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Rorschach and MMPI-2 construct specific convergence: Disentangling the roles of response style and general psychopathology

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Rorschach and MMPI-2 Construct Specific Convergence: Disentangling the Roles of Response Style and General Psychopathology

By

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Abstract

Although the MMPI-2 and Rorschach are commonly used and researched tests, studies examining the convergence of similarly named constructs (e.g., depression) have typically found that the tests are unrelated (Archer & Krishnamurthy, 1997). Meyer (1997, 1999) and Meyer, Riethmiller, Brooks, Benoit, and Handler (2000) established that choosing participants who respond to the Rorschach and the MMPI-2 in a similar way based on their placement on the first unrotated principal component (FUPC) moderates convergence between similarly named constructs (e.g., depression). However, it has been unclear as to whether these results were due to specific construct convergence or whether they were due merely to the match of FUPC. In addition, the matches based on FUPC markers might have been due to response style and/or general psychopathology. Thus, it had been unclear in the literature to what extent the convergence of similarly based constructs on the MMPI-2 and Rorschach has been due to: specific construct convergence, response style, or general psychopathology. The current study sought first to replicate Meyer's findings in a new sample. Secondly, additional analyses were conducted that were designed to disentangle the respective influences of construct specific convergence, response style, and general psychopathology. Meyer's results were generally replicated in a new sample. Second, after having separated the influences of response style and general psychopathology, correlations between conceptually related constructs were not higher than correlations between conceptually unrelated constructs indicating that construct-specific convergence could not be established. Third, correlations between conceptually unrelated psychopathology constructs were not higher than correlations between non-

psychopathology constructs. This suggests that the effect of general psychopathology did not have an effect over and above the effect of response style. The findings suggest that there is no construct-specific convergence between similarly named (e.g., depression) constructs on the MMPI-2 and the Rorschach. The findings also highlight the large influence of response style on the convergence of similarly named constructs.

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CHAPTER I

Introduction

It has been recognized that indices of the same disorders and syndromes in the Rorschach Inkblot Test (Rorschach; Exner, 2003) and the Minnesota Multiphasic Personality Inventory-2 (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) largely do not converge (Archer & Krishnamurthy,1996; Ganellen, 1996; Vigilione, 1996). That is, indicators from the MMPI-2 and the Rorschach that were devised to indicate, for example, depression, psychosis, or paranoid-like attitudes, have near zero correlations within clinical samples of individuals administered the tests. Meyer (1996, 1997) has advanced an explanation for this phenomenon, and has also provided empirical data in support of that explanation. However, that explanation itself has received little attention, either favorable or unfavorable, and this dissertation concerns his explanation. In order to introduce the issues, we must first jump right into the middle, with little literature review and with giving only minimal explanation of key concepts. Hence, these are deferred until after this introduction.

The goal of the current study was to help resolve a lingering issue from Meyer's (1996) attempt to explain the apparent failure of MMPI-2 and Rorschach indicators of conceptually related psychopathology constructs to converge. This was done by conducting analyses to help differentiate the relative influences of that test content that is construct-specific (for example, depression or dysphoria, psychosis or thought disorder, paranoia or interpersonal wariness, each narrowly conceived), versus that content due to response style and general psychopathology. The current study will address the question: To what extent are Meyer's (1997, 1999; Meyer, Riethmiller,

Brook, Benoit, & Handler, 2000) arguments regarding the non-convergence of conceptually related constructs (dysphoria, thought disorder, interpersonal wariness) on the MMPI-2 and Rorschach due to a type of confound, namely, Meyer's selection of participants who have similar response styles and similar general psychopathology scores rather than because of true, specific construct convergence? To understand this, we first need to see how this confound may have arisen.

Since Campbell and Fiske's (1959) classic paper, it has been recognized that two or more measures employing different methods of evaluation (e.g., self report vs. samples of performance) are likely to be discrepant to some extent simply because of the differences in modalities. This fact has always helped to explain failures in the convergence of Rorschach and MMPI-2 scores. However, Meyer (1996) took this explanation a step further by, first, explicating the relevance of the construct of "response styles", and then tying this construct to that of differences in test modalities. The notion of response style was first identified by Cronbach (1937). Response style could be *any* factor that contributes to error in a test score but that nonetheless is systematic. That is, whereas classical test theory assumes most of measurement error to be completely random (e.g, Anastasi & Urbana, 1997), a portion of it that is due to the response style of a test taker is actually systematic, rather than random. Classic examples of this would include things like a preference for the first or last stem completion in a multiple choice test, "yea- or nay- saying" in true false tests, etc. However, there are additionally other examples that come closer to styles of defense such as impression management or self deception (Paulhus, 1986). Any of these makes a systematic contribution to error in MMPI-2 scores: Indeed, it is for just this reason that most self-

report scales "build in" validity indicators or have means of adjusting scores precisely due to response styles.

Noting this systematic contribution of response styles to test scores, Meyer (1996) argued that the expression of response style is modality specific within individuals: the fact that an individual may express a given response style, for example, impression management, on the MMPI-2, has no relation to whether or not that same individual will express the same response style (e.g., impression management) on the Rorschach. This is because the expression of response style is constrained by the modality of the test to such an extent that it overrides the degree of "motivation" within an individual to express the response style on the test.

On the MMPI-2 and on the Rorschach, the expression of response style is overwhelmingly defined by the first unrotated principle component (FUPC) of each test. The FUPC of the MMPI-2, and hence by extension, of all multiple score and multiple variable personality and pathology tests, has long been known to be saturated by both response style and general psychopathology variance (Block, 1965, Edwards & Heather, 1962).

Factor analysts (Gorsuch, 1990) have long shown that the first unrotated principle component or "first factor" of any set of variables comprises the construct that is most tapped by the set of variables factor analyzed. General psychopathology is a broad bandwidth construct that covers narrower pathology constructs such as dysphoria, psychosis, and interpersonal wariness. However, for the MMPI-2 and for all self-report batteries that measure a broad range of psychopathologies, the FUPC is saturated with both general psychopathology and with response style, largely the combination of

impression management and self deception. The mixture of general psychopathology and response style cannot be directly disentangled. Although less work has been done on the FUPC of the Rorschach (Meyer, 1992), it is reasonable to suppose that it also contains both a degree of broad bandwidth general trait and pathology variance as well as response style variance (Meyer, 1996).

Under these circumstances, it is reasonable to suppose that to the extent that individuals within a sample have roughly the same rank order placement on the FUPC of *both* the Rorschach and the MMPI-2, this would increase the likelihood that their scores on specific indices (e.g., dysphoria) would converge. A sample selected from a larger sample such that it consists of *only* individuals with roughly the same FUPCs on both tests should correlate on scores for more specific syndromes (dysphoria, psychosis, interpersonal wariness), first, to the extent that the more specific syndrome scores load on the respective FUPCs, and second, to the extent that specific syndrome indices within each measure (MMPI-2 and Rorschach) are in fact valid measures of the same syndrome. Hence, Meyer (1999) designated participants as having the same response style on the MMPI-2 and Rorschach if their scores on FUPC markers were similar. However, matching participants on FUPC markers also matches them on general psychopathology, because as previously stated, both are inextricably bound up in a test's FUPC. Thus, even within the FUPC, it is unclear what is contributing to the convergence. The question arises, and the focus of this dissertation is to explore whether, both response style and general psychopathology variance within the FUPCs of the Rorshcach and MMPI-2 can be separately accounted for, in order to then test the degree of specific construct convergence between these two tests.

That is, Meyer's method of FUPC matching (Meyer 1997, 1999; Meyer et al., 2000) matches participants not only on response style but on general psychopathology as well. It would help to retain the mutual validity of the Rorschach and MMPI-2's conceptually related measures if it could be shown that their failures to correlate are due *only* to method differences in the test and to associated response style differences, but *not* to convergence in the amount of general psychopathology. However, to the extent that Meyer's argument depends on FUPC matching, this likely not only matches participants on response styles, but also on degree of general psychopathology. But the degree of general psychopathology carried by an individual's score on a narrower bandwidth specific construct (dysphoria, psychosis, or inetrpersonal wariness) is *not at all* extraneous to that specific construct, as is, e.g., impression management extraneous to the nature of dysphoria or thought disorder. It would therefore help to clarify matters if it can be tested whether, after selection of participants based on chance matches on the FUPC, observed correlations between specific psychopathology constructs are more influenced by chance convergences in response bias or by chance convergence in general psychopathology.

One might test this by seeing whether similarly high correlations are observed between psychopathology constructs thought not to be conceptually related (e.g., Rorschach dysphoria and MMPI-2 thought disorder) and non-psychopathology constructs thought not to be related (e.g., MMPI-2 responsibility vs. Rorschach zed scores). If, after selecting only participants who have the same rank on Rorschach and MMPI-2 FUPCs, conceptually unrelated constructs have high correlations, one could reasonably conclude that the observed correlations are due to the subject selection

process. Further, for the psychopathology constructs thought not to be conceptually related, one could also argue that the correlations are due to the fact that the measures all index overlapping aspects of general psychopathology. That is, the correlations would be due to their rank order on the respective response bias measures and general psychopathology variance rather than due to their measuring the same specific construct.

Meyer (1999; Meyer et al., 2000) acknowledged this possibility and he conducted additional analyses that, in his view, strengthen his conclusion that construct convergence is not simply a result of aligning subjects on response style indicators. It remains unclear, however, whether the conclusions he draws from these additional analyses are justified by his results. Specifically, limitations in the methodology used for these analyses still leave open the possibility that his results reflect the large influence of response style and general psychopathology variance rather than "true" construct convergence.

Current Study

Using a new sample of participants, Meyer's (1997, 1999; Meyer et al., 2000) studies were replicated to determine whether the findings were consistent in different samples. Secondly, additional analyses were conducted to determine whether the convergence of similarly named constructs was due to construct-specific convergence, response style, or general psychopathology. It was expected that there would be no convergence for similarly named constructs when all participants were used. Second, it was expected that similarly named constructs on the MMPI-2 and Rorschach would converge when the analyses were limited to participants with similar positions on FUPC

markers. Third, it was expected that conceptually related constructs on the MMPI-2 and Rorschach would be negatively correlated when the analyses were limited to participants with dissimilar placement (e.g., high MMPI-2 FUPC marker; low Rorschach FUPC marker). Fourth, when the analyses were limited to participants with similar placement on FUPC markers, it was expected that conceptually related psychopathology constructs (e.g., depression) on the MMPI-2 and Rorschach would be more highly correlated than conceptually unrelated psychopathology constructs (e.g., Rorschach depression and MMPI-2 psychosis). Finally, it was expected that conceptually unrelated psychopathology constructs (e.g., Rorschach depression and MMPI-2 psychosis) would be more highly correlated that conceptually unrelated constructs that do not measure psychopathology.

Results of this investigation will potentially contribute to the literature by adding support to the role of FUPC and the specific influences of response style and general psychopathology on the convergence of conceptually related constructs. Second, results of the present investigation will potentially help clarify to a greater extent than has been previously done, the conditions under which conceptually related constructs on the MMPI-2 and the Rorschach converge or fail to converge. For example, it will be determined whether construct-specific (e.g., MMPI-2 depression and Rorschach depression) convergence across methods can be achieved. With this information, clinicians will be better able to understand the meaning of test scores, whether convergent or discrepant, when conducting cross-method assessments. Further, results of this investigation may add support to Meyer's (e.g., Meyer, 1999) contention that construct specific convergence can be achieved under certain conditions (i.e., when

participants with the same FUPC marker placement are compared). Finally, on a general level, the American Psychological Association's Psychological Assessment Workgroup (PAWG) (cited in Meyer, 2006) has argued that personality assessment research is "one of the most pressing research needs in the field." (Meyer, 2006, p. 226). Results from the current study will add to the field of personality assessment by addressing this often-neglected area.

Following a review of the literature regarding MMPI-2 and Rorschach relations, a detailed analysis of the nature and influence of response style on test results is offered. This will be followed by a discussion of convergent and discriminant validity. Next, an investigation of the role of the FUPC on personality tests will be presented. Then, a detailed review and critical analysis of Meyer's studies and a description of the current study will be presented.

CHAPTER II

Literature Review

The MMPI-2 and the Rorschach: Overview of Clinical Use and Research

The Rorschach Inkblot Method (Exner, 1993) and the Minnesota Multiphasic Personality Inventory-2 (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) are two of the most widely used, taught, and researched personality assessment measures (Piotrowsky & Zalewsky, 1993). A national survey conducted in the United States by Lubin, Larsen, and Matarazzo (1984) found that the MMPI-2 and Rorschach ranked among the top four tests used in a variety of clinical settings. Piotrowsky and Keller (1989), in a survey of test usage among 413 outpatient clinicians, found that these two instruments ranked among the top 10 most widely used tests. Similar findings have emerged with adolescents. For example, a national survey of 165 clinicians who work with adolescents found that the Rorschach and MMPI-2 were ranked second and third, respectively, in terms of most frequently used assessment measures (Archer, Maruish, Imhof, & Piotrowsky, 1991). The combined use of the tests in assessment batteries is also common. The survey by Archer and colleagues found that the Rorschach and MMPI-2 were included in 75% and 48% of test batteries, respectively.

The two measures are also the most extensively researched tests. Exner (1986) reported that by 1970 there were over 4000 articles (of which 2000 were research-based) and 40 books and articles on the Rorschach. Similarly, Butcher (1987) reported that more than 10, 000 books and articles on the MMPI had been published since 1943.

Despite the breadth of studies examining each measure independently, there is a paucity of research examining the combined use of the measures (Acklin, 1993). In a representative study of published articles on MMPI-2-Rorschach interrelations, and in contrast to the voluminous research examining each measure independently, Archer and Krishnamurthy (1993b) found fewer than 50 studies that explicitly examined relations between the MMPI-2 and the Rorschach. This finding is consistent for both adult and adolescent populations (Archer & Krishnamurthy, 1993a, 1993b).

Correlations between MMPI-2 and Rorschach Conceptually Related Constructs

Studies have consistently found weak or non-existent relations between conceptually related constructs on the Rorschach and the MMPI and the MMPI-2 (e.g., Archer & Krishnamurthy, 1993a; Bornstein, 2001). Thus, studies that have correlated scales having the same names and purported constructs (e.g., psychosis) have not consistently found relations. Archer and Krishnamurthy (1993a, 1993b) reviewed the 37 studies published between 1943 and the fall of 1992 examining Rorschach-MMPI relations in adult samples.

Surprisingly, 19 of the 37 studies (51%) reported nonsignificant relations between MMPI and MMPI-2 scales and Rorschach variables, while another 8 studies (22%) reported weak associations reflecting small effect sizes (*r*s = .04 to .14). Thus, 73% of reviewed studies showed either a nonsignificant or a minimal relation between MMPI and MMPI-2 and Rorschach variables. The remaining 11 (27%) showed moderate effect sizes (*r*s = .24 to .34). None of the studies evidenced strong relations (i.e., effect size above .40). Also, among the studies showing relations, there was little consistency in the combination of variables studied and replication was generally not undertaken. These

findings are similar to those found with adolescent samples (Archer & Krishnamurthy, 1993b). Archer and Krishnamurthy (1993a) concluded that despite methodological limitations inherent in many of the reviewed studies, there seems to be little connection between the Rorschach and MMPI and MMPI-2.

The seeming lack of association between two of the most widely used assessment measures has led to widespread debate and explanations for the findings (e.g., Ganellen, 1996; Jocic, 2005; Meyer, 1996; Viglione, 1996). Although several of the explanations are likely partly correct (see Ganellen, 1996; Archer, 1996), for the present purposes, two reasons given for the null results will be briefly examined. Then, as a bridge to the current study, a third and promising empirically-based explanation of Rorschach-MMPI-2 convergence will be examined in detail (Meyer, 1997, 1999; Meyer et al., 2000).

Explanations for the Lack of Agreement between MMPI-2 and Rorschach Constructs

As a starting point, the lack of agreement between two different kinds of assessment methods (i.e., MMPI-2 self-report and Rorschach-performance) leads to questions about the relative reliability and validity of each measure as the explanation for the incongruity. If one or both tests fail to meet modern psychometric standards for reliability and validity, then the lack of agreement is to be expected and the "inferior" test should be abandoned. In the case of the MMPI-2 and Rorschach, however, numerous studies have confirmed their relative reliabilities and validities (Mattlar, 2004). For example, Parker, Hanson, and Hunsley (1988) have confirmed that both the MMPI-2 and Rorschach have good reliabilities, $r = .86$ and $r = .84$, respectively, and good convergent validity with scales having similar names, $r = .41$ and $r = .46$, respectively. The convergent validity correlations are higher than what would be expected given the

premise of the current study. However, they were based on earlier studies and it is unclear from the Parker, Hanson, and Hunsley (1988) what variables were compared and under what conditions. Also, a comparative meta-analysis of MMPI-2 and Rorschach validity showed that both methods have acceptable criterion-related validity (Hiller, Rosenthal, Bornstein, Berry, & Brunell-Neuleib, 1999). Thus, the lack of association between the tests is not due to difficulties with reliability or validity with one or both tests.

A second argument focuses on the way constructs are manifested differently in the MMPI-2 and Rorschach. Ganellen (1996) has argued that each test looks at different aspects of psychopathology, and thus they should not be related. For example, the MMPI-2 psychosis items reflect hallucinations and delusions whereas the Rorschach Perceptual Thinking Index (PTI) quantifies aspects of disordered thinking and cognitive slippage. The differing symptoms of psychosis are not necessarily present in the same person at the same time and so one might be sensitive to a certain subclass of people with psychosis, while the other might measure a different subclass. Thus, the lack of association is an expected finding given that each test is sensitive to different components of psychological constructs (e.g., psychosis). Although there is likely some substance to this argument, relevant research is needed. For example, in a clinical group of individuals with a mood disorder, the MMPI-2 depression scales should pick out some of the people with mood disorders, while the Rorschach depression scales should pick out other people with mood disorders. Few studies of this sort have been conducted, and are very much needed (e.g., Blais, Hilsenroth, Castlebury, Fowler, & Baity, 2001; Dao, Prevatt, & Horne, 2008).

