Comparing MMPI statements and mental status items. *American Journal of Psychiatry*, 129(6), 693-697.

- Morrison, J. (1993). *The First Interview: A guide for clinicians*. Guilford Press, NY.
- Nagler, S. & Glueck, Z. (1985). The clinical interview. *Schizophrenia Bulletin*, *11*(1), 38-47.
- Nagule, R.I., & Kawczak, K. (1986). Limitations of the Mini-Mental State Examination. *Cleveland Clinic Journal of Medicine*, *56*, 277-281.
- Noggle, C., & Dean, R. S. In press. *Neuropsychology of Psychiatric Disorders*. Springer, US.
- Hall, G.C.N., Bansal, A., & Lopez, I.R. (1999). Ethnicity and psychopathology: A meta-analytic review of 31 years of comparative MMPI/MMPI-2 research. *Psychological Assessment*, *11*(2), 186-197.
- O'Brien, R.M. (2007). A caution regarding rules of thumb for Variance Inflation Factors. *Quality and Quantity*, *41*, 673-690.
- O'Jile, J. R., Ryan, L. M., Parks-Levy, J., Betz, B., & Gouvier, W. G. (2004). Sensation seeking and risk behaviors in young adults with and without head injury. *Applied Neuropsychology*, *11*(2), 107-112.
- Oldham, J.M., Skodol, A.E., Kellman, H.D., Hyler, S.E., Rosnick, L., & Davies, M. (1992) Diagnosis of DSM-III-R personality disorders by two structured interviews: Patterns of comorbidity. *American Journal of Psychiatry*, *149*(2), 213-220.
- Ownsworth, T., & Fleming, J. (2005). The relative importance of metacognitive skills, emotional status, and executive function in psychosocial adjustment following acquired brain injury. *Journal of Head Trauma and Rehabilitation*, *20*(4), 315-332.

- Patton, M.Q. (1990). *Qualitative Evaluation and Research Methods, Second Edition*. Sage: Newbury Park.
- Payne, F.D., & Wiggins, J.S. (1968). Effects of rule relaxation and system combination on classification rates in two MMPI “cookbook” systems. *Journal of Consulting and Clinical Psychology, 32*(6), 734-736.
- Persons, R.W., & Marks, P.A. (1971). The violent 4-3 MMPI personality type. *Journal of Consulting and Clinical Psychology, 36*(2), 189-196.
- Piotrowski, C., & Keller, J.W. (1989). Psychologicla testing in outpatient mental health facilities: A national study. *Professional Psychology: Research and Practice, 20*, 423-425.
- Polanski, P.J., & Hinkle, J.S. (2000). The Mental Status Examination: Its Use by Counselors. *Journal of Counseling and Development, 78*, 357-364.
- Rader, C.M. (1977). MMPI profile types of expositors, rapists, and assaulters in court services population. *Journal of Consulting and Clinical Psychology, 45*(1), 61-69.
- Reitan, R. M. (1962). Psychological deficit. *Annual Review of Psychology, 13*, 415-444.
- Reitan, R. M. (1974). Methodological problems in clinical neuropsychology: In R. M. Reitan & L. A. Davidson (Eds.), *Clinical neuropsychology: Current status and applications* (pp. 19-46). Washington, D.C.: Hemisphere.
- Reitan, R. M., Wolfson, D. (2001). The significance of sensory-motor functions as indicators of brain dysfunction in children. *Archives of ClinicalNeuropsychology, 18*, 11-18.
- van Balen, R., Essink-Bot, M.L., Steyerberg, E.W., Cools, H.J.M. (2003). Quality of life

- after hip fracture: A comparison of four healthy status measures in 208 patients. *Disability and Rehabilitation*, 25(10), 507-519.
- Rosenthal, R.H., & Akiskal, H.S. (1985). Mental status examination. In M. Herson & S.T. Turner (Eds.), *Diagnostic Interviewing* (pp. 25-52). New York: Plenum.
- Rouse, S.V., Butcher, J.N., & Miller, K.B. (1999). Assessment of substance abuse in psychotherapy clients: The effectiveness of the MMPI-2 substance abuse scales. *Psychological Assessment*, 11(1), 101-107.
- Rubin, H.J., & Rubin, I.S. (1995). *Qualitative Interviewing: The Art of Hearing Data*. Sage: Newbury Park.
- Sanderson, W.C. (2003). Why empirically supported psychological treatments are important. *Behavior Modification*, 27(3), 290-299.
- Sandifer, M.G., Hordern, A., & Green, L.M. (1970). The psychiatric interview: The impact of the first three minutes. *American Journal of Psychiatry*, 126(7), 968-973.
- Sarkstein, S.E., & Lischinsky, A. (2002). The phenomenology of depression after brain injury. *NeuroRehabilitation*, 17, 105-113.
- Satz, P, Friel, J., & Rudegair, F. (1976). Some predictive antecedents of specific reading disability: A two, three, and four year follow-up. In: J. Guthrie (Ed.), *Aspects of Reading Acquisition*. Baltimore, MD: Johns Hopkins University Press.
- Sawyer, J. (1966). Measurement and prediction, clinical and statistical. *Psychological Bulletin*, 66, 178-200.
- Seeman, W. (1952). "Subtlety" in structured personality tests. *Journal of Consulting Psychology*, 16(4), 278-283.