Meyer's (1996, 1997, 1999) Theory of the Role of Response Style

Meyer has proposed an alternative explanation for the lack of association between MMPI-2 and Rorschach conceptually related constructs. Further, he has presented empirical data supporting his position. First, the reason that MMPI-2 and Rorschach indices of the same construct (e.g., psychosis) do not agree is because every measurement method (e.g., self-report) has its own form of response bias indicators. Second, every individual's response bias is unique to the particular measurement method (e.g., self-report). In other words, people are not uniformly biased across methods. If someone shows a strong response bias on the Rorschach, for example, that individual is not necessarily likely to show a strong response bias on the MMPI-2, and vice versa. Third, when one selects participants, who, by chance, have the same positions on response bias indicators on the two tests, the correlations between measures of substantive constructs such as psychosis and dysphoria do substantially increase. Meyer refers to individuals who have the same positions on response bias indicators on the two tests as being "aligned" on response bias. Meyer's theory is anchored in the classical literatures on modes of tests and response bias (e.g., Cronbach, 1946), and hence these will be discussed. This will be followed by a review of Meyer's relevant studies and a description of the current study. Cronbach (1946, 1950) stated that the final score of a given individual on a given test is not only composed of the test content but also is dependent on the form in which the items are presented. Thus, he defined response style, response bias, or "response set" as "any tendency causing a person consistently to give different responses to test items than he (sic) would when the same content is presented in a different form (Cronbach, 1946, p. 476)." Therefore, tests supposedly measuring

one trait may also be measuring another trait that would not be measured if the trait was measured using another kind of test. For example, a true-false test measuring depression may misdiagnose someone as depressed if the respondent has a tendency to answer ambiguous items as true, since most psychopathology constructs are indexed by a "true" response to the items. This tendency is referred to as acquiescence or "yay-saying". In this case, the test measures people's propensity to answer items as "true" in addition to their depression. Cronbach defines a number of response sets (also called "response styles") and their posited influence on test scores. For example, the tendency to gamble on abilities tests by choosing to answer questions when unsure of the correct response is likely to lead to higher scores compared to the tendency not to answer items when unsure of the correct response, since respondents generally have at least partial knowledge of the test answer. Another response set has been named evasiveness (Cronbach, 1950) and refers to the tendency to respond "Uncertain", "Indifferent", or "?" when unsure of which response to give. Other sets include the tendency to check many items in a checklist and working for speed rather than accuracy on performance tests.

Thus, Cronbach (1946, 1950) was saying that the observed score for an individual on a given test consists of both "true score" variance (i.e., measurement of the construct of interest), as well as systematic error variance (response sets or response styles). One can add random error (i.e., conditions of the testing or person being tested that cause the score to be an inaccurate reflection of the person's abilities) to this combination. Thus, the observed scores contain these three components.

The types of response styles or sets and the names for them are too numerous to mention. Cronbach (1946, 1950) was concerned primarily with educational tests.

Personality and psychopathology tests are susceptible to some forms of response style which overlap with those of educational tests, but largely, the response sets that confound psychopathology tests are different from those that affect educational tests. In particular, social desirability concerns are very important in tests of personality and psychopathology. A sense of how numerous are the varieties of response sets in addition to social desirability can be gleaned by consulting Greene's (2000) MMPI-2 text for terms such as faking-good, faking-bad, threshold for response, self-deception, other-deception, and so forth.

Edwards, Block, and the "All is Social Desirability" Debate

Given the large influence of method or "systematic error" variance over construct or "true" score, a scholarly debate developed in the 1960s as to what exactly was being measured by self-report personality inventories. Edwards and Heather (1962) and Block (1965) focused on the first unrotated principal component (FUPC) of the MMPI as their focus of study. The FUPC extracted is by definition the largest, and the percentage of common variance (variance shared by one or more bivariate correlations) in the set indicates how much redundancy there is throughout the test. On one side of the debate, Edwards (Edwards & Heathers, 1962; Edwards & Diers, 1962) argued that the FUPC of personality inventories could be seen as a response style component. Specifically, he argued that social desirability, or the tendency to respond to items in a manner judged to be socially acceptable, accounted for the majority of the variance in personality inventories' FUPC. On the other side of the debate, Block (1965) argued that the FUPC of personality inventories measured psychological constructs of interest to the test users and not social desirability as argued by Edwards.

First, Edwards (1959) stated that the social desirability dimension, which he operationalized via a scale of 39 MMPI items, was the principal dimension of the MMPI and other personality inventories. This was based on commonly accepted results of factor analyses of the MMPI scales. It is a mathematical fact that the first unrotated factor or first principal component of any set of items or test scores is an indication of what that set of scores measures primarily (Goruch, 1993). That is, factor or component analysis is a means of reducing a large amount of data by deriving what is common to the set of correlations in a complete correlation matrix of all the data points in the set being considered. The FUPC of the MMPI has usually been observed as accounting for greater than fifty percent of the variance, which is considered quite large. Hence, there is undisputably a great deal of redundancy in the MMPI scales, and the question has always been, is that redundancy a general anxiety, neuroticism, negative affect, or, as Greene (2000) has called it, "misery" factor, or is it something else.

Edwards achieved a correlation of -.93 between FUPC loadings and his measure of social desirability on a large sample of MMPI protocols (Edwards & Heather, 1962). Thus, he argued that when MMPI scores are subject to factor analysis, the largest or main component can be seen as being a response style dimension. He then argued that because a particular response style (social desirability) was such a huge component of self-report personality inventories, reference to results on these tests could not be explained using psychological interpretation of the target traits the tests were supposed to measure.

He argued, in line with Campbell and Fiske (1959), that since irrelevant method variance accounted for the findings on these tests, his psychometric explanation (influence of response style) was adequate in explaining the results. In doing

so, he and others questioned the current and future uses of personality inventories (see Greene, 2000 for discussion).

Block (1965), in his rebuttal, first showed that 22 of the 39 items Edwards used in his social desirability scale had come from the Taylor Manifest Anxiety (TMA) scale. Block stated that by itself, this meant that it would be just as rational to explain the FUPC of the MMPI as an anxiety measure since these 22 items had originally and independently been identified as measuring anxiety. He thus argued that this confound needed to be resolved before it could be shown that the first principal component of the MMPI was a social desirability response style.

Second, in an attempt to resolve this debate, Block (1965) developed a scale that measured the first predominant factor of the MMPI that relied on items that were judged by a panel of expert raters to be "neutral" in terms of social desirability. He then correlated participants' scores on this measure, which was undisputably a measure of neuroticism or "misery", but also judged to be neutral in regard to social desirability, with independent observations obtained from psychologists. He found numerous correlations between scores on the FUPC and the independent observations made by psychologists. The results, he argued, suggests that substantial psychopathology variance, in the sense outlined above, is being measured by the FUPC of the test. According to Greene (2000), Block's argument convinced most assessment researchers and helped to maintain and increase the enterprise of measuring personality through structured personality inventories.

There are, however, limitations in Block's (1965) argument. First, in spite of the correlations he adduced, those correlations were moderate. Even large correlations

between socially desirable-neutral indices of the MMPI FUPC and psychologists' independent observations would not disprove the contention that the FUPC is strongly influenced by response sets or response style, including but not exclusively social desirability. Indeed, the development of the K scale (described below) prior to the Edwards-Block debate was motivated by a concern to establish some way of more closely estimating actual personality dimensions, correcting precisely for response style variance (Meehl & Hathaway, 1946). It can be conceded that Block established that the FUPC of the MMPI, and by implication, because of the FUPCs size, that the MMPI itself is not solely a measure of social desirability. This does not mean that response styles or more informally stated, manners and methods of approaching the test, do not systematically influence observed test scores, and that the extent to which they do cannot be easily disentangled from what we refer to as "true score" or trait variance, i.e., the amount of the targeted trait in the individual.

The Meaning of Observed Test Scores

Thus, for any observed test score earned by an individual, there is random measurement error, systematic measurement error (response sets or response style), and the true score (Meyer, 1999). The observed score is always a combination of these three. Traditional reliability indices, for example, test-retest and internal consistency, only index random error (Anastasi & Urbina, 1997). They do not index those types of error that are due to the method used. Hence, although it may be accurate to describe as "traits" those response styles indexed by the systematic error variance in any given test (e.g., acquiescence, evasiveness, guessing propensity, defensiveness – see Table 1 for a list of common response styles), the "real" trait score is that amount of the observed score that

measures the intended or targeted trait, i.e., what the test is supposed to measure (e.g., extraversion or psychosis). To the extent, however, that irrelevant but systematic method variance contributes to the observed score, the validity of the measure is attenuated (Campbell & Fiske, 1959).

For the current purposes, the key point is that response styles are dependent on the form or manner or method of the test. This point was inherent in the definition quoted by Cronbach (1946), above, to the effect that response bias is "any tendency causing a person consistently to give different responses to test items than he (sic) would when the same content is presented in a different form" (Cronbach, 1949, p.476). Hence, according to the definition, although response bias is a characteristic of persons, it is contingent on characteristics of a specific test as well (i.e., it is contingent on the "form" of the test). Thus, the validity of a test is constrained by the response set of the test taker, but that response set is specific to design features or "formal properties" of the test. It is precisely for this reason that Meyer (1996, 1997) was able to argue that response sets for any individual are stable within test methods or test types, but do not automatically extend beyond a particular test type. For example, if an individual is acquiescent on a given self-report, broad spectrum psychopathology measures such as the MMPI-2, that individual is likely to response "yes" or "true" to the items on the Millon Clinical Multiaxial Inventory-II (MCMI-II; Millon, 1987) as well. This would lead to "overreporting" of psychopathology on both tests, since the keyed direction for most items on these tests is "yes" or "true". However, the same individual would not necessarily "overreport" on another form of the test. That is, response sets for an individual are variable over widely different test modalities.

Table 1

Selected Response Styles and Their Definitions

Response Styles	Definitions
All true	Respondent answers "true" to every item on a test.
All false	Respondent answers "false" to every item on a test.
Deviation	The tendency to give unusual or uncommon responses (Berg, 1967).
Social Desirability	The tendency to answer items in a manner judged by the respondent to be socially acceptable (Edwards & Heather, 1962).
Acquiescence	The tendency to answer "yes" or "agree" when presented with a list of symptoms (e.g., Greene, 2000).
Guessing Propensity	The tendency to guess when unsure of the correct answer (Greene, 2000).
Evasiveness	The tendency to avoid giving answers that will give the tester personal information about the testee (Greene, 2000).

Thus, response styles are common within tests of the same method family (e.g., self-report tests – MMPI-2 and MCMI-II) but do not necessarily extend beyond a specific test family(e.g., inkblot performance tests – Rorschach and Holtzman Inkblot Test; Barger & Sechrest, 1961).

For example, the same individual with an acquiescent response style would likely respond "True" to many MMPI-2 items. This same tendency, however, may not be evident in an open-ended test like the Rorschach or Holtzman where the individual is free to respond in whatever manner that individual sees fit. Indeed, it is difficult to conceive of any precise analogue to acquiescence in the inkblot modality. What is there to acquiesce in the Rorschach? The very concept presupposes that there is a statement with which to agree or disagree. There are no statements in the Rorschach.

The same concept, acquiescence, also shows that response style cannot be defined by anything so simplistic as, for example, whether the test uses verbal or visual stimuli. Most intelligence tests are verbally based, but unless they ask for some variant of assent or dissent, the response style known as acquiescence simply would not apply to them. For example, acquiescence does not apply to multiple-choice tests, although, serial position effects for the first or last option is a common response bias for multiple-choice tests. The case of acquiescence illustrates the point that some sources of response style simply cannot be extended across families of tests. Beyond this point, the case of acquiescence further indicates that what is often called a modality or method of testing (Campbell & Fiske, 1959) cannot easily be defined simply by referencing whether the test is verbal or non-verbal, "performance or self-report", etc.

Response styles have the effect of biasing the actual measurement of the intended constructs by increasing (or lowering) test scores (Cronbach, 1946). For example, a subject's score on an achievement test will, to some extent, be influenced by the degree to which the respondent is willing to guess (rather than say "I don't know") apart from the respondent's knowledge of the material. If one respondent has a tendency to guess when unsure of the correct response and the other respondent chooses not to answer when unsure of the correct response, the likely outcome is a difference in final scores. In this case, their final scores will reflect both their knowledge of the test content and the way that they responded to the test. The same scenario can be applied to personality tests. Again, if one respondent has a lower threshold for responding "yes" to a symptom checklist, that respondent's scores will be different from those of an individual with the same symptoms whose threshold for responding "yes" is higher (Couch & Keniston, 1960). Thus, response styles lower the validity of inferences that can be drawn from test results and can be seen as "error" variance, albeit systematic error variance. The degree of error cannot be easily determined since the single "yes" response to items in the keyed direction indexes both psychopathology (true score) and response set (systematic error variance). Further, as discussed above, there are many different kinds of response styles and they do not reflect only exaggeration or minimization of psychopathology. They reflect personal tendencies to respond to test stimuli apart from test content (Jackson & Messick, 1962).

Genuine Traits and Response Style "Traits"

Further complicating this whole discussion is that, broadly speaking, a response set is typically the result of a genuine trait, that is, an aspect of personality that is stable

in much the same way the aspects of personality psychopathology targeted by tests such as the MMPI-2 are stable traits (Wiggins, 1962). This means, in an indirect sense, one can speak of tests as measuring these "traits". Consider first Edwards' trait, social desirability (Edwards & Heather, 1962). Observance of what is socially desirable is itself a trait. Again, consider a character trait associated with responses to the MMPI-2 K-scale. Caldwell (1985) has identified this as consisting of a certain attitude found among those of higher socio-economic status that one should be relatively impervious to the slings and arrows of fortune, to keep a "stiff upper lip", and so forth. K was developed precisely in order to correct for subtle forms of underreporting (Greene, 2000), and its developers did not have this "stiff upper lip" character style in mind.

The response style or response set itself is very much trait-like, and most likely is a form of self-enhancing (narcissistic) self-deception. It very obviously influences scores on tests of psychopathology, including the MMPI-2 clinical and content scales. These response sets can be conscious strategies, devised in the given situation, and to this extent are state-like: the particular situation of being examined for some secondary gain (including avoidance of punishment) potentiates the response set. Typically, those who markedly distort their responses under these circumstances would be less likely to do so under different circumstances. Nonetheless, the tendency to do so situationally could be called a "trait" in the sense that under certain circumstances where the consequences are likely to be more trivial, the individual compromises his or her honesty. The fact is, traits are almost all situationally dependent in the sense that they are conditional (see, for example, Horowitz, 2002). That is, dishonesty as a trait is not typically global, but rather becomes manifest only when various opportunities to display it apply. Dishonest people

do not typically take every opportunity to display dishonesty, but qualify for the description as dishonest by virtue of choosing a subset of the available opportunities, one of which arises when taking self-report psychopathology tests in situations in which secondary gain may apply. For the current purposes, one cannot count the measurement of "traits" such as social desirability, malingering (or consciously faking bad), or unconscious self-enhancement, such as the K scale seems to measure, as true score variance in MMPI-2 scales intended to measure constructs such as psychosis, anxiety, or depression. Rather, to the extent that these MMPI-2 scales measure such traits as social desirability and so forth, they measure systematic error variance. Nonetheless, there are tests intended to target precisely such traits as impression management and self-enhancing self-deception (e.g., the Paulhus Tests, Paulhus, 1984). Insofar as these tests are designed to target precisely these constructs, they are the "real" traits on which respondents compile true score variance from these tests. On these tests, impression management and self-deception are not systematic error, but rather the targeted traits of interest. Hence, for some traits (e.g., impression management) one test's systematic error variance (e.g., the MMPI-2) is another test's targeted constructs (e.g., Paulhus Impression Management scale).

For the current purposes in discussing self-report measures, however, we are not discussing tests like Paulhus' and reserve the term "trait" to refer to traits targeted by these psychopathology measures (e.g., depression). Impression management, social desirability, self-enhancing self-deception, and so forth, are described as response styles (i.e., systematic error variance), while acknowledging that they are quite trait-like.

Campbell and Fiske's (1959) Explication of Convergent and Discriminant Validity

In an attempt to help sort out the relative influences of method variance (systematic error) and trait variance (true), Campbell and Fiske (1959) developed a model describing the operations needed to establish a test's validity. They stated that for a test to be valid, it needs to have both convergent and discriminant validity. Thus, a construct from a particular test should be correlated with a similarly named construct from a different test. For example, as mentioned above, depression on one test needs to be correlated with depression on a second test in order to establish the test's convergent validity. To further establish convergent validity, the two tests under study should be maximally different in test mode or method (e.g., self-report and performance). That is, the manner in which the testing procedure gets the evaluee to interact with the test, what the evaluee is actually doing procedurally in order to measure the construct, should be maximally different. Again, the rationale for this second requirement, according to Campbell and Fiske (1959) is because two tests from the same method family (e.g., two self-report tests) share method specific, systematic error variance. Thus, the correlations for the constructs under study will be spuriously elevated because the correlations found will reflect both construct variance and method-specific error variance (Campbell & Fiske, 1959). In other words, when the achieved convergent validity correlations are due to tests being from the same method family rather than from similar constructs, the tests have not been shown to have convergent validity. If, on the other hard, it can be shown that a construct from one method family correlated significantly with the same construct from a different method family, and if the separate development of the two tests and earlier research

indicates they should be measuring similar constructs, then convergent validity has been shown (Campbell & Fiske, 1959). This is an idealized model, however, and it has not generally been found in the literature. Typically, tests from the same method family (e.g., self-report) will have higher correlations with each other than with tests from a different method family (e.g., performance), regardless of the constructs being studied (Campbell & Fiske, 1959; Jocic, 2005).

Discriminant validity is established when a test is uncorrelated with another test from which it is supposed to differ (Campbell & Fiske, 1959). For example, a test of intelligence should not have any appreciable correlation with a test of depression, regardless of the method family under study. In order to establish discriminant validity, as well as the relative contributions of method and trait variance, several traits and several methods must be used. Discriminant validity is established when a construct correlates more highly with a similarly named construct measured using a test from a different method-family than with an independent construct from the same method family. For example, depression on the MMPI-2 should be more highly correlated with depression on the Rorschach than with psychosis on another self-report measure.

Thus, Campbell and Fiske (1959) claimed that method variance was essentially a form of systematic error variance, and reported that it usually accounts for a substantial portion of total variance in convergent validity analyses. This has been the general finding for the MMPI-2-Rorschach interrelations (e.g., Archer & Krishnamurthy, 1993a). Campbell and Fiske (1959) did not, however, label this systematic error variance as response bias or response style, but simply saw it as due to a common method. As seen

above, the fact that response styles are common with method families is largely due to the fact that some forms of response bias are only possible within specific types of methods. For example, as we saw, acquiescence is really not applicable in the Rorschach nor most intelligence tests. Nor does it make sense, for example, in a sentence completion test or a continuous performance test.

Meyer's Alignment Argument

Edwards and his colleagues (Edwards & Heathers, 1962; Edwards & Diers, 1962) argued the strong claim that the FUPC of every self-report test was to such a degree infused with social desirability (i.e., response style bias) that virtually no test score on any scale could be trusted to index the target construct. A weaker claim can be made that the FUPC on *any* test, or at least on the MMPI-2 and the Rorschach, is infused with substantial amounts of response style (Meyer, 1999). Coupling this with the insight that response style variance is method-specific, then the grounds are set for seeing why valid measures of the same psychological construct might not correlate. As Meyer (1996) pointed out, response style as it has been defined above does not rely on deliberate falsification, exaggeration, or minimization of pathology. It is to be understood apart from any conscious attempt to falsify or change test data. It has much more to do with the method of the test itself, and an individual respondent's approach or manner of interacting with the test. It is due to a particular way of interacting with the test, and hence is more like a cognitive or personality style. Thus, Meyer (1999) has labelled these "response-character" styles.

Meyer (1999) provides some caution in the interpretation of response-character styles. First, they are seen as method variance in the sense that they are method specific

in the ways illustrated above. Again, it is expected that the way one responds on two self-report inventories, for example, will be correlated. A correlation of r (357) = .85, p < .01 has been found for response style indicators on two self-report measures (MMPI-2 and MCMI-II) (Meyer, 1997). In contrast, the way one responds on the MMPI-2 (self-report) will be uncorrelated with the way one responds on the Rorschach (performance). To illustrate this point, Meyer (1997) turned to traditional measures of "defensiveness" or lack of "engagement" on the MMPI-2 and the Rorschach. These have been identified as, for the MMPI-2, the L and K scales. The L scale was originally developed to contain items that involve highly desirable but very rare human characteristics. For example, to the statements "I do not always tell the truth" or "what others think of me does not bother me" most individuals, if they were being honest, would have to answer true to the first statement and false to the second statement. Thus, individuals who respond in the opposite (dishonest) direction to many such statements are likely being dishonest. The K scale was originally developed as a way to identify patients who were diagnosed with significant psychopathology, yet still obtained scores within the normal range (Meehl & Hathaway, 1946). The scale thus serves as a measure of defensiveness with higher scores indicating an unwillingness to acknowledge psychological distress. Both L and K can be understood as measure of dishonesty or inability to disclose human weakness (L) and psychological distress (K) (Meehl & Hathaway, 1946).

For the Rorschach, the pure form or the percentage of responses that have only pure form as determinants have been used for these purposes. Higher pure form percentage protocols have been interpreted as resulting from defensiveness, lack of creativity, or a tendency to answer the question "what might this be?" in a concrete and

literalistic manner, disengaged from the emotional content that might arise in the patient during the test administration (Exner, 2000). Meyer (1997) showed that traditional measures of defensiveness on the MMPI-2 (scales L and K) and Rorschach (pure form percent) had an average correlation of r (357) = .01, p = ns. Thus, the characteristics that make a person respond in a defensive, exaggerated, or relatively open and honest manner on the MMPI-2 are different from those that make a patient respond in a defensive, exaggerated, or more open manner on the Rorschach. This is due in part to the large differences between the methods. Chief among these is that most self-report measures, including the MMPI-2, rely heavily on the face validity of items. Thus, when the person is responding in the keyed or non-keyed direction, he or she generally knows the implications of the response. Even though an evaluee may not know whether an item is specifically, say, a depression item ("Lately, I've been feeling blue) or, say, a persecution item ("Someone has it in for me"), each of these sentences is an obvious vehicle for complaint, a vehicle for expressing dysphoria or negative affect, and the questions themselves are invitations to complain. Being shown a Rorschach card and being asked "What might this be?" is not such an obvious invitation to complain. The MMPI-2 items consistently constrain their content in such a way as to invite or, in terms of projective literature, to "pull" for complaining. It is difficult to see the individual Rorschach cards as vehicles for complaint. As opposed to the MMPI-2, the Rorschach's stimuli are novel, the expectations are minimally defined, and there is a wide range of potential responses (S. Hibbard, personal communication, September 30, 2005).

Second, the boundaries between styles are also seen as "fuzzy" (Meyer, 1999) in that there is no clear separation between an optimal style and styles that over- or under-

endorse pathology. Otherwise put, for any style, the individual differences recorded as stable error variance in the observed score in any sample constitute continuous variable(s), measuring a continuously distributed trait or set of traits.

Third, it is not possible to distinguish intentional and unintentional deviation from true construct scores (Meyer, 1999). In other words, it is not possible to determine, from the test scores, whether scores are elevated (or reduced) because of intentional exaggeration (or minimization) or character structure. For example, a respondent may achieve high scores on MMPI-2 depression scales because they endorsed symptoms of depression in an effort to achieve secondary gain or because they see themselves as fragile and deficient.

Fourth, these styles are not mutually exclusive. A subject may exaggerate pathology because of his character structure and the intentional exaggeration of symptoms (Meyer, 1999). For example, a respondent may over-endorse symptoms because of the desire to achieve secondary gain and because they see themselves as fragile and deficient.

Finally, styles that, either intentionally or unintentionally, exaggerate symptomatology have the effect of increasing scores on the relevant constructs (e.g., depression, psychosis) while styles that minimize pathology (again either intentionally or unintentionally) decrease scores on test constructs (Meyer, 1999). This is because respondents who exaggerate psychopathology will endorse many symptoms and achieve higher scores on relevant constructs (e.g., depression, psychosis), while those who minimize psychopathology will endorse fewer symptoms and achieve lower scores on the same constructs (e.g., depression, psychosis).

First Unrotated Principal Component (FUPC) Variance

A related issue has to do with a test's first factor and FUPC. As discussed above, a test's FUPC and largest dimension can be seen partly as a response style factor (Edwards & Edwards, 1991). For example, the MMPI-2's first dimension has accounted for as much as 50% of total test variance and 75% of common variance (Edwards & Edwards, 1991). The first factor of the MMPI-2 has also been labelled negative affectivity or distressed emotionality (Johnson, Null, & Johnson, 1984). Thus, it has been described as a general measure of psychopathology. Welsh's A (Anxiety; Welsh, 1956) was developed specifically as a factor marker for the first factor of the MMPI-2. It correlated with the first factor $r = .95$. Thus, it is an excellent marker of the MMPI-2's first factor. Like scores on the FUPC, scores on Welsh's Anxiety Scale reflect genuine distress or psychopathology as well as a more open response style. For example, participants who respond in a more open manner on the MMPI-2 and who endorse many symptoms of psychopathology achieve higher scores on Welsh's A, compared to participants who respond in a more defended manner (minimizing psychopathology).

The Rorschach's first unrotated principal component (FUPC) accounts for approximately 20-25% of total variance. Meyer (1992) developed R-Engagement as a factor marker for the Rorschach's FUPC. R-Engagement was calculated for each individual using the additive sum of each individual's score on each Rorschach variable weighted by that variable's loading on the first unrotated principal component from the component analysis of these variables. R-Engagement correlates highly the FUPC of the Rorschach (.96). Thus, R-Engagement is an excellent marker of the Rorschach's FUPC. Again, this factor is considered to be partly a response style measure. In contrast to the

MMPI-2, the FUPC of the Rorschach can best be understood as "engagement". Scores on the FUPC will vary depending on the extent to which participants are involved and engaged in the task. 'Defended' participants who approach the Rorschach in a disinterested, basic, or defended manner, giving few responses and sticking to basic descriptions of the inkblots (that is, using mainly form as determinants) will get low scores on R-Engagement. Conversely, 'open' participants who approach the Rorschach in an open, interested and engaged manner, describing their percepts based on the colour, shading, apparent movement, and potential content of the inkblots will achieve high scores on the R-Engagement. High scores will also be achieved by participants experiencing significant psychopathology as well as by participants who approach the test in an undefended, flamboyant, or unusual manner. Thus, as with Welsh's A, R-Engagement contains both response style variance and general psychopathology variance.

Meyer's Studies

In a series of studies, Meyer and colleagues (Meyer, 1996, 1997,1999; Meyer et al., 2000) showed how selecting participants who have similar rank order positions on the FUPC of each test moderates convergent validity. That is, when participants who have similar rank order positions on both tests' FUPC are selected (e.g., open on the MMPI-2 and open on the Rorschach), conceptually related scales (e.g., psychosis) correlated at a significant level. Also, when participants are selected who have opposite rank order positions on each test's FUPC (e.g., open on the Rorschach and defended on the MMPI-2), negative correlations are found between conceptually related constructs. Again, as noted in the preceding section, FUPCs and FUPC markers (e.g., Welsh's A and R-

Engagement) contain both response style variance and general psychopathology variance. Thus, choosing subjects who have similar (aligned) or dissimilar (opposite) scores on FUPCs matches these subjects on both response style dimensions and general psychopathology.

Meyer's 1997 Study

In the first of these studies, Meyer (1997) selected participants based on their scores on Welsh's Anxiety Scale for the MMPI-2 and scores on R-Engagement for the Rorschach. Participants who scored in the upper third (i.e., top tercile) on both Welsh's Anxiety Scale and R-Engagement were considered openly responsive and participants who scored in the lower third (i.e., bottom tercile) were considered defensively guarded.

His results were as follows (Meyer, 1997). First, FUPC marker placement, as measured by Welsh's A and R-Engagement, were essentially uncorrelated in the MMPI-2 and Rorschach. Thus, as previously discussed, what leads a person to have a high rank order position on the MMPI-2 FUPC marker is essentially uncorrelated with what leads a person to have a high rank order position on the Rorschach FUPC markers.

Second, when FUPC marker position was ignored (i.e., when the entire sample is used), there is essentially no correlation (average validity correlation of r (357) = -.01, p = ns) between similarly named MMPI-2 and Rorschach constructs (dysphoria, psychosis, and interpersonal wariness) (Meyer, 1997). This finding is consistent with the literature (e.g., Archer & Krishnamurthy, 1993a).

Third, when analyses were limited to participants whose rank order positions on the respective FUPC markers are very similar (high MMPI-2, high Rorschach or low MMPI-2, low Rorschach), correlations increase substantially. For dysphoria, the range

of correlations was r (85) = .42 to .67, $p < .01$. For psychosis, the correlations ranged from r (85) = .46 to .54, $p < .01$. For interpersonal wariness, the correlations averaged Mr (85) = .47, $p < .01$. Overall, then, when participants were selected whose FUPC maker placement was similar on both methods, substantial convergent validity can be obtained (Meyer, 1997).

Fourth, when analyses were limited to participants who have opposite placement on FUPC and FUPC markers (e.g, guarded on the MMPI-2 and openly responsive on the Rorschach), negative correlations were obtained. For dysphoria, the correlations averaged Mr (76) = -.55, $p < .01$. The findings, however, were less pronounced for constructs of psychosis and interpersonal wariness (Meyer, 1997).

Meyer (1997) discussed his results by indicating that method and trait variances were confounded while intentionally equalizing response style. In other words, because response-character style indicators (e.g., Welsh's A and R-Engagement) overlap with the constructs under study (e.g., depression), the results reflect ways of approaching the tests (response style) as well as personality constructs. He described his study (Meyer, 1997) as answering the questions "If we hold response style constant across methods – as is always the case when analyses are conducted with two self-report inventories or two observer rating scales – will there be convergent validity?" His results answer the question in the affirmative. Again, although Meyer highlighted the influence of response style inherent in the FUPC markers, it is important to remember that subjects who are aligned on FUPC markers are aligned on both response style and general psychopathology.

Meyer (1997) also cautioned that even though Rorschach and MMPI-2 FUPCs are uncorrelated in the full sample, selecting participants on the upper and lower third forces them to be correlated. The FUPCs were correlated at a level of r (85) = .70, $p <$ .01 in the group who have the same positions on both MMPI-2 and Rorschach FUPC markers and r (76) = -.77, $p <$ .01 in the group that has opposite placement on FUPC markers. Thus, any scales that are correlated with their respective FUPCs will also be correlated. Then, the question becomes, "To what extent are the observed convergent validity correlations larger than would be predicted simply by matching participants on the upper and lower thirds of each FUPC?" Using a correction formula, Meyer showed that when the expected degree of correlation between each MMPI-2 and Rorschach variable (i.e., dysphoria, psychosis, and interpersonal wariness) is removed (based on FUPC correlations), the residual provides an estimate of construct convergence. In his sample, the correlations were r (85) = .29, $p <$ .05 for dysphoria, r (85) = .25, $p <$ .05 for psychosis, and r (85) = .20, $p <$ .05 for wariness. This is compared to r (85) = .42, to .67 $p >$ .01 for dysphoria, r (85) = .46 to .54, $p <$ .01 for psychosis, and an average of *Mr* (85) = .47, $p <$ .01 for wariness prior to applying the correction formula. Meyer (1997) did not compare the residual correlations to the original correlations to determine whether they were significantly different.

Thus, the residual correlations are smaller than what was originally found (i.e., *Mr* for depression of .42 to .67, .46 to .54 for psychosis, and .47 for wariness). They are, however, higher than what was found when FUPC marker position was ignored (average correlation of r (356) = .02, p = ns). Meyer (1997), however, did not compare the residual correlations to the correlations achieved when FUPC marker position is ignored.

He cautioned, however, that the correction formula in a sense overcorrects by treating all FUPC variance as being the result of response style. Since we know that FUPC scores reflect traits (general psychopathology) as well as response style, the obtained correlation coefficients are an underestimate of true construct overlap. In other words, it provides an estimated floor value.

Meyer's 1999 Replication and Extension

Meyer (1999) replicated and extended the previous study based on four limitations. First, he wanted to devise FUPC markers that were: (a) easy to calculate and interpret, (b) relied on commonly recognized MMPI-2 and Rorschach indicators of response style, and (c) were not potentially confounded by alternative constructs.

Second, due to potential methodological artifacts of selecting extreme groups of participants for the analysis (upper and lower third of FUPCs) in the prior study, he further investigated the integrity of the results. In order to investigate the discriminant validity of his results, he tested whether participants who had similar rank order positions on FUPC markers on both tests would obtain positive correlations for variables thought to be conceptually unrelated. For example, if participants with similar rank order positions on FUPC markers on the MMPI-2 and Rorschach achieved high correlations on conceptually unrelated MMPI-2 and Rorschach constructs, then the convergent validity analyses would not have provided anything of substance. In other words, if conceptually unrelated constructs correlate when participants are matched on FUPC marker placement, then the results from the previous study would simply document the overwhelming influence of FUPC markers rather than convergent validity of conceptually related constructs (e.g., MMPI-2 and Rorschach depression). Thus, the

results would reflect the large influence of response style and general psychopathology rather than specific construct convergence (e.g., MMPI-2 dysphoria and Rorschach dysphoria).

For these analyses, Meyer (1999) used several variables from both the MMPI-2 and Rorschach that were minimally related to the constructs of dysphoria, wariness, and psychosis. For example, he used Scale 3 (hysteria) from the MMPI-2 and the adjusted D score (a measure of stress coping resources) from the Rorschach. He performed the analysis with two sets of variables. The first set was selected because each variable in the set had high correlations with the respective test's FUPC. He named these "conceptually unrelated variable pair selected for high FUPC correlations" (CUVP-HighFF). For the Rorschach, the variables used in the CUVP-HighFFs analysis had an average correlation of r (360) = .44, $p < .01$ with the Rorschach's FUPC. This is essentially equivalent to the average correlation of dysphoria, wariness, and psychosis with the Rorschach FUPC (.48). For the MMPI-2, the CUVP-HighFFs had an average correlation of r (360) = .52, $p < .01$ with the MMPI-2's FUPC. This was lower than the average correlation of the MMPI-2 indicators of dysphoria, wariness, and psychosis and the MMPI-2's FUPC (r (360) = .78, $p < .01$). No significance tests were conducted however.

Meyer (1999) then selected sets of variables from the Rorschach and the MMPI-2 that were not highly correlated with each test's FUPC in order to see whether these correlations would be as high as those for the CUVP-HighFFs. He named these "conceptually unrelated variable pairs – not selected for FUPC correlations" (CUVP-NotFF). For the Rorschach, the average correlation between CUVP-NotFF and the

Rorschach's FUPC was r (360) = .27, $p < .01$. For the MMPI-2, the average correlation between CUVP-NotFF and the MMPI-2 FUPC was r (360) = -.01, p = ns. He reasoned that even though both the CUVP-NotFF and CUVPHighFFs are made up of conceptually unrelated variables, the CUVP-NotFF correlations would be significantly lower than the CUVP-HighFF correlations because of the influence of response style or FUPC variance on the CUVP-HighFF.

Third, as an additional test of potential methodological artifacts, Meyer (1999) reasoned that even without selected participants based on FUPC alignment, the expected pattern of correlations could be found. From his large aggregate sample (N=362), he selected multiple sub-samples whose FUPC correlations varied naturally. He thus reasoned that correlations between the MMPI-2 FUPC and the Rorschach FUPC would naturally vary when different sub-samples are chosen. It was thought that conceptually related constructs would correlate to the extent that FUPCs correlate. As predicted Meyer found that conceptually related constructs correlated to the extent that first factors correlated. When, by chance, the first factors were highly correlated in the sub-sample chose, conceptually related constructs were likewise highly correlated.
When the first factors were less highly correlated, the conceptually related constructs were likewise less highly correlated.

Fourth, Krishnamurthy, Archer, and House (1996) were unable to replicate Meyer's (1997) earlier findings with a sample of adolescent patients. Thus, Meyer (1999) evaluated whether his earlier findings (Meyer, 1997) were due to chance or potential personality organization differences between adolescents and adults. Krishnamurthy et al. (1996) did not use factor criteria to define response style. Thus,

Meyer (1999) evaluated the similarity between the procedures for defining FUPC markers employed by Krishnamurthy et al. and his own. He further evaluated whether the Krishnamurthy et al. criteria would produce the expected results with a sample of adults.

As an additional way of defining FUPC markers, Meyer (1999) used variables traditionally thought to be direct measures of response style. For the Rorschach, these were R (i.e., the number of total responses given) and Lambda (i.e., the number of responses and the number of pure F determined responses as a function of pure F). For the MMPI-2, the direct measures of response style were F and K. These measures have traditionally been used in the clinical interpretation of the Rorschach and MMPI-2, irrespective of any relation they may have had to the factor structure of the measures. That is, they are encoded in clinical interpretation manuals for use in determining, in the case of the Rorschach, what Exner (2000) termed stylistic variables, and in the case of the MMPI-2, what Hathaway and Meehl originally called validity indices (Greene, 2000), in the sense that they are used to assess the validity of the administration of a particular MMPI-2. Hence, by appealing to these variables, Meyer hoped to show that his argument for the alignment perspective makes intuitive sense to clinicians who have already used these variables to determine the level of engagement in the task. For the Rorschach, R and Lambda were selected as measure of both poles of the FUPC.