- Selz, M., & Reitan, R.M. (1979). Rules for neuropsychological diagnosis: Classification of brain function in older children. *Journal of Consulting and Clinical Psychology, 47*(2), 258-264.
- Setin, J.M. (1982). Clinical judgment in gerontology practice. *Psychotherapy: Theory, Research, and Practice, 19*, 397-404.
- Spitzer, R.L., Endicott, J., & Robins, E. (1978). Research diagnostic criteria: Rationale and reliability. *Archives of General Psychiatry, 23*, 41-55.
- Stanghellini, G. (2004). The puzzle of the psychiatric interview. *Journal of Phenomenological Psychology, 35*(2), 173-195.
- Srivastava, A., Rapoport, M.J., Leach, L., Phillips, A., Shammi, P., & Feinstein, A. (2006). The utility of the Mini-Mental Status Exam in older adults with traumatic brain injury. *Brain Injury, 20*(13-14), 1377-1382.
- Staal, M.A., & Greene, R.L. (1998). Classification accuracy in the measurement of MMPI/MMPI-2: Profile similarity. *Journal of Personality Assessment 71*(1), 70-83.
- Sutker, P.B., Brantley, P.J., & Allain, A.N. (1980). MMPI response patterns of alcohol consumption in DUI offenders. *Journal of Consulting and Clinical Psychology, 48*(3), 350-355.
- Swartz, S. (1992). Sources of misunderstanding in interviews with psychiatric patients. *Professional Psychology: Research and Practice, 23*(1), 24-29.
- Tellegen, A., & Ben-Porath, Y.S. (1993). Code-Type Comparability of the MMPI and MMPI-2: Analysis of recent findings and criticism. *Journal of Personality Assessment, 61*(3), 489-500.

- Teng, E., Chui, H., & Gong, A. (1990). Comparison between the Mini-Mental State Exam (MMSE) and its modified version-The 3MS test. *Psychogeriatrics: Biomedical and social advances*, 189-192, Tokyo: Experta Medica.
- Thomas, D.F., Rosenthal, D.A., & Barone, N.M. (2001). Consumers with traumatic brain injury and significant others' perceptions of changes in cognitive, behavioral, and physical status. *Journal of Applied Rehabilitation Counseling*, 32(3), 17-21.
- Trzepacz, P.T., & Baker, R.W. (1993). *The psychiatric mental status examination*. New York: Oxford University Press.
- Vacc, N.A., & Juhnke, G.A. (1997). The use of structured clinical interviews for assessment in counseling. *Journal of Counseling and Development*, 75, 470-480.
- Volpe, A.G., Davis, A.S., Dean, R.S. (2006). Predicting global and specific neurological impairment with sensory-motor functioning. *Archives of Clinical Neuropsychology*, 21, 203-210.
- Ward, L.C. (1991). A comparison of T scores from the MMPI and MMPI-2. *Psychological Assessment*, 3(4), 688-690.
- Warriner, E. M., Rourke, B. P., Velikonja, D., & Metham, L. (2003). Subtypes of emotional and behavioral sequelae in patients with traumatic brain injury. *Journal of Clinical and Experimental Neuropsychology*, 25(7), 904-917.
- Watson, C.G, Juba, M.P, Manifold, V., Kucala, T., & Anderson, P.E. (1991). The PTSD Interview: Rationale, description, reliability and concurrent validity of a DSM-III-based technique. *Journal of Clinical Psychology*, 47, 179-188.
- Widiger, T.A., & Axelrod, S.R. (1995). Recent developments in the clinical assessment of personality disorders. *European Journal of Psychological Assessment*, 11(3),

213-221.

Widiger, T.A., Sanderson, C., & Warner, L. (1986). The MMPI, prototypal typology, and Borderline Personality Disorder. *Journal of Personality Assessment, 50*(4), 540-553.

Winfield, D.L. (1952). An investigation of the relationship between intelligence and that statistical reliability of the Minnesota Multiphasic Personality Inventory. *Journal of Clinical Psychology, 8*, 146-148.

Winters, K.C., Weintraub, S., & Neale, J.M. (1981). Validity of MMPI codetypes in identifying DSM-III schizophrenics, unipolars, and bipolars. *Journal of Consulting and Clinical Psychology, 49*(3), 486-487.

Wrobel, N.H. (1993). Effect of patient age and gender on clinical decisions. *Professional Psychology Research and Practice, 24*(2), 206-212.

Woodcock, R.W., McGrew, K.S., & Mather, N. (2001). *Woodcock-Johnson III*. Itasca, IL: Riverside Publishing.

Woodward, H. R., Ridenour, T. A., Dean, R. S., & Woodcock, R. W. (2002). Generalizability of Sensory and Motor Tests. *International Journal of Neuroscience, 112*(9), 1115-1137.

Wooten, A.J. (1983). MMPI profiles among neuropsychology patients. *Journal of Clinical Psychology, 39*(3), 392-406.

Woodworth, R. S. (1917). *Personal Data Sheet*. Chicago: C. H. Stoelting Company.

Woodworth, R. S. (1919). Examination of emotional fitness for warfare. *Psychological Bulletin, 16*, 59-60.

Woychyshyn, C.A., McElheran, W.G., & Romney, D.M. (1992). MMPI validity

measures: A comparative study of original with alternative indices. *Journal of Personality Assessment*, 58, 138-148.

Wright, K.M., Adler, A.B., Bliese, P.D., & Eckford, R.D. (2008). Structured clinical interview guide for postdeployment psychological screening programs. *Military Medicine*, 173(5), 411-421.

Zimmerman, M., & Mattia, J.I. (1999). Differences between clinical and research practices in diagnosing borderline personality disorder. *American Journal of Psychiatry*, 156, 1570-1574.

Zuckerman, E.L. (2000). *Clinician's Thesaurus, 5<sup>th</sup> Edition*. P. 26-43. Guilford Press: NY.

Zukerman, M., Sola, S., Masterson, J., & Angelone, J.V. (1975). MMPI patterns in drug abusers before and after treatment in therapeutic communities. *Journal of Consulting and Clinical Psychology*, 43(3), 286-296.