The number of responses given on the Rorschach or R has clinical significance (Meyer, 1992). Faced with the question "what might this be?" participants are free to give as many responses as they deem appropriate to the 10 inkblots with a minimum of at least 14 responses over the entire protocol. Thus, it seems valuable to interpret the

difference between participants who give few compared to many responses. Exner (1986) interpreted profiles with few responses as possibly being due to neurological deficits, depression, or guardedness. He also described low R protocols as largely being due to resistance/defensiveness (Exner, 2000). Profiles with high Rs have been described as being due to high engagement with the task, a flamboyant or dramatic presentation, or to an exaggeration of pathology.

Lambda is based on the percent of response that are "pure form" compared to the total number of responses. Specifically, the number of pure form responses is divided by the total number of responses minus the pure form responses (Pure Form/(R-Pure Form). Again, since participants are free to respond to the inkblots in any way they deem appropriate, the kinds of response they make have clinical significance. Someone who responds to the form of the inkblots, rather than the colour, or the shading for example, can be seen as responding very strictly and very minimally to the instructions of the protocol. Thus, they are interpreting the question "what might this be?" in a very minimalist and very objective fashion, taking very minimal chance on allowing their feelings or yearnings to emerge. Participants who achieve high Lambdas have been described as defended, guarded, cognitively limited, or uncreative (Exner, 2000). Thus, high Lambda protocols help define the guarded end of the response style spectrum.

R had a loading of .70 on the Rorschach's FUPC and Lambda had a loading of -.40. Thus, these variables adequately quantify the openly responsive and guarded ends of the Rorschach FUPC.For the MMPI-2, Meyer (1999) used F and K as indicators of response style. The F scale was originally developed as a way of detecting unusual or atypical ways of answering questions. It contains items that the normative sample

responded to less than 10% of the time (e.g., "There is something wrong with my mind." "No one cares much what happens to you."). Thus, respondents who achieve high scores on F are either experiencing significant psychopathology or they are overreporting their symptoms. K was previously described as a measure of defensiveness and a reluctance to endorse psychological difficulties. F had a loading of .73 on the FUPC and K had a loading of -.73. F and K adequately quantify openly responsive and guarded poles of the MMPI-2 FUPC. Participants were identified as openly responsive or guarded if their values for both variables (MMPI-2 F and K; Rorschach R and Lambda) were above or below the median values. For example, a subject whose F score was above the median and whose K score was below the median would be defined as openly response. Since the scores are encoded in a standard MMPI-2 or Rorschach profile summary (i.e., test report), Meyer named F and K on the MMPI-2 and R and Lambda on the Rorschach profile scores.

Krishnamurthy et al.'s (1996) criteria for defining FUPC markers generally used only one variable (e.g., MMPI-2 F scores). Thus, Meyer's (1999) criteria were more inclusive and included a variable from each pole of the tests' FUPC. Meyer (1999) then evaluated the relation between FUPC markers as measured by the factor scores used in the previous study (Meyer, 1997) (Welsh's Anxiety Scale and Response-Engagement) and the current profile scores (MMPI-2 F and K; Rorschach R and Lambda). He found that the MMPI-2 profile scores used had a good association with the MMPI-2 factor scores, while the Rorschach profile scores had a fair association with the Rorschach factor scores. For the MMPI-2, the two ways of measuring the FUPC were correlated at a level of $r\,(350) = .61, p < .01$ (Meyer, 1999). For the Rorschach, the two ways of

measuring the FUPC correlated at a level of r (350) = .37, p < .01 (Meyer, 1999). Both profile scores and factor scores generally had poor associations with the criteria employed by Krishnamurthy et al. (1996) (overall Kappa Coefficients Classification Agreement of .11 with the factor criteria and .10 with the profile criteria). Thus, Meyer's two different FUPC markers were unrelated to Krishnamurthy et al.'s FUPC marker. It is interesting to note that Meyer's profile scores selected substantially different sets of patients for analysis than did Meyer's factor scores. Thus, even though the profile and factor scores are correlated (r (350) = .61, p < .01 for the MMPI-2 and r (350) = .37, p < .01 for the Rorschach), each FUPC marker selects different patients. Participants who were above and below the median using the profile scores were generally not the same patients who were in the upper and lower terciles using the factor scores. For example, the overall classification agreement (k) based on Cohen's kappa between the factor criteria (R-Engagement and A) and the profile scores (L and K from the MMPI-2, and F and Lambda from the Rorschach) was .31. Meyer thus reasoned that the addition of the profile scores serves as an additional way to measure FUPCs, and may also serve as a semi-independent test of the convergent validity hypotheses because each method selects substantially different samples of patients. Thus, if both FUPC markers generate the expected convergent validity results, more confidence can be placed in those results.

Both sets of criteria were found to generate the expected pattern of convergent validity. The factor scores had an average correlation of Mr (85) = .52 , p < .01 across the constructs of dysphoria, wariness, and psychosis, while the profile scores had an average correlation of Mr (52) = .43, p < .01 across the same constructs. The adolescent criteria used by Krishnamurthy et al. (1996), however, had an average correlation of only

Mr (145) = .08, $p < .01$. Thus, Krishnamurthy et al.'s criteria produced the same pattern of results for the adult sample as was found for their adolescent sample. These findings also held for patients with opposite placement of FUPC markers. Thus, as with the previous study, participants identified as having opposite placement on the profile scores or the factor criteria achieved negative correlations between the MMPI-2 and Rorschach constructs of dysphoria, of wariness, and of psychosis.

In regard to the analysis of conceptually unrelated variable pairs (CUVPs), Meyer (1999) found that even when participants were matched on FUPC markers, the average correlations between the CUVP-HighFF were smaller than those found for conceptually related variables. All correlations for the CUVP-HighFF were below $r = .19$ compared to $r = .48$ or above for conceptually related variables (dysphoria, wariness, and psychosis) on both methods. Thus, even though the variables selected for the CUVP-HighFF analyses correlated with their respective FUPCs at a levels comparable (at least for the Rorschach) to the constructs of interest (i.e., dysphoria, wariness, psychosis), the correlations achieved were lower, although Meyer did not test whether the differences in the correlations were significant. Meyer concluded that construct convergence among conceptually related variables is not due simply to FUPC alignment since the associations are larger for the conceptually related variables than for the CUVP-HighFFs. Again, Meyer (1999) did not test to see whether there was a significant difference between the correlations. When participants who had opposite placements on MMPI-2 and Rorschach FUPC markers were chosen based on factor scores, the results were larger negative correlations for conceptually related constructs compared to CUVP-HighFFs. However, the profile scores did not result in higher negative correlations among

conceptually related variables compared to CUVP-HighFFs. Thus, with the profile scores, the results were undifferentiated. Again, however, Meyer did not test whether the correlations between CUVP-HighFFs were significantly smaller than the correlations between conceptually related variables.

For the CUVP-NotFF, the correlations were essentially zero (r (350) = .01, p = ns). Thus, as expected, conceptually unrelated variables that are also not highly correlated with their respective FUPCs were uncorrelated. This helps show evidence of discriminant validity (Meyer, 1999).

In Meyer's (1999) analysis of multiple samples, he found high correlations between FUPCs and constructs. Thus, in this case, construct convergence was largely a product of response-character styles. However, as is consistent with the entire purpose of the present study, it can be pointed out that the FUPC of any general psychopathology measure is a confounded indicator of both systematic error variance (response style) and systematic but general true score variance (general psychopathology). Meyer's finding that correlations between specific, highly related variable pairs (e.g., Rorschach dysphoria and MMPI-2 dysphoria) may be no more due to response style than it is due to general psychopathology.

In conclusion, Meyer (1999) stated that when Rorschach and MMPI-2 FUPCs are aligned, there will be high correlations between variable pairs as long as those variables are also highly correlated with their respective FUPCs. He added, however, that this correlation would be most pronounced with conceptually similar variable pairs.

Archer and Krishnamurthy's Critique of Meyer's 1999 Study

Archer and Krishnamurthy (1999) criticized Meyer's (1999) study on two grounds. They questioned his statistical methodology and his conclusions based on the process of inference in the scientific method. First, they felt that his results do not support convergent validity since they are based on "highly focused and complex analyses (p. 320)" on a very small number of participants (less than 25% of sample). They found it unconvincing that with his procedure he was able to find convergent validity. They further questioned his use of aggregating similar constructs into composite measures since they spuriously inflate the correlations found. They concluded that in order to gain support for convergent validity of the Rorschach and MMPI-2, they would need to obtain "contrasting patterns of convergent and divergent correlations coefficients for similar and dissimilar constructs by using similar and dissimilar methods, respectively. (p 320)".

Their second point relates to the conclusions reached by Meyer (1999). Meyer stated that his studies have shown that under certain conditions, similarly named Rorschach and MMPI-2 constructs converge. Archer and Krishnamurthy (1999), drawing on their own literature review of MMPI-2-Rorschach relations, stated that there are studies spanning over 50 years and thousands of participants that have not found any consistent relations between the MMPI-2 and the Rorschach. They further state that Meyer's analyses are based on unreplicated correlational studies using very restrictive samples and that much more evidence is needed in order to confidently state that there are clear and consistent relations between the MMPI-2 and the Rorschach.

Meyer et al.'s 2000 Study

Meyer's third and final study considered for this review (Meyer, Riethmiller, Brooks, Benoit, & Handler, 2000) addressed Archer and Krishnamurthy's (1999) criticisms. In order to select more patients for analyses, Meyer used, as FUPC markers, the factor scales (R-Engagement and Welsh's Anxiety Scale), the traditional test-taking indicators or profile scales (F and K; R and Lambda), and FUPC scores. In a further effort to include more patients for analysis, patients were defined as guarded or openly responsive if they met criteria from any of the above methods. For example, someone would be considered openly responsive on the MMPI-2 if she/he was above the median on F and below the median on K OR she/he was in the upper tercile on Welsh A OR she/he was in the upper tercile of the FUPC. Individuals who were openly responsive on both the MMPI-2 and the Rorschach, comparably defined, or guarded on these two measures comparably defined, were included. The results for dysphoria, psychosis, and wariness generally replicated the previous
results.

Meyer et al. (2000) also performed the convergent validity analyses using the MMPI-2 and the MCMI-II (Millon, 1987). Using two self-report measures, the authors suggested, would help put the Rorschach-MMPI-2 relations into perspective. The results would also help identify the effects of method variance since the two instruments come from the same method family (i.e., self-report). Finally, in order to address Archer and Krishnamurthy's (1999) concerns regarding convergent and discriminant validity, Meyer et al. (2000) constructed a multi-trait multi-method matrix (Campbell & Fiske, 1959).

In terms of Meyer et al.'s (2000) more liberal method for determining FUPC marker placement, the inclusion criteria that involve a disjunct of all three criteria (factor markers, traditional test-taking indices, and FUPC scores) identified 33.3% of the sample as having similar styles and 33.3% as having opposing styles. Thus, this more liberal method resulted in a substantially larger percentage of the full sample than previous studies.

Again, using any of the above criteria (factor scales, traditional test-taking indices, FUPC scores) resulted in the predicted pattern of correlation. For patients with similar rank order positions of FUPC markers, the average correlation for the constructs of dysphoria, wariness, and psychosis in this sample was Mr (107) = .42, $p < .01$. The average correlation for patients with opposite FUPC marker placement was Mr (102) = -.26, $p < .05$. Again, the general findings replicated those found in previous studies (Meyer, 1997, 1999).

With regard to the multi-trait multi-method matrix, Meyer et al. (2000) found that using all participants (similar style, opposite style, and all participants) MMPI-2 constructs did not support a finding of discriminant validity, while Rorschach constructs did. For example, the average correlation between MMPI-2 constructs was Mr = .79 compared to Mr = .32 for Rorschach constructs. Thus, MMPI-2 constructs were less differentiated that Rorschach constructs. Thus, when a subject has an elevation on one MMPI-2 construct, it is very likely that she/he will also be elevated on other MMPI-2 constructs. In contrast, a person with an elevation on one Rorschach construct will be much less likely to have an elevation on another Rorschach construct. This finding was expected, however, because of the large amount of variance accounted for by the MMPI-

2's FUPC (48.3% of total variance) compared to the Rorschach (20-25% of total variance). The findings also indicate that the FUPC marker placement (e.g., upper third) has a greater impact on the MMPI-2 than on the Rorschach. Aside from the previous findings, results did not support a pattern of convergent and discriminant validity as outlined in Campbell and Fiske (1959).

With regard to the MMPI-2-MCMI-II analyses, results suggested that the pattern of correlations found with these two self-report instruments are not appreciably different from those from the MMPI-2-Rorschach analyses (Meyer et al., 2000). As with the MMPI-2-Rorschach analyses, no pattern of discriminant validity as suggested by Campbell and Fiske (1959) was found. Although these results are disappointing, they are fairly typical of what is presented in the literature. This finding of relatively high correlations between the self-report measures in contrast with the Rorschach versus MMPI-2 correlations is largely explicable in terms of homogeneity of methods.

An important conclusion can be drawn from this failure to exactly fulfill Campbell and Fiske's (1959) criteria for a multi-trait multi-method matrix. The failure is due to there being essentially no correlations between the same constructs using different methods and is due to there being radically different correlations between the sizes of the correlations common to a method across different constructs. For example, contrary to what Campbell and Fiske postulated, the correlations between MMPI-2 psychosis and dysphoria measures are much larger than those between Rorschach psychosis and dysphoria measures (Meyer, 1999). Meyer (1999) would explain both of these considerations by distinguishing between the concept of method variance and that of response style variance. Essentially, Campbell and Fiske were most likely correct to

suggest that different measurement methods would attenuate correlations because each method would capture a slightly different aspect of the construct. What they did not see is that the approach to the interaction between test and test-taker differs across test methods, so that response style on one test is not correlated with that on another. This has such a marked effect on test scores that scores do not correlate across tests.

Swedish Replication of Meyer's Studies

Finally, Meyer et al.'s (2000) study was replicated in a Swedish psychiatric sample (Lindgren & Carlsson, 2002). Using Welsh's Anxiety Scale from the MMPI-2 and R-Engagement from the Rorschach, Lindgren and Carlsson identified patients as guarded or openly responsive if they fell in the upper or lower 40% of the sample. Thus, their criteria for selecting subjects on the upper and lower ends of the FUPC markers were more liberal than Meyer's (1997, 1999) and included a larger percentage of the sample. Even with the more liberal criteria, Lindgren and Carlsson found the same pattern of results. That is, conceptually related constructs were correlated when the analyses were limited to patients with similar rank order positions on FUPC markers. Thus, they relied on alignment to a weaker extent than did Meyer (1999), which suggests that it may not be necessary to rely on alignment to the extent that Meyer did.

Lindgren and Carlsson (2002) found, however, that the convergent validity correlations were also significant for conceptually unrelated variables when analyses were limited to patients with similar rank order FUPC scores. For example, Rorschach dysphoria was highly correlated with MMPI-2 wariness in patients with similar rank order positions on FUPC markers. The authors explain this finding by suggesting that the scales used in the analyses all measure psychopathology and thus should be related.

Although this argument makes sense and is discussed in more detail above, the problem is that the convergent validity analyses were designed to measure specific kinds of psychopathology (i.e., dysphoria, wariness, and psychosis) rather than psychopathology in general (Campbell & Fiske, 1959). Greater specificity is needed in order not to confuse constructs. For example, according to their findings it would be possible for a psychotic individual to be categorized as being depressed.

When the analyses were limited to more distinctly unrelated constructs (e.g., Rorschach Whole Response and MMPI-2 Scale 1), the correlations were much lower. Thus, when variables that do not directly measure psychopathology and that are conceptually unrelated are used for the analyses, the correlations between MMPI-2 and Rorschach constructs tend to be low. Again, as with Meyer's (1999) analysis of CUVP-HighFF, Lindgren and Carlsson's choice of variables in their CUVP-HighFF analyses correlated with their respective FUPCs to a lower extent than did the constructs of dysphoria, psychosis, and wariness (Rorschach constructs of dysphoria, psychosis, and wariness $r\,(76) = .52, p < .01$ compared to $r\,(76) = .42, p < .01$ for CUVP-HighFF variables; MMPI-2 constructs of dysphoria, psychosis, and wariness $r\,(76) = .76, p < .01$ compared to only $r\,(76) = .38, p < .01$ for the CUVP-HighFF). The authors, however, did not test whether the CUVP-HighFF correlations were significantly smaller than the correlations for the constructs of dysphoria, psychosis, and wariness.

Statement of the Problem

Meyer (1996, 1997; Meyer et al., 2000) has shown that under certain circumstances, conceptually related psychopathology constructs on the MMPI-2 and Rorschach (e.g., MMPI-2 psychosis and Rorschach psychosis) correlated to a significant

extent. This is observed whenever a sub-sample of participants who have similar rank order positions on the First Unrotated Principal Component (FUPC) markers (i.e., Welsh's A and R-Engagement) is chosen. However, the reasons for the results remain unclear.

To summarize Meyer's (1997, 1999; Meyer et al., 2000) results, aligning participants on FUPC markers overcomes the limitations of cross-method assessment. Specifically, if one takes Meyer's results at face value, then he has shown that response-character style moderates convergent validity. Specifically, once participants are aligned on FUPC markers, significant and moderate to large correlations are observed among conceptually related constructs (Meyer, 1999). In other words, he is stating that aligning participants serves to make the different assessment methods function as though they were the same method. In this sense, "aligning" participants overcomes the limitations of using tests from different method families (i.e., self-report and performance-based). In this case, it makes the Rorschach function as though it was a self-report test or it makes the MMPI-2 function as though it were a performance-based test (Meyer, 1999). Thus, once participants have been aligned, one is able to assess the "true" amount of construct convergence across the Rorschach and MMPI-2 (Meyer, 1999). There are, however, a number of problems with his analyses that need to be addressed.

First, recent published reports (Dao, 2008; Petot, 2005) have found that using Meyer's (1997) procedure for defining response-character style has not resulted in the expected pattern of correlations (i.e., high convergent correlations for conceptually related constructs when participants have similar FUPC marker placement).

Second, as mentioned above, FUPC markers of any general psychopathology measure contains both response style variance and general psychopathology variance. The critical difference between these two, however, is that the former is a type of error variance, whereas the latter is a part of true score variance. To the extent that a measure like Welsh A or R-Engagement measures the FUPC of its respective test scales, it measures general psychopathology. The FUPC of any measure is by definition what it mostly measures. This is what it means for it to be a "data reduction" technique. As such, general psychopathology as measured by the FUPC of the MMPI-2, for example, is simply a broad bandwidth measure of what more specific MMPI-2 scales measure. Hence, general psychopathology as contained in the FUPC of the MMPI-2 is a broad bandwidth measure of true score variance contained in the MMPI-2's more specific measures of psychosis, interpersonal wariness, and dysphoria. To use another example, subscales of sensation-seeking, gregariousness, and interpersonal warmth are specific "facets" of extraversion, the latter being a broad bandwidth measure; similarly, anger and anxiety are aspects of the broader construct of neuroticism. The broader constructs are summative forms of the more specific, and hence, the broader constructs are aspects of true score variance on the tests. For both the Rorschach and the MMPI-2, however, the FUPC contains both error variance (response style) and true score variance at the most general level (general psychopathology). The difficulty and indeterminateness of Meyer's (1997, 1999, Meyer et al., 2000) findings are that when he selects only those evaluees who are aligned on their FUPCs, he is equating them for systematic variance that is both error variance and true score variance, and there is no clear way to determine which equated variance is responsible for the observed correlations.

As outlined above, Welsh's Anxiety Scale reflects genuine psychopathology as well as a more open response style. Similarly, high scores on R-Engagement will be achieved by participants who are experiencing significant psychopathology as well as by participants who approach the test in an undefended or flamboyant manner. Thus, Welsh's A and R-Engagement contain both systematic response style variance and general psychopathology variance. Therefore, when participants are aligned on FUPC markers, they are matched on both response style markers and general psychopathology. The problem, then, is that it is unclear to what extent the convergent correlations between conceptually related constructs (e.g., MMPI-2 psychosis and Rorschach psychosis) are due to general psychopathology variance rather than specific construct (e.g., MMPI-2 dysphoria and Rorschach dysphoria) variance. Petot (2005) succinctly phrased the difficulty, " ...if convergence between two markers of neuroticism [i.e., Welsh's A and Response-Engagement] is the criteria for 'response-character styles,' it may be tautological to find that scores on the scales of dysphoria (= negative emotionality) are convergent among subjects whose score of neuroticism are convergent across instruments, and divergent among subjects whose score of neuroticism are divergent across instruments" (pp 31-32). He thus argued that because the criteria for defining marker placement (i.e., Welsh's A and R-Engagement) contain general psychopathology (i.e., neuroticism), choosing participants with similar scores on these neuroticism measures might necessarily result in convergence of constructs that also contain neuroticism (e.g., dysphoria, wariness, and psychosis).

To state the problem generally, correlations across methods (Rorschach and MMPI-2) of the same psychopathology construct (e.g., psychosis) should be larger than

correlations across methods (Rorschach and MMPI-2) of different specific psychopathology constructs (e.g., MMPI-2 psychosis and Rorschach wariness). For example, although correlations between Rorschach dysphoria and MMPI-2 dysphoria reached r (78) = .53, $p < .01$ in aligned participants, correlations between MMPI-2 interpersonal wariness and Rorschach dysphoria in aligned participants were just as high (r (78) = .59, $p < .01$; Meyer et al., 2000). Thus, these results suggest a general relation between the constructs of dysphoria, psychosis, and wariness among aligned participants rather than a specific relation. That is, it remains unclear whether MMPI-2 dysphoria and Rorschach dysphoria, for example, correlated in aligned participants because they, in fact, measure the same specific components of dysphoria or whether the resulting correlations are simply due to the influences of FUPC marker alignment as aligning participants on general psychopathology.

It is easy to see how this comes about through the process of aligning participants on FUPC markers. Even though the MMPI-2 and Rorschach FUPC (and FUPC markers) are uncorrelated in the full sample of participants (r (87) = .01, p = ns), choosing participants who are aligned (i.e., similar rank order positions on FUPC markers) forces the FUPCs (and FUPC markers) to be correlated. Meyer (1997) reported that in his sample of aligned participants, the Rorschach and MMPI-2 FUPCs correlated at a level of r (87) = .70, $p < .01$. Thus, because the FUPCs are highly correlated after alignment, it forces any scales that are correlated with the FUPC to be correlated with each other. This means that if any two scales from different methods have very high loadings on their respective FUPCs, they will have substantial correlations, whether or not they measure the same specific construct. Since MMPI-2 and Rorschach constructs of

dysphoria, psychosis, and wariness are highly correlated with their respective FUPCs in the aligned subsample, (r (85) = .48, p < .01 for Rorschach variables and r (85) = .78, p < .01 for MMPI-2 variables) the correlations between them (e.g., MMPI-2 dysphoria and Rorschach dysphoria) will be artificially elevated (Meyer, 1999). For example, there necessarily will be a high correlation between the constructs of dysphoria in the aligned subsample because the FUPCs are highly correlated with each other and because MMPI-2 and Rorschach dysphoria are highly correlated with their respective FUPCs. Again, it remains unclear to what extent the results are due to FUPC marker alignment, which includes general psychopathology, rather than true construct convergence.

To summarize, although Meyer's results (1997, 1999; Meyer et al., 2000) suggest a relation between the constructs of dysphoria, psychosis, and wariness on the MMPI-2 and Rorschach when a subsample of aligned participants are chosen, the reasons for these relations remain ambiguous, as between response style variance and general psychopathology, or systematic error variance and general true score variance. This leaves open the question as to what exactly is driving the correlations between parallel constructs (e.g., MMPI-2 dysphoria and Rorschach dysphoria).

Meyer et al. (2000) acknowledged the fact that FUPC markers had a large effect on the correlations between conceptually related variable pairs and his analysis of conceptually unrelated variable pairs that have high correlations with their respective test's FUPC (CUVP-HighFF) attempted to correct for this possibility. His goal was to choose variables on the Rorschach and MMPI-2 that had correlations with their respective FUPCs at a level similar to the correlations between the constructs used in the convergent validity analyses (i.e., dysphoria, psychosis, and wariness) and their FUPCs.

In this manner, if he could show that the correlations for the constructs of dysphoria, psychosis, and wariness were significantly higher than correlations for conceptually unrelated variables that were also highly correlated with their respective FUPC markers, then the correlations could not simply be due to FUPC marker variance. For this analysis, he chose 13 Rorschach variables and 11 MMPI-2 variables that were not used in the convergent validity analyses and that had high correlations with the Rorschach FUPC (see Meyer, 1999 for a full description of variables). The 13 Rorschach variables and 11 MMPI-2 variables resulted in 143 variable pairs. Then, using a sub-sample of aligned individuals, he correlated each of the Rorschach variables with each of the MMPI-2 variables and averaged the results.

Meyer's (Meyer et al., 2000) results showed that the average CUVP-HighFF correlation was $r\ (78) = .19, p < .01$, compared to $r\ (78) = .48, p < .01$ for conceptually related constructs (i.e., dysphoria, psychosis, wariness). Meyer concluded that although choosing variables that have high correlations with their FUPCs moderates convergence, the correlations he found between conceptually related constructs (e.g., MMPI-2 dysphoria and Rorschach dysphoria) are not due simply to alignment. The finding that CUVP-HighFF correlations were lower than those for the conceptually related constructs (i.e., dysphoria, psychosis, wariness) supports Meyer's position. Lindgren and Carlsson (2000) obtained the same results in their CUVP-HighFF analysis. Again, neither Meyer nor Lindgren and Carlsson conducted significance tests to determine whether the correlations from CUVP-HighFF were significantly lower than the correlations from the constructs of interests (i.e., dysphoria, wariness, and psychosis). There are problems with the above analysis.

First, the correlations between the MMPI-2 CUVP-HighFF and the MMPI-2 FUPC were lower than the correlations between the constructs of dysphoria, wariness, and psychosis and MMPI-2 FUPC (*Mr* (76) = .52, p < .01 compared to *Mr* (76) = .78, p < .01 and .38 compared to .76 for Lindgren and Carlsson). Thus, on average, the constructs used for the CUVP-HighFF analyses were correlated at a lower level with the MMPI-2 FUPC than were the constructs of dysphoria, wariness, and psychosis. Again, however, it was not reported whether there were significant differences between the correlations. His choice of CUVP-HighFF variables for the MMPI-2 may have resulted in lower correlations between these variables and Rorschach CUVP-HighFF variables because the CUVP-HighFF variables for the MMPI-2 were not as highly correlated with the FUPC as were the conceptually related constructs (dysphoria, psychosis, and wariness). Had he been able to choose CUVP-HighFF variables that had correlations with the MMPI-2 FUPC that were as high as those for dysphoria, psychosis, and wariness, more confidence could be placed in the results.

Second, Meyer (Meyer et al., 2000) averaged all the correlations between the 143 variables (13 Rorschach constructs and 11 MMPI-2 constructs). This procedure of averaging all the correlations may have obscured some of the results. For example, if Rorschach variables X correlated with MMPI-2 variable Y at a level of .80, but Rorschach variable B correlated with MMPI-2 variable C at a level of .20, then the average correlation would be .50 (.80 + .20/2 = .50). Thus, it is unclear whether his total average correlation of .19 obscures any higher correlations between conceptually unrelated variables pairs.

Third and most importantly, even though the correlations for the conceptually related constructs were higher than those for the conceptually unrelated constructs (although it was not indicated whether there were significant differences between the correlations), and even if we could assume that this is the result of construct convergence over and above that realized from alignment on error variance contained in the FUPC, still, the reason for this increment in correlations over and above that observed in CUVP-HighFFs could still be due to the related constructs (i.e., dysphoria, psychosis, wariness) all being measures of *general* psychopathology, whereas some of the high CUVP-HighFFs are not measures of general psychopathology. If so, what is driving the correlations between Rorschach and MMPI-2 psychopathology measures-both the discriminant and convergent correlations-within protocols selected on the basis of alignment, over and above response style variance (which is error), is true score, general psychopathology variance. This latter is a form of true score variance, but it lacks specificity sufficient to satisfy the claim that, for example, Rorschach thought disorder measures are measuring the same construct as MMPI-2 thought disorder measures. This claim received support from Petot (2005) who conducted convergence analyses on the Rorschach and the NEO PI-R. Petot showed that using a modification of Meyer's (1999) procedure for defining response-character style (i.e., R-Engagement values above and below the median value) and values above and below the median of the NEO PI-R neuroticism scale did not result in the expected pattern of correlations when the Rorschach was compared to the NEO PI-R, which is not a measure of psychopathology. Thus, he showed that the results from Meyer's analyses (e.g., Meyer, 1999) did not hold when the analyses are conducted with a test that does not measure psychopathology.

Again, the resulting correlations achieved by Meyer may be due to general psychopathology variance rather than construct specific variance (e.g., MMPI-2 dysphoria and Rorschach dysphoria). The problem with this is that convergent validity analyses were designed to measure specific kinds of psychopathology (i.e., dysphoria, wariness, and psychosis) rather than psychopathology in general. Greater specificity is needed in order not to confuse constructs. For example, it would be consistent with Meyer's findings as thus far explicated for someone classified as psychotic on the Rorschach to be categorized as depressed on the MMPI-2. This is problematic because one important purpose of personality tests is to help with diagnosis rather than simply identifying the presence or absence of psychopathology (Ritsher, 2004).

Meyer (1997) also acknowledged that choosing participants who are aligned on their respective FUPC markers spuriously inflates the observed correlations between conceptually related constructs (e.g., dysphoria). To the extent that an FUPC measures general psychopathology, this does not represent spuriousness, since conceptually related forms of psychopathology can be said to carry psychopathology that is general as well as specific. However, to the extent that an FUPC represents systematic response style, then selecting participants on the basis of FUPC scores involves spurious inflation of correlations.

To correct for this, Meyer applied a formula suggested by James Wood (Meyer, 1997) that accounts for the FUPC shared variance. (It does not, however, distinguish between general psychopathology and response style within the FUPC.) Because it does not correct *solely* for response style, but also removes general psychopathology variance, it can be said to provide a lower bound estimate of convergent correlations. For example,

this formula provides correlations between Rorschach DEPI and MMPI-2 Scale 2 in the aligned sample, after having taken away the influence of the FUPC markers. The exact formula is: ((correlation of MMPI-2 scale X with the MMPI-2's FUPC) X (correlation of Rorschach scale Y with the Rorschach's FUPC) X (correlation between Rorschach and MMPI-2 FUPCs)) in the aligned subsample. The formula computes what is to be expected by merely selecting FUPC-correlated participants. This is then subtracted from the observed correlations, and the resulting correlations serve as the residuals. It is worth noting again, however, that because the broad band construct of general psychopathology (non-error variance) and response style (systematic error variance) are *both* contained in the respective first factors (FUPC), removal of this first factor variance through this correction formula removes both of these indifferently. To the extent that general psychopathology is thus removed, this results in an *over*correction.

Meyer (1997) showed that the correlations between conceptually related constructs (e.g., dysphoria) were larger than would be expected simply as a result of matching participants (i.e., alignment) on the FUPC (and FUPC markers). In Meyer's (Meyer et al., 2000) sample, the correction formula yielded residual correlations of r = .29 for dysphoria, r = .25 for psychosis, and r = .20 for wariness. Thus, the residual correlations are smaller than what was originally found (r = .55 to .65 for dysphoria, r = .45 to .55 for psychosis, and r = .37 for wariness). They are, however, higher than what was found when response style was ignored (average correlation of Mr = -.006). He thus concluded that with this formula he has been able to assess true construct convergence since he has eliminated the effect of FUPC variance. Again, there are problems with the above analyses.

In particular, although Meyer (Meyer et al., 2000) has shown that removing the influence of FUPC markers still results in residual correlations of .29, .25, and .20, these small residual correlations leave unclear whether the pattern of convergent and divergent validity co-efficients are satisfactory to establish specific construct convergence. Meyer (1997) presented residual correlations of those Rorschach and MMPI-2 variables that had the same name, those that were supposed to demonstrate convergence. Had Meyer also computed residual correlations for the psychopathology constructs with different names (e.g., MMPI-2 dysphoria with Rorschach psychosis) and compared them with conceptually related variables (e.g., MMPI-2 dysphoria and Rorschach dysphoria), he could have shown that the correlations are due to construct-specific variance rather than general psychopathology variance. For example, had his results shown that the residual correlations between MMPI-2 dysphoria and Rorschach dysphoria were significantly higher than the correlations between MMPI-2 dysphoria and Rorschach psychosis after applying his correction formula, he then could have stated that he had achieved construct-specific convergence. However, since no such correlations have been produced, the question of Rorschach and MMPI-2 measures' relations to each other is not yet resolved.

The Present Study

Meyer's (1997, 1999; Meyer et al., 2000) findings are interesting and provocative and they deserve further consideration. For this reason, they will be replicated in a new sample of participants. Also, because there are alternative explanations for his findings,

namely, the influence of general psychopathology on the findings, additional analyses that help clarify this influence will be conducted.

Again, in an effort to further Meyer's (1997, 1999; Meyer et al., 2000) work, a study was conducted to help disentangle the effects of response style and general psychopathology on MMPI-2 and Rorschach constructs. By conducting analyses on variables that differ in their conceptual relatedness and their correlations with their respective FUPC markers, it was possible to clarify the relative influences of response style and general psychopathology. Specifically, using samples of aligned participants, correlations were performed on: (a) variables that are conceptually unrelated and do not measure psychopathology, (b) variables that are conceptually unrelated in the sense that they measure different kinds of psychopathology (e.g., MMPI-2 dysphoria and Rorschach psychosis), and (c) conceptually related constructs that measure specific kinds of psychopathology (e.g., MMPI-2 dysphoria and Rorschach dysphoria). Then, the correction formula described above was applied to each of the sets of correlations and the residuals served as the results. The goal was to help clarify the extent to which response style and general psychopathology play a role in the results.

Specifically, the correlations between the constructs that are conceptually unrelated and do not measure psychopathology and the conceptually unrelated psychopathology constructs (e.g., MMPI-2 dysphoria and Rorschach psychosis) established the extent to which Meyer's (1997, 1999; Meyer et al., 2000) findings are due to general psychopathology in addition to response style variance. For the non-psychopathology scales, the general psychopathology variance has been eliminated, leaving only the response style variance inherent in the FUPC markers. What this means

is that if the non-psychopathology variables that are conceptually unrelated and that have relatively high correlations with their respective FUPC markers correlated with each other to the same extent that conceptually unrelated psychopathology variables did, then it could be determined whether the correlations for the non-psychopathology scales were due to response style variance rather than general psychopathology variance. If, on the other hand, conceptually unrelated psychopathology variables correlated to a greater extent than the non-psychopathology variables, then these higher correlations would have been due to general psychopathology variance in addition to response style variance. Then, the comparisons of the residual conceptually related psychopathology correlations (e.g., MMPI-2 dysphoria with Rorschach dysphoria, etc.) with the residual conceptually unrelated psychopathology correlations (e.g., MMPI-2 dysphoria with Rorschach psychosis) reflected the influence of construct-specific convergence over and above general psychopathology and response style. In this case, after having removed the influence of FUPC markers, the remaining correlations would be due to construct-specific convergence.

Hypotheses

1) There will be no convergence for similarly named MMPI-2 and Rorschach constructs (e.g., MMPI-2 dysphoria and Rorschach dysphoria) when all participants are used for the analyses.

2) When the analysis is limited to participants who are aligned (i.e., same tercile position placement on both MMPI-2 Welsh's A and Rorschach R-Engagement and same median position on MMPI-2 F and K and Rorschach R and Lambda), correlations between

conceptually related psychopathology constructs (e.g., MMPI-2 psychosis and Rorschach psychosis) will be positive and significant.

3) Correlations between conceptually related psychopathology constructs will be negative and significant for participants who have opposite placement on FUPC markers (e.g, high R-Engagement scores and low Welsh's Anxiety scores).

4) Correlations between conceptually related forms of psychopathology (e.g., MMPI-2 dysphoria and Rorschach dysphoria) will be significantly higher than correlations between conceptually unrelated kinds of psychopathology (e.g., MMPI-2 dysphoria and Rorschach psychosis) in the aligned subsample. This will hold both prior to and after having applied the correction formula.

5) For aligned participants, correlations between conceptually unrelated kinds of psychopathology (e.g., MMPI-2 dysphoria and Rorschach wariness) will be significantly higher than correlations between constructs that do not measure psychopathology (e.g, MMPI-2 social introversion with Rorschach popular responses). This will hold both prior to and after having applied the correction formula.

CHAPTER III

Method

Participants and Archival Datasets for the Study

The University of Windsor Research Ethics Board has granted approval to the current research project. The data consisted of Rorschach and MMPI-2 protocols from 534 participants. All the data were archival. Four hundred and fifty of the participants were parents involved in child custody cases drawn from two forensic psychologists. These data were collected in California. The Rorschach protocols from the parents involved in child custody cases were scored by a licensed psychologist. Twenty seven participants were from Dr. Hibbard's private practice in Michigan. The Rorschachs from Dr. Hibbard's private practice were scored by him. Fifty seven participants were drawn from an assessment class supervised by a licensed psychologist between 1989 and 1990 at Sam Houston State University in Texas. The Rorschachs were scored by masters and doctoral students in clinical psychology and supervised by a licensed psychologist. Twenty-one Rorschach protocols had fewer than 14 responses, and these protocols were excluded from the analyses as were the corresponding MMPI-2 protocols. No other protocols were excluded from the analyses. Data from 513 participants were retained for the analysis. Table 2 highlights relevant demographic data for the current sample. Eighty four percent of the participants were parents involved in child custody cases, 11% of participants were student volunteers, and 5% of participants were psychiatric outpatients. The average age of the sample was 36.4 (SD = 9.97, Range = 18 to 67). Age was not available for 6 participants. Fifty-one percent were men. Race and marital status were not available for the majority of participants. All Rorschach protocols were

Table 2

Demographic Data from the Current Sample

Source	Number	% of Participants	Location	Date Collected
Private Practice Child Custody	429	84	California	1988-1996
Psychiatric Outpatients	28	5	Michigan	2001-2007
Student Volunteers	56	11	Texas	1989-1991

administered according to the methods prescribed in Exner's (1993, 2000) Comprehensive System. Raw Rorschach data were not available for the parents involved in child custody cases, thus interrater reliability could not be established. These data, however, were used in actual child custody cases and therefore deemed by the author and Dr. Hibbard to be adequately administered and scored for purposes of the dissertation.

Measures

MMPI-2 Measures

*Welsh Anxiety (*Welsh's A; Welsh, 1956). Welsh's A was constructed as a measure of the MMPI-2's first factor. This has been described as anxiety (Welsh, 1956), lack of ego resiliency (Block, 1965), and general maladjustment (Tyler, 1951). As discussed above, Welsh's A has also been described as response style measure reflecting social desirability (Edwards & Diers, 1962).

High positive correlations have been found between Welsh's A and Scale 7 (Psychasthenia) (.951), Scale 8 (Schizophrenia) (.895), and high negative correlations with K (-.792) (Butcher et al., 1989). In the current sample, Welsh's A had correlations of $r\,(511) = .68, p < .01$ with Scale 7, $r\,(511) = .57, p < .05$ with Scale 8, and $r\,(511) = -.76, p < .01$ with K.

F Scale. The F scale contains 60 items that were chosen to detect unusual or atypical ways of answering questions. It contains items that the normative sample responded to less than 10% of the time (e.g., "There is something wrong with my mind." "No one cares much what happens to you."). Thus, respondents who achieve high scores on F are either experiencing significant psychopathology or they are overreporting their symptoms.

Test-retest reliabilities for one-week intervals were .78 for men and .69 for women (Butcher et al., 1989). The F scale is correlated most highly with Scale 6 (Paranoia) and Scale 8 (Dahlstrom et al., 1972). In the current sample, F has correlations of r (511) = .56, $p < .01$ with Scale 6 and r (511) = .68, $p < .01$ with Scale 8, and r (511) = -.48, $p < .01$ with K.

K Scale. The K scale contains 30 items that helped identify patients who were diagnosed with significant psychopathology, yet still obtained scores within the normal range. The scale thus serves as a measure of defensiveness with higher scores indicating an unwillingness to acknowledge psychological distress. K has also been empirically shown to be a measure of defensiveness in maladjusted populations (Nakamura, 1960).

Test-retest reliability coefficients for one-week intervals were .84 for men and .81 for women (Butcher et al., 1989).

In the current sample, K is negatively correlated with all standard clinical scales and is positively correlated with CON (r (427) = .19, $p < .01$).

Scale 2 (Depression). Scale 2 contains 57 items measuring symptomatic depression (Hathaway & McKinley, 1942). The major content areas within Scale 2 included general apathy, physical symptoms such as sleep disturbances, excessive sensitivity, and a lack of sociability (Dahlstrom et al., 1972). Test-retest reliability coefficients for one-week intervals were .75 for men and .77 for women (Butcher et al., 1989). With respect to convergent and discriminant validity, Scale 2 has correlations of .796 with DEP, -.813 with a measure of ego strength, and it is strongly related to Symptom Checlist-90 Revised scales (Hungerford, 2004). In the current sample, Scale 2 had the highest positive correlations with DEP (r (511) = .70, $p < .01$) and Scale 7

(Psychasthenia) (r (511) = .66, p < .01), and high negative correlations with the K scale (r (511) = -.31, p < .01).

Scale 7 (Psychasthenia). Scale 7 contains 48 items designed to measure the symptoms of psychasthenia, which is an earlier label for what today would be called obsessive-compulsive disorder. It also measures abnormal fears, self-criticism, difficulties in concentration, and feelings of guilt (Greene, 2000). Test-retest reliability coefficients for a one-week interval were .89 for men and .88 for women (Butcher et al., 1989). With respect to convergent and discriminant validity, Scale 7 has correlations of .913 with DEP, .912 with ANX, and -.937 with Edwards social desirability scale. In the current sample, Scale 7 has correlations of r (511) = .70, p < .01 with DEP and r (511) = .60, p < .01 with ANX.

Depression Content Scale (DEP). DEP contains 33 items that measure generalized dysphoria and negative emotionality. Munley (2002) reported test-retest reliabilities for periods of up to one year to be .66. In terms of convergent validity, DEP was found to be correlated .796 with Scale 2, .913 with Scale 7, and .888 with Scale 8 (Greene, 2000). In the current sample, DEP had a correlation of r (511) =.70, p < .01 with Scale 2, r (511) = .70, p < .01 with Scale 7, and r (511) = .60, p < .01 with Scale 8.

Anxiety Content Scale (ANX). ANX contains 23 items that tap general dysphoria and negative emotionality. In terms of convergent validity, ANX was found to be correlated at .799 with Scale 2, .912 with Scale 7, and .833 with Scale 8 (Schizophrenia) (Greene, 2000). In the current sample, ANX is correlated at r (511) = .65, p < .01 with Scale 2, r (511) = .60, p < .01 with Scale 7, and r (511) = .80, p < .01 with Scale 8.

Psychopathology Five Negative Emotionality/Neuroticism Scale (*Psy-5-Neg*; Harkness, McNulty, & Ben-Porath, 1995). Psy-5-Neg contains 33 items designed to measure a broad affective proclivity to experience negative emotions related to nervousness and anxiety. In terms of convergent and discriminant validity, Psy5Neg has correlations of .879 with Scale 7, .820 with Scale 8, .887 with ANX, .821 with DEP, and -.810 with the K scale (Greene, 2000). In the current sample (N=509), Psy5Neg has correlations of $r = .53, p < .01$ with Scale 7, $r = .42, p < .01$ with Scale 8, $r = .88, p < .01$ with ANX, $r = .79, p < .01$ with DEP, and $r = -.80, p < .01$ with K.

Scale 8 (Schizophrenia). Scale 8 consists of 78 items that assess a wide variety of content areas including: bizarre thought processes, peculiar perceptions, and difficulties in concentration and impulse control. Test-retest reliability coefficients for Scale 8 for up to 2-week intervals range from .74 to .95, and 1-year intervals range from .37 to .64 (Dahlstrom et al., 1975). Test-retest reliability coefficients for 1-week intervals were reported to be .87 for men and .80 for women (Butcher et al., 1989). Scale 8 has a correlation of .925 with Scale 7, .888 with DEP, and -.911 with Edwards Social Desirability Scale. In the current sample, Scale 8 has correlations of $r\,(511) = .80, p < .01$ with Scale 7, $r\,(511) = .60, p < .01$ with DEP, and $r\,(511) = -.14, p < .01$ with K.

Bizarre Mentation Content Scale (BIZ). BIZ contains 24 items that measure overt signs of psychotic thought process. It has correlations of .782 with Scale 8 and .679 with Scale 6 (Butcher et al., 1989). In the current sample, BIZ has correlations of $r\,(511) = .52, p < .01$ with Scale 8 and $r\,(511) = .49, p < .01$ with Scale 6.

Psychopathology Five Psychoticism Scale (Psy5Psy; Harkness, McNulty, & Ben-Porath, 1995). PSY-5-Psy "assesses the cognitive ability of the individual to model the

external, objective world in an objective manner" (Greene, 2000, p. 262). In the current sample, Psy5Psy had the highest correlations with BIZ (r (501) = .85, p < .01), and Cynicism (r (501) = .72, p < .01).

Scale 6 (Paranoia). Scale 6 contains 40 items that tap into interpersonal sensitivity, suspiciousness, and self-righteousness. Test-retest reliabilities for one week were reported to be .67 for men and .58 for women (Butcher et al., 1989). With respect to convergent and discriminant validity, scale 6 correlates .749 with Scale 8, .703 with DEP, and -.679 with Edwards Social Desirability scale. In the current sample, Scale 6 has correlations of r (511) = .56, p < .01 with Scale 8, r (511) = .50, p < .01 with DEP, and r (511) = -.26, p < .01 with K.

Cynicism Content Scale (CYN). CYN contains 23 items that tap into misanthropic beliefs and interpersonal suspiciousness. With respect to convergent and discriminant validity, CYN has correlations of .642 with Scale 8, and -.780 with K (Greene, 2000). In the current sample, CYN has correlations of r (511) = .26, p < .01 with Scale 8 and r (511) = -.76, p < .01 with K.

Social Discomfort Scale (SOD). SOD contains 24 items that measure one's preference for being alone (i.e. social isolation). With respect to convergent correlations, SOD has correlations of .651 with Scale 7, .620 with Scale 8, and .614 with Scale 2 (Greene, 2000). In the current sample, SOD has correlations of r (511) = .35, p < .01 with Scale 7, r (511) = .33, p < .01 with Scale 8, and r (511) = .45, p < .01 with Scale 2.

Social Introversion (SI). SI contains 39 items that measure the introversion pole of extraversion/introversion. High scorers on SI are described as socially introverted, shy, and withdrawn. SI has correlations of .892 with social discomfort, and .856 with a

measure of shyness/self-consciousness (Greene, 2000). In the current sample SI has a correlation of r (511) = 84, $p < .01$ with SOD.

Constraint (PSY-5-Con). CON contains 29 items that "assesses a dimension from rule following versus rule breaking and criminality" (Greene, 2000, p. 262). CON has correlations of -.402 with Scale 9 (hypomania), and -.58 with Antisocial Practices. In the current sample, CON has correlations of r (427) = -.34, $p < .01$ with Scale 9, and r (427) = -.45, $p < .01$ with Antisocial Practices.

Rorschach Measures

R-Engagement. Meyer (1992) developed R-Engagement as the factor marker for the Rorschach's FUPC. R-Engagement was calculated for each individual using the additive sum of each individual's score on each Rorschach variable weighted by that variable's loading on the first unrotated factor from the factor analysis of these variables.

The precise formula used by Meyer (1992) for R-Engagement was: (using sample-based z-transformed Rorschach scores) 0.436 (Colour-Shading Blends) + 0.372 (FY) + 0.325 (FC') + 0.3 (FC) + 0.3 (FC + C) + 0.29 (Shading Blends) + 0.29 (R) + 0.27 (S) + 0.24 (FM) + 0.22 (FV) + 0.21 (W) + 0.19 (MOR) + 0.18 (M) – 0.24 (Lambda).

Number of Responses (R). The number of responses given on the Rorschach or R has clinical significance (Meyer, 1992). Exner (1986) interpreted profiles with few responses as possibly being due to neurological deficits, depression, or guardedness. He also described low R protocols as largely being due to resistance/defensiveness (Exner, 2000). Profiles with high Rs have been described as being due to high engagement with the task, a flamboyant or dramatic presentation, or to an exaggeration of pathology. R had a loading of .70 on the Rorschach's FUPC (Meyer, 1997) and thus it quantifies the

dilated pole of the Rorschach FUPC. In the current sample, R had a loading of .75 on the Rorschach's FUPC and it thus also serves as a quantification of the more open or psychopathological end of the Rorschach FUPC.

Lambda. Lambda is based on the percent of response that are "pure form" compared to the total number of responses. Specifically, the number of pure form responses is divided by the total number of responses minus the pure form responses (Pure Form/(R-Pure Form). Participants who achieve high Lambdas have been described as defended, guarded, cognitively limited, or uncreative. Lambda had a loading of -.40 on the Rorschach's FUPC (Meyer, 1997). Thus, Lambda helps define the guarded or defended end of the response style spectrum. In the current sample, Lambda had a loading of -.39 on the Rorschach FUPC, and it also thus serves as a quantification of the guarded or defended end of the Rorschach FUPC.

Depression Index (DEPI). DEPI consists of a combination of variables that tap into unpleasant and distressing emotions, interpersonal isolation, and negative self-evaluations.

Variables included in the DEPI are: FV and FD, Colour-Shading Blends, egocentricity index, morbid responses, Sum of Shading responses, Cooperative movement responses, and the isolation index. FV and FD index preoccupation with negative aspects of the self with higher scores indicating greater negative self-preoccupation. Colour-Shading Blends usually indicate the presence of confusion and uncertainty about feelings (Exner, 2000). The egocentricity index is a measure of self-focus and "possibly self-esteem" (Exner, 2000, p. 256). Higher scores indicate excessive involvement with self while a low score indicates poor self-esteem and poor social

comparisons. With respect to morbid response, if the frequency in the protocol is greater than one, it indicates that the individual's self-image contains negative aspects. The sum of all shading responses indicates the presence of unpleasant emotions with higher values indicating greater negative feelings. Cooperative movement responses (COP) index the expectation that interpersonal exchanges will be positive. If the protocol contains less than 2 COP responses, it indicates that the person does not anticipate that positive results will occur from interpersonal exchanges. The isolation index taps into one's interest in interpersonal relations. Lower values indicate less interest in getting involved in interpersonal relations.

Exner (1986) reported that scores on the DEPI correctly identified 70% of subjects diagnosed with dysthymia and unipolar depression. Scores on the DEPI added significant incremental validity above and beyond the BDI (Beck Depression Inventory; Beck, Rush, Shaw, & Emery, 1979) in identifying a group of depressed individuals (Hartmann, Want, Berg, & Saether, 2003).

Suicide Constellation (S-CON). S-Con consists of 12 variables that best discriminated a group of patients who subsequently committed suicide from a group who did not (Exner, 2000).

Variables included in S-CON are: FV and FD, Colour-Shading Blends, egocentricity index, morbid responses, Zd, Es values higher than EA values, the presence of a greater number of pure colour and colour-form compared to form colour, X+%, responses that include white space (S), Popular responses, Pure Human responses, and the total number of responses (R). FV and FD, Colour-Shading Blends, the egocentricity index and morbid responses were described in the description of DEPI variables.

Zd values provide an estimate of the efficiency of scanning during the protocol administration. Very high values indicate a tendency to expend a significant amount of energy scanning the stimulus field. This can become problematic during periods of stress because it results in difficulty making decisions. A very low Zd values indicates that the stimulus field was haphazardly scanned, often missing important elements. This can be problematic in that it can lead to poor decision-making, since not all relevant information is used to make decisions. When the values for Es are greater than the values for EA, it indicates that the individual's psychological resources are lower than average. Higher values for pure colour and colour-form compared to form-colour indicate that the individual tends to be "more obvious or intense in expressing feelings than the average individual" (Exner, 2000, p. 100). This can be problematic in individuals with unpleasant emotions in that this can result in inappropriate behaviour. The X+% variables indexes the number of responses involving ordinary form demand compared to the number of total responses. When this value is low, the individual is likely to make decisions without regard for social conventions. White space responses index oppositional tendencies, and possibly anger. When the S values exceeds three, it indicates that the individual is likely more oppositional than average. Popular responses index propensities to make conventional responses when provided with clear boundaries. High values indicate significant concerns with social norms. Lower values indicate less conventional forms of thinking and behaviour, even in clearly defined situations. Pure H responses index one's interest in other people. Lower values indicate less interest in others. The total number of Responses (R) indexes one's engagement with the test, with lower values indicating less engagement (Exner, 2000).

S-CON has been found to successfully predict near-lethal suicide activity in parasuicidal patients (overall correct classification rate [OCC] = .79), non-suicidal patients (OCC = .79) and college students (OCC = .89)) (Fowlers, Piers, Hilsenroth, Holdwick, & Padawer, 2001).

Schizophrenia Index (SCZI). The SCZI consists of 6 variables that measure inaccurate perception, disordered thinking, inadequate controls, and interpersonal ineptness. Three of the variables (X+%, X-%, WDA%) index the extent to which respondents' answers conform to form demands of the inkblots. Significant deviations from form demand indicates difficulties with reality-testing and meditational impairments. The rest of the variables (LVL2, FAB2, WSUM6) index difficulties in conceptual thinking and cognitive slippage with higher values indicating greater difficulty with ideational clarity and logical cause-and-effect thinking (Exner, 2000).

According to Hilsenroth, Fowler, and Padawer (1998), scores on the SCZI accurately differentiated DSM-IV diagnosed schizophrenics from individuals with personality disorders. Exner (2000) reported that applying a cutoff of 4, the SCZI correctly identified between 65 and 80% diagnosed with schizophrenia. More recently, Kumar and Khess (2005) found a hit rate of 73% and 83% with SCZI values of 4 and 5, respectively.

To accommodate changes to the concept and diagnosis of schizophrenia and schizophrenia-spectrum illness, a number of studies were conducted to improve the ability of the SCZI to correctly identify schizophrenics. Exner (2000) added two new variables that help in detecting thought disorder. He named the new index Perceptual Thinking Index (PTI) to reflect the cognitive problems indexed by the scale. For this

study, however, the SCZI was used as the Rorschach psychosis measure. This is in concert with Meyer (1997, 1999) and Meyer et al. (2000).

Hypervigilance Index (HVI). The HVI consists of 8 variables that measure the extent to which patients invest excessive energy to ensure that all features of a stimulus field are carefully surveyed. Variables included in the HVI are: The presence or absence of Texture responses, Zf values, Zd values, white space responses, the total number of human responses and their ratios, and the presence of clothing responses.

The first positively indexed variable is the absence of Texture responses (T). This indicates a conservative manner in approaching interpersonal relations as well as an over concern with personal space and cautiousness with respect to emotional ties with others (Exner, 2000). Second, the Zf value is greater than 12 indicating that the participant has expended more energy than others scanning his stimulus field. Third, Zd is greater than 3.5 indicating an overincorporative style, which is a tendency to invest more effort than average scanning the environment. Fourth, respondents whose white space responses (S) are greater than 3 indicate a tendency to be oppositional, possibly related to the test administration, but it can also indicate a general negative attitude towards authority. Fifth, the total responses involving human content are less than 6, indicating less interest in others than most. Sixth is the total number of human responses based on fictional whole or part human responses (e.g., clowns, angels, ghosts; the arm of an angel) and fictional human detail responses and fictional whole or part animal content (e.g., dragon, unicorn, animal masks) is greater than 3. This indicates that the person does not understand others well, possibly leading to social blunders as well as unrealistic expectations for their relations. Seven, total whole animal and human responses is less

than four times fictional whole animal and human responses. Again, when this is the case, it indicates the person does not understand people well, and likely has difficulties with their interpersonal relations (Exner, 2000).

High values on the HVI denote an individual who expends a considerable amount of energy scanning their environment because of a mistrusting attitude. They become suspicious and confused when met with gestures of closeness by others. At its extreme, this tendency has paranoid-like qualities (Exner, 2000).

Zf. Zf indexes the number of responses that have a z-value. It serves as a crude estimate of processing effort (Exner, 2000). Higher values indicate greater processing effort while lower values indicate lower processing effort. A tendency to exert greater processing effort is conceptually unrelated to constraint in terms of obeying the law (CON) or social introversion (SI).

Popular Responses (P). The number of popular responses given indexes the "likelihood that the person will make obvious customary or conventional responses in situations where the cues regarding expected or accepted behaviours are easily identified" (Exner, 2000, p. 184). Higher values indicate more conventional responses and lower values indicate unconventional responses. Conventionality has no conceptual relation to introversion (SI). However, it could be argued that conventionality as measured by P is related to constraint in terms of obeying the law as measured by the MMPI-2 CON variable. Even if they are conceptually related, it is not expected that their correlation in the full sample will be significant. In a sense, it is similar to correlations between MMPI-2 psychosis and Rorschach psychosis, for example. These two constructs are generally not correlated when all participants are used and likewise it

is not expected that Rorschach P and MMPI-2 CON would be significantly correlated in the full sample (e.g., Meyer, 1996).Table 3 outlines all variables and their construct areas (e.g., Welsh's A – FUPC marker).

All scales measuring the same constructs were examined individually (e.g., Rorschach DEPI and MMPI-2 Scale 2). Also, all scales targeting a common construct (e.g., dysphoria) were z-transformed based on sample characteristics and aggregated to form composite measures. According to Rosenthal and Rubin (1986), the above procedure for constructing composite measures is a more accurate estimate of combined effects compared to average effect size when individual scales of the same construct are not perfectly correlated. As described by Lindgren and Carlsson (2002, p. 364) "For the MMPI-2, the different scales used to form a single composite measure have varying degrees of individual item overlap. Due to the way the composite measures are calculated, the effect of this confound is that the composite measure becomes more similar to an average correlation. It is only unique variance contributed by individual scales that can make a composite score a stronger measure of overall effect."

In the current sample, total scores were used for Rorschach scales and K-corrected T-scores were used for the MMPI-2 analyses. No Rorschach variables had a skewness or kurtosis above .621. One MMPI-2 variable had skewness above two (F scale: 2.52). Six MMPI-2 variables had kurtosis values above 2 (F scale: 9.03; Scale2: 4.03; Scale 6: 2.24; Scale 7: 2.14; Scale 8: 3.64; PSY: 2. 46). All scales were kept for the analyses.

Table 3

Variables and Construct Areas

Construct Areas	MMPI-2	Rorschach
FUPC markers	Welsh's A	R-Engagement
	F and K	R and Lambda
Dysphoria variables	Scale 2	S-Con
	Scale 7	DEPI
	DEP	
	ANX	
	PSY-5-Neg	
Psychosis variables	Scale 8	SCZI
	BIZ	
	PSY-5-Psy	
Wariness variables	Scale 6	HVI
	CYN	
	SOD	
Non-psychopathology		
Variables	Scale 0	Zf
	CON	Pop

Note. FUPC=First Unrotated Principal Component; Welsh's A=Welsh's Anxiety Scale; R-Engagement=Response Engagement; R=total number of Rorschach responses; Lambda=pure form responses/R-Pure form responses; DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale; Scale 0=Social Introversion; CON=Constraint Scale; Zf=total number of responses with a Z value; Pop=total number of popular responses

CHAPTER IV

Results

Overview of the Findings

The findings were organized in the following way. First, principal component analyses of MMPI-2 and Rorschach were conducted. Second, analyses were conducted to (a) determine aligned and opposite groups using factor-based scales (i.e., Welsh's A and R-Engagement) and profile scales (i.e., MMPI-2: F and K; Rorschach: R and Lambda), and (b) to test for discrepancies between the current sample and Meyer's. Third, the findings were organized according to the hypotheses in the following manner. The first hypothesis involved all subjects and is presented as such. The data from the remaining hypotheses are presented in the following manner. When aligned subgroups were used, the order was to present the findings for individual scales for participants aligned on factor-based scales. Next, the findings for z-transformed aggregated scales for participants aligned on factor-based scales are presented. This is followed by individual and z-tranformed aggregated data for participants aligned on profile scales.

Principal Components Analysis on MMPI-2 and Rorschach for the Present Sample (N =513)

Following Meyer (1999), response style was determined with two independent procedures. The first procedure used scales designed to quantify the MMPI-2 and Rorschach first principal unrotated components (FUPC). Welsh's Anxiety Scale (A) was designed to quantify the first MMPI-2 factor. To assess its adequacy in this sample, a principal components analysis was conducted using MMPI-2 basic, validity and content scales. Using all 513 participants, the first unrotated component accounted for 46.97% of

the total variance (the second, third, fourth, and fifth components accounted for 12.55, 6.70, 3.95, and 3.69% of the variance, respectively). This dimension was defined by the A scale, which had a loading of .94. This indicates that A is an excellent measure of the MMPI-2's first factor. In Meyer's (1997) sample, the first unrotated principal component accounted for 51.3% of the total variance (the second, third, fourth, and fifth components accounted for 11.70, 5.90, 4.10, and 3.70% of the variance, respectively). Thus, the percentages of the variances explained by the factors derived from the current sample are very similar to Meyer's (1999) factor loadings on the MMPI-2. The second procedure for defining response style on the MMPI-2 involves the F and K scales. This is explained below.

To assess the adequacy of Response-Engagement to function as the marker for the Rorschach's first factor, a principal component analysis was conducted using all 513 participants from the present sample. R-Engagement and the entire set of Rorschach variables used by Meyer (1992) to develop R-Engagement were analyzed together. The first unrotated component accounted for 23.98% of the total variance (the second, third, fourth, and fifth components accounted for 7.77, 6.55, 5.84, and 5.04%, respectively). This dimension was defined by R-Engagement, which had a loading of .97. This indicates that R-Engagement is an excellent measure of the Rorschach's first factor. In Meyer's (1997) sample, the first unrotated principal component accounted for 23.4% of the total variance (the second, third, fourth, and fifth components accounted for 8.90, 4.80, 4.40, and 3.50% of the variance, respectively). Thus, the percentage of the variance explained by the factors derived from the current sample are very similar to Meyer's

factor loadings on the Rorschach. The second procedure for defining response style with the Rorschach involves the R and Lambda scales. This is explained below.

Preliminary Analysis I: Formation of Aligned and Opposite Groups using First Factor Markers.

Table 4 shows correlations between Welsh's A and relevant MMPI-2 variables and R-Engagement and relevant Rorschach variables in the entire sample. Tables 5, 6, 7, and 8 show correlations between Welsh's A and relevant MMPI-2 variables and R-Engagement and relevant Rorschach variables in the factor-based aligned sample, the profile-based aligned sample, factor-based opposite sample, and the profile-based opposite sample, respectively.

Using factor-based scales (i.e., Welsh's A and R-Engagement), for the MMPI-2, participants were considered openly responsive if they scored in the upper third of the A distribution (i.e., ≥t score 46) and considered defensively constricted if they scored in the lower third (i.e., ≤t score 39). With these criteria, 176 participants were considered openly expressive, and 187 were considered defensively constricted. These values are higher than one third because in an effort to increase the sample size, all values that were at the upper and lower third (i.e., t score of 46; t score of 39) were included in the analyses.

For the Rorschach, participants were considered openly responsive if they scored in the upper third of R-Engagement (i.e., ≥.37) and considered defensively constricted if they scored in the bottom third of R-Engagement (i.e. ≤-1.06). With these criteria, 171 participants were considered openly expressive and 170 were considered defensively constricted. Patients were considered aligned if they scored in the upper third of both A

Table 4

Correlations of Welsh's A and R-Engagement (R-E) with Relevant MMPI-2 and Rorschach Scales in the Entire Sample

Dysphoria			Psychosis			Wariness		
	Welsh' A	R-E		Welsh's A	R-E		Welsh's A	R-E
	MMPI-2 Scales			MMPI-2 Scales			MMPI-2 Scales	
Scale 2	.61**	.05	Scale 8	.57**	.16**	Scale 6	.45**	.14**
Scale 7	.68**	.17**	BIZ	.64**	.15**	CYN	.64**	.03
DEP	.90**	.15**	PSY	.71**	.14**	SOD	.47**	-.01
ANX	.86**	.11*						
				Rorschach Scale			Rorschach Scale	
PSY-5 -Neg	.88**	.13**	SCZI	-.06	.27**	HVI	.00	.49**
Welsh's A		.17**						
Rorschach Scales								
DEPI	.11*	.34**						
S-CON	.01	.33**						

Note. MMPI-2 Scales: DEPI=Depression Index; S-CON=Suicide Constellation; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale; Rorschach Scales: SCZI=Schizophrenia Index; HVI=Hypervigilance Index;. N=513 for Scales 2, 6, 7, 8, DEP, ANX, CYN, SOD, and BIZ; N=511 for PSY-5-Neg; N=503 for PSY-5-Psy.

*$p<.05$. **$p<.01$.

Table 5

Correlations of Welsh's A and R-Engagement (R-E) with Relevant MMPI-2 and Rorschach Scales in the Factor-Based Aligned Subsample

Dysphoria			Psychosis			Wariness		
	Welsh' A	R-E		Welsh's A	R-E		Welsh's A	R-E
MMPI-2 Scales			MMPI-2 Scales			MMPI-2 Scales		
Scale 2	.62**	.43**	Scale 8	.61**	.40**	Scale 6	.51**	.33**
Scale 7	.72**	.53**	BIZ	.74**	.50**	CYN	.68**	.43**
DEP	.93**	.67**	PSY	.82**	.56**	SOD	.41**	.30**
ANX	.88**	.64*						
PSY-5 -Neg	.91**	.66**						
Welsh's A		.70**	Rorschach Scale			Rorschach Scale		
			SCZI	.12	.27**	HVI	.32**	.54**
Rorschach Scales								
DEPI	.43**	.36**						
S-CON	.32**	.36**						

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale. N=133.

*$p<.05$. **$p<.01$.

Table 6

Correlations of Welsh's A and R-Engagement (R-E) with Relevant MMPI-2 and Rorschach Scales in the Profile-Based Aligned Subsample

Dysphoria			Psychosis			Wariness		
	Welsh' A	R-E		Welsh's A	R-E		Welsh's A	R-E
MMPI-2 Scales			MMPI-2 Scales			MMPI-2 Scales		
Scale 2	.64**	.26*	Scale 8	.65**	.38**	Scale 6	.56**	.37**
Scale 7	.72**	.41**	BIZ	.78**	.53**	CYN	.65**	.34**
DEP	.94**	.50**	PSY	.85**	.52**	SOD	.47**	.19
ANX	.90**	.51**	PSY-5 -Neg	.89**	.54**			
Welsh's A		.56**						
Rorschach Scales			Rorschach Scale			Rorschach Scale		
DEPI	.19	.33**	SCZI	.15	.24*	HVI	.37**	.61**
S-CON	.26*	.46**						

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale. N=133.

*p<.05. **p<.01.

Table 7

Correlations of Welsh's A and R-Engagement (R-E) with Relevant MMPI-2 and Rorschach Scales in the Factor-Based Opposite Subsample

Dysphoria			Psychosis			Wariness		
Welsh' A		R-E	Welsh's A		R-E	Welsh's A		R-E
MMPI-2 Scales			MMPI-2 Scales			MMPI-2 Scales		
Scale 2	.65**	-.44**	Scale 8	.56**	-.25*	Scale 6	.44**	-.12
Scale 7	.70**	-.42**	BIZ	.61**	-.50**	CYN	.69**	-.64**
DEP	.91**	-.67**	PSY	.75**	-.62**	SOD	.60**	-.43**
ANX	.89**	-.67**	Rorschach Scale			Rorschach Scale		
PSY-5 -Neg	.89**	-.69**	SCZI	-.34**	-.48**	HVI	-.46**	.63**
Welsh's A		-.73**						
Rorschach Scales								
DEPI	-.43**	.47**						
S-CON	-.43**	.52**						

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale. N=101.

*$p<.05$. **$p<.01$.

Table 8

Correlations of Welsh's A and R-Engagement (R-E) with Relevant MMPI-2 and Rorschach Scales in the Profile-Based Opposite Subsample

Dysphoria			Psychosis			Wariness		
	Welsh' A	R-E		Welsh's A	R-E		Welsh's A	R-E
MMPI-2 Scales			MMPI-2 Scales			MMPI-2 Scales		
Scale 2	.71**	-.42**	Scale 8	.73**	-.29*	Scale 6	.68**	-.22
Scale 7	.77**	-.34**	BIZ	.76**	-.36**	CYN	.74**	-.46**
DEP	.94**	-.50**	PSY	.79**	-.34**	SOD	.69**	-.32**
ANX	.90**	-.46**	Rorschach Scale			Rorschach Scale		
PSY-5 -Neg	.88**	-.36**	SCZI	-.27**	-.49**	HVI	-.42**	.60**
Welsh's A		-.45**						
Rorschach Scales								
DEPI	-.19**	.46**						
S-CON	-.26**	.44**						

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale. N=61.

*p<.05. **p<.01.

R-Engagement (i.e., upper third on R-Engagement and lower third on A; upper third on A and lower third on R-Engagement). Using these criteria, across both methods, 133 participants adopted the same style (openly responsive on both, n= 65, defensively constricted on both, n=68). Across both methods, 101 participants adopted opposite response styles (i.e., openly responsive MMPI-2 and defensively constricted Rorschach, n=48, or openly responsive Rorschach and defensively constricted MMPI-2, n=55). Since scores on response style indicators are separated into terciles (i.e., R-Engagement value in the bottom third, middle third or upper third; Welsh's A value in the bottom third, middle third, or upper third), we would expected that 22% of participants would be opposite or aligned by chance. In the current sample, for participants aligned on factor-based scales, 26% or one quarter of all participants were aligned and 20% were opposite.

Preliminary analysis II: Formation of Aligned and Opposite Groups using Traditional Profile Indicators of Response Style.

The second procedure for defining response style used profile scores traditionally interpreted as indices of response style. For the MMPI-2, these were F and K, and for the Rorschach, these were Lambda and R. The median values for each profile score was used as the cut-off to identify participants as defended or open. Median values for F and K were 45 and 58 respectively. Median values for R and Lambda were 20 and .80 respectively. Meyer's (1999) median values for F and K were 58 and 50, respectively. Meyer's (1999) median values were 20 for R and .55 for Lambda. Participants were considered openly responsive on the MMPI-2 if their F value was above 45 and their K value was below 58. Participants were considered constricted if their F values were

below 45 and their K value was above 58. For the Rorschach, participants were considered dilated if their R value was above 20 and their Lambda value was below .80. Participants were considered constricted if R was below 20 and Lambda was above .80. Using these criteria, 73 participants were classified as aligned and 61 participants were classified as opposite. Using profile scores, 14% of participants were aligned and 12% were opposite.

Preliminary analysis III: Testing for Discrepancies between Meyer's and the Present Samples in Rorschach and MMPI-2 First Factor Correlations

Because over 80% of the sample includes parents involved in child custody cases, and such cases are known to involve motivated responding (Greene, 2000), the correlations between the Rorschach and MMPI-2 first factors in Meyer's (1977) sample and the current sample was investigated. In this way, it was determined whether the current sample was so highly saturated with motivated denial that the comparison was not reasonable, and also whether correlations between response style indicators across methods in the current sample significantly differed from correlations between Meyer's (1996, 1997, 1999) response style indicators. If there were significant differences in the relations between response style indicators in the current sample and Meyer's, any additional analyses would be biased and this would indicate that participants responded differently to each test than in Meyer's data. For example, if the current sample showed a high correlation between R-Engagement and Welsh's A, due to motivation to distort, it could undermine one entire basic premise that the study is founded upon, that the FUPCs are uncorrelated. If this had been the case, correlations between conceptually related constructs would have been spuriously high when using the entire sample because the

conceptually related constructs are highly correlated with their respective FUPCs. In this sample, Welsh's A and R-Engagement correlated at r (510) = .17, p < .05. In Meyer et al.'s (2000) study, correlations between Welsh's A and R-Engagement were r (325) = .13, p < .05. A test for the difference in the size of these two correlations was not significant (z = .55, p = ns), indicating that the relation between the response style indicators in the current sample (R-Engagement and Welsh's A) were not statistically different than the relation between Meyer's response style indicators. The additional analyses were thus conducted.

In the current sample, the mean and standard deviation for Welsh's A was M = 45.38 and SD = 10.03. The mean for R-Engagement was M = .00 and the standard deviation was SD = 2.20. The median values in this sample for F and K were 45 and 58, respectively. Meyer's (1999) values for F and K were 58 and 50, respectively. Meyer (1997, 1999) and Meyer et al.'s (2000) University of Chicago sample had R-Engagement mean and standard deviation values of M = .00 and SD = 2.45, respectively. The means for R-Engagement in the current sample are identical to Meyer's (1997, 1999) and Meyer et al. (2000) because the variables used in the analysis were converted to z-scores prior to calculating R-Engagement.

Table 9 highlights mean and standard deviations for the variables used in R-Engagement from Meyer's (1999) sample and the current sample.

Relations Between Rorschach and MMPI-2 Constructs in All Participants

Hypothesis 1: Relations in All Participants

According to hypothesis 1, it was expected that when all participants are included in the analyses, the correlations between conceptually related Rorschach and MMPI-2

Table 9

Comparison of R-Engagement Variables Between Meyer's (1999) Sample and the Current Sample

Variables	Meyer's Sample (N = 372)		Current Sample (N = 513)	
	Mean	SD	Mean	SD
FY	.76	1.27	.65	1.28
FC Prime	1.50	1.63	1.05	1.47
CF+C	2.72	2.59	1.63	1.69
Shading Blends	.51	1.02	.03	.17
Inanimate Movement	2.61	2.69	1.60	1.63
Number of Responses	23.49	9.69	22.55	8.84
Space Responses	3.64	3.02	2.17	2.15
Animal Movement	2.99	2.21	3.19	2.44
Form Vista	.47	.86	.25	.64
Whole Responses	10.63	4.97	9.45	4.56
Morbid Responses	2.13	2.25	.78	1.28
Human Movement	4.93	3.84	3.73	2.83
Lambda	.9405	1.29	1.13	1.32
Colour-Shading Blends	.94	1.28	.47	.86

Note. FY = Form-based diffuse shading responses. FC Prime = Form-based achromatic colour responses. CF+C = Colour-based for responses and pure colour responses. Shading Blends = Blends with two or more shading response. . Space Responses = Responses using white space. Form Vista = Form-based vista shading responses. Whole Responses = Responses using the entire blot. Lambda = Total number of pure form responses divided by total number of responses minus pure form responses. Colour-Shading Blends: Blends that include shading and colour responses. Meyer's Sample N = 372; Current Sample N =513.

constructs (e.g., MMPI-2 psychosis and Rorschach psychosis) would be nonsignificant. As shown in Table 10, disregarding response style, there were three small but significant correlations between Rorschach DEPI and MMPI-2 DEP (r (511) = .10, p < .05), ANX (r (511) = .11, p < .05), and PSY-5-Neg (r (511) = .10, p < .05). Overall, however, the average correlation for conceptually related individual Rorschach and MMPI-2 scales of dysphoria, psychosis, and wariness was not significant (Mr (511) = .02, p = ns) and Hypothesis 1 was supported.

In Meyer's (Meyer et al., 2000) sample, the average correlation between conceptually related constructs for all participants was r (358) = .05, p = ns. There was no significant difference between the size of the average correlation in the current sample and that from Meyer's sample (z = .49, p = ns).

As shown in Table 11, the average correlation for z-transformed aggregated scales for the Rorschach and MMPI-2 constructs of dysphoria, psychosis, and interpersonal wariness was also nonsignificant (Mr (511) = .02, p = ns). Thus, when all participants are used, there is no significant average correlation between Rorschach and MMPI-2 variables of dysphoria, psychosis, or interpersonal wariness and hypothesis 1 was supported.

Relations Between Rorschach and MMPI-2 Conceptually Related Constructs in Aligned Participants

Hypothesis 2: Relations in Participants Aligned on Factor-Based Scales.

The second hypothesis was that when the analyses are limited to participants who are aligned (i.e., same tercile placement on both MMPI-2 and Rorschach FUPC markers), correlations between conceptually related constructs (e.g., MMPI-2 psychosis and

Table 10

Using Entire Sample: Correlations Between Rorschach and MMPI-2 Scales in the Areas of Affective Dysphoria, Psychosis, and Interpersonal Wariness

Dysphoria			Psychosis		Wariness	
	DEPI	S-CON	SCZI			HVI
Scale 2	-.01	-.04	Scale 8	.04	Scale 6	.03
Scale 7	.07	-.09	BIZ	-.01	CYN	.00
DEP	.10*	.00	PSY	-.02	SOD	-.07
ANX	.11*	-.01				
PSY-5 -Neg	.10*	.02				

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale. N=513 for Scales 2, 6, 7, 8, DEP, ANX, CYN, SOD, and BIZ; N=511 for PSY-5-Neg; N=503 for PSY-5-Psy.

*$p<.05$.

Table 11

Using Entire Sample: Correlations Between z-transformed Aggregated Rorschach and MMPI-2 Scales in the Areas of Affective Dysphoria, Psychosis, and Interpersonal Wariness

MMPI-2 Scales	Rorschach Scales		
	Dysphoria	Psychosis	Wariness
Dysphoria	.05		
Psychosis		.00	
Wariness			-.02

Note. Rorschach Dysphoria=Z-transformed aggregated Rorschach DEPI and Rorschach S-Con. MMPI-2 Dysphoria=Z-transformed aggregated MMPI-2 Scale 2, Scale 7, DEP, ANX, PSY-5-Neg. MMPI-2 Psychosis=Z-transformed aggregated MMPI-2 Scale 8, BIZ, PSY-5-Psy. MMPI-2 Wariness=Z-transformed aggregated MMPI-2 Scale 6, CYN, SOD; N=513.

Rorschach psychosis) would be significant. As shown in Table 12, using participants aligned on factor-based scales (i.e., Welsh's A and R-Engagement), significant correlations were found between individual Rorschach scales of dysphoria and individual MMPI-2 scales of dysphoria and between Rorschach wariness and MMPI-2 CYN. No significant correlations were observed between Rorschach SCZI and MMPI-2 individual psychosis scales (*Mr* (131) = .08, p = ns). The average correlation between all conceptually related individual scales across constructs was significant (*Mr* (131) = .28, $p < .01$). Meyer's (Meyer et al., 2000) average correlation for all individual scales for participants aligned on factor-based scales was r (78) = .48, $p < .001$. The average convergent correlations from the current sample was significantly smaller than Meyer's average correlation (z = -1.39, p <.05). Thus, on average, for participants aligned on factor-based scales, significant correlations were obtained between individual conceptually related constructs, which supported the hypothesis. But the size of these correlations was reliably smaller than that reported by Meyer. With respect to z-transformed aggregated scales with aligned participants, as shown in Table 13, z-transformed aggregated Rorschach and MMPI-2 scales of dysphoria were significantly correlated (r (131) = .39, $p < .01$). For z-transformed psychosis scales, the correlation was non-significant (r (131) =.08, p = ns). For z-transformed aggregated wariness scales the correlation was non-significant (r (131) = .16, p = ns). Overall, when participants with similar positions on FUPC markers based on factor-based scales are used, the average correlation between conceptually related variables was significant (r (131) = .21, $p < .05$). Meyer's (Meyer et al., 2000) average correlation for z-transformed aggregated

Table 12

Similar Responses Styles on Factor-Based Scales (Aligned): Correlations Between Rorschach and MMPI-2 Scales in the Areas of Affective Dysphoria, Psychosis, and Interpersonal Wariness

Dysphoria			Psychosis		Wariness	
MMPI-2 Scales	Rorschach DEPI	Rorschach S-CON	MMPI-2 Scales	Rorschach SCZI	MMPI-2 Scales	Rorschach HVI
Scale 2	.10	.19*	Scale 8	.07	Scale 6	.13
Scale 7	.20*	.16	BIZ	.07	CYN	.18*
DEP	.42**	.27**	PSY	.09	SOD	.03
ANX	.41**	.32**				
PSY-5 -Neg	.45**	.35**				

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale. N=133

*p<.05. **p<.01.

Table 13

Similar Responses Styles on Factor-Based Scales (Aligned): Correlations Between z-transformed Aggregated Rorschach and MMPI-2 Scales in the Areas of Affective Dysphoria, Psychosis, and Interpersonal Wariness

MMPI-2 Scales	Rorschach Scales		
	Dysphoria	Psychosis	Wariness
Dysphoria	.39**		
Psychosis		.08	
Wariness			.16

Note. Rorschach Dysphoria=Z-transformed aggregated Rorschach DEPI and Rorschach S-Con. MMPI-2 Dysphoria=Z-transformed aggregated MMPI-2 Scale 2, Scale 7, DEP, ANX, PSY-5-Neg. MMPI-2 Psychosis=Z-transformed aggregated MMPI-2 Scale 8, BIZ, PSY-5-Psy. MMPI-2 Wariness=Z-transformed aggregated MMPI-2 Scale 6, CYN, SOD; N=133

**p<.01.

scales for participants aligned on factor-based scales was r (78) = .57, p < .01. There was a significant difference between the current sample and Meyer's sample (z = -3.02, p < .01) such that in Meyer's sample, z-transformed aggregated scales were more highly correlated with each other than in the current sample. On average, for participants aligned on factor-based scales, conceptually related z-transformed aggregated scales were significantly and positively correlated which supported the hypothesis. But the size of this correlation was reliably smaller than that reported by Meyer.

Relations Between Rorschach and MMPI-2 Conceptually Related Constructs in Aligned Participants

Hypothesis 2: Relations in Participants Aligned on Profile Scales.

As shown in Table 14 and Table 15, correlations were also computed for participants aligned on profile scales (i.e., F and K for the MMPI-2; R and Lambda for the Rorschach). Using profile scales, participants with similar response styles evidenced significant correlations between individual Rorschach scales of dysphoria and individual MMPI-2 scales of dysphoria and between Rorschach wariness and MMPI-2 CYN. No significant correlations were found between individual psychosis constructs. For the individual dysphoria scales, shown in Table 14, S-Con was significantly correlated with Scale 7 (r (71) = .27, p < .05), DEP, (r (71) = .24, p < .05), and PSY-5-Neg (r (71) = .25, p < .05). For the individual psychosis scales, no correlations were significant (Mr (71) = .14, p = ns). For interpersonal wariness, Rorschach HVI was significantly correlated with CYN (r (71) = .30, p < .01). Overall, for participants aligned on profile scores, the average correlation across all constructs was not significant (r (71) = .18, p = ns) and did

Table 14

Similar Response Styles Using Profile Scores (Aligned): Correlations Between Rorschach and MMPI-2 Scales in the Areas of Affective Dysphoria, Psychosis, and Interpersonal Wariness

Dysphoria			Psychosis		Wariness	
MMPI-2 Scales	Rorschach DEPI	Rorschach S-CON	MMPI-2 Scales	Rorschach SCZI	MMPI-2 Scales	Rorschach HVI
Scale 2	.05	.19	Scale 8	.14	Scale 6	.22
Scale 7	.19	.27*	BIZ	.15	CYN	.30**
DEP	.23	.24*	PSY	.13	SOD	.04
ANX	.17	.20				
PSY-5 -Neg	.15	.25*				

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale. N=73.

*p<.05. **p<.01.

Table 15

Similar Response Styles Using Profile Scores (Aligned): Correlations Between z-transformed Aggregated Rorschach and MMPI-2 Scales in the Areas of Affective Dysphoria, Psychosis, and Interpersonal Wariness

MMPI-2 Scales	Rorschach Scales		
	Dysphoria	Psychosis	Wariness
Dysphoria	.26*		
Psychosis		.18	
Wariness			.27*

Note. Rorschach Dysphoria=Z-transformed aggregated Rorschach DEPI and Rorschach S-Con. MMPI-2 Dysphoria=Z-transformed aggregated MMPI-2 Scale 2, Scale 7, DEP, ANX, PSY-5-Neg. MMPI-2 Psychosis=Z-transformed aggregated MMPI-2 Scale 8, BIZ, PSY-5-Psy. MMPI-2 Wariness=Z-transformed aggregated MMPI-2 Scale 6, CYN, SOD; N=73.

*$p<.05$.

not support the hypothesis. Meyer's average correlation (Meyer et al., 2000) for participants aligned on profile scores was r (43) = .42, p < .001. The difference in the size of the correlation between the current sample and Meyer's sample was not significant (z = -1.36, p = ns). The correlation between MMPI-2 and Rorschach z-transformed aggregated dysphoria scales was significant (r (71) =.26, p < .05). The correlation for MMPI-2 and Rorschach z-transformed aggregated psychosis scales was nonsignificant (r (71) = .18, p = ns). The correlation for z-transformed aggregated interpersonal wariness scales was significant (r (71) = .27, p < .05). When participants with similar positions on FUPC markers based on profile scales are used, the average correlation was significant (Mr (71) = .24, p < .05). Meyer's (Meyer et al., 2000) average correlation for z- transformed aggregated scales for participants aligned on profile scores was Mr (43) =.49, p < .001. The difference in correlations between the current sample and Meyer's was not significant (z = -1.49, p = ns). On average, for participants aligned on profile scales, conceptually related z-transformed aggregated scales were significantly and positively correlated which supported the hypothesis.

Thus, for individual constructs, the average correlation was significant for participants aligned on factor-based scales, but not on profile scales. For z-transformed aggregated constructs, the average correlation was significant for participants aligned on both factor-based scales and profile scales. Thus, the results supported the hypothesis for three of four correlations. However, in general these correlations were smaller than those reported by Meyer (1999) and Meyer et al. (2000).

Relations Between Rorschach and MMPI-2 in Participants with Opposite FUPC Placement

Hypothesis 3: Relations for Opposite Participants Using Factor-Based Scales.

The third hypothesis was that for participants with opposite placements on FUPC markers (e.g., high R-Engagement and low Welsh's A), correlations between conceptually related constructs would be significant and negative. As shown in Table 16 and Table 17, using factor-based scales (i.e., Welsh's A and R-Engagement), significant correlations were found in all three construct areas. For the individual dysphoria scales, the average correlation was significant (Mr (99) = -.33, $p < 01$). For individual psychosis scales, the average correlation was significant (Mr (99) = -.20, $p < .05$). For the construct of wariness, the average correlation for individual scales was significant (Mr (99) = -.29, $p < .01$). Overall, when participants with opposite FUPC marker placements are used, the average correlation for all three constructs was significant (r (99) = -.27, $p < .05$). The average correlation for Meyer's (Meyer et al., 2000) sample for participants with opposite placement on FUPC markers was r (74) = -.37, $p < .01$). There was no significant difference in the size of the correlation between the current sample and Meyer's sample ($z = .72$, p = ns). Thus, for participants aligned on factor-based scales, the hypothesis was supported with respect to individual scales.

As shown in Table 17, the correlation between z-transformed aggregated Rorschach and MMPI measures of dysphoria was significant (r (99) = -.43, $p < .01$). The correlation between aggregated z-transformed Rorschach and MMPI psychosis scales was significant (r (99) = -.23. $p < .05$). The correlation between z-transformed aggregated scales of interpersonal wariness was significant (r (99) = -.41, $p < .01$). For participants aligned on factor-based scales, the average correlation for the constructs of

Table 16

Correlations Between Individual MMPI-2 and Rorschach Psychopathology Scales for Participants with Opposite placement on Factor-Based Scales

Dysphoria		Psychosis		Wariness		
MMPI-2 Scales	Rorschach DEPI	Rorschach S-CON	MMPI-2 Scales	Rorschach SCZI	MMPI-2 Scales	Rorschach HVI
Scale 2	-.25*	-.31**	Scale 8	-.05	Scale 6	-.07
Scale 7	-.18	-.23*	BIZ	-.23*	CYN	-.41**
DEP	-.36**	-.41**	PSY	-.32**	SOD	-.38**
ANX	-.37**	-.37**				
PSY-5 -Neg	-.40**	-.39**				

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale. N=101.

*p<.05. **p<.01.

Table 17

Correlations Between z-transformed Aggregated MMPI-2 and Rorschach Scales for Participants with Opposite FUPC placement on Factor-Based Scales

MMPI-2 Scales		Rorschach Scales	
	Dysphoria	Psychosis	Wariness
Dysphoria	-.43**		
Psychosis		-.23*	
Wariness			-.41**

Note. Rorschach Dysphoria=Z-transformed aggregated Rorschach DEPI and Rorschach S-Con. MMPI-2 Dysphoria=Z-transformed aggregated MMPI-2 Scale 2, Scale 7, DEP, ANX, PSY-5-Neg. MMPI-2 Psychosis=Z-transformed aggregated MMPI-2 Scale 8, BIZ, PSY-5-Psy. MMPI-2 Wariness=Z-transformed aggregated MMPI-2 Scale 6, CYN, SOD; N=101.

*p<.05. **p<.01.

dysphoria, psychosis, and wariness was significant and negative (r (99) = -.36, p < .01) which supported the hypothesis. Meyer's average correlation (Meyer et al., 2000) for z-transformed aggregated scales for participants aligned on factor-based scales was r (74) = -.45, p < .01. There was no significant difference between the sizes of the correlation in the current sample and Meyer's (z = .70, p = ns).

Relations Between Rorschach and MMPI-2 Conceptually Related Constructs in Participants with Opposite Placement on FUPC Markers

Hypothesis 3: Relations for Opposite Participants Using Profile Scales.

These analyses were also computed for participants with opposite placements on FUPC markers based on profile scales (e.g., MMPI-2: high F, low K; Rorschach: high R, low Lambda). As shown in Table 18 and Table 19, significant correlations for individual dysphoria scales were found only for S-Con and Scale 2 (r (59) = -.28, p < .05). For individual scales of psychosis, no significant correlations were found (Mr (59) = -.17, p = ns). For individual interpersonal wariness scales, significant correlations were found between HVI and CYN (r (59) = -.43, p < .01) and between HVI and SOD (r (59) = -.32, p < .05). However, there were only three significant correlations out of 16, and the average correlation for all scales was not significant (Mr (59) = -.18, p = ns). Thus, the hypothesis was not supported. Meyer's average correlation (Meyer et al., 2000) for participants with opposite placement based on profile scores was r (46) = -.27, p < .05. The difference in the sizes of the correlations was not significant (z = .48, p = ns).

For z-transformed aggregated dysphoria scales, the correlation was not significant (r (59) = -.23, p =, ns). For z-transformed aggregated scales of psychosis, the correlation was not significant (r (59) = -.19, p = ns). For z-transformed aggregated scales of

Table 18

Correlations Between Individual MMPI-2 and Rorschach Psychopathology Scales for Participants with Opposite Placement on Profile Scales

Dysphoria		Psychosis		Wariness		
MMPI-2 Scales	Rorschach DEPI	Rorschach S-CON	MMPI-2 Scales	Rorschach SCZI	MMPI-2 Scales	Rorschach HVI
Scale 2	-.10	-.28*	Scale 8	-.03	Scale 6	-.19
Scale 7	-.18	-.24	BIZ	-.24	CYN	-.43**
DEP	-.07	-.22	PSY	-.25	SOD	-.32*
ANX	-.15	-.23				
PSY-5 -Neg	-.12	-.18				

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale. N=61.

*p<.05. **p<.01.

Table 19

Correlations Between Z-transformed Aggregated MMPI-2 and Rorschach Scales for Participants with Opposite Placement on Profile Scales

MMPI-2 Scales	Rorschach Scales		
	Dysphoria	Psychosis	Wariness
Dysphoria	-.23		
Psychosis		-.19	
Wariness			-.40**

Note. Rorschach Dysphoria=Z-transformed aggregated Rorschach DEPI and Rorschach S-Con. MMPI-2 Dysphoria=Z-transformed aggregated MMPI-2 Scale 2, Scale 7, DEP, ANX, PSY-5-Neg. MMPI-2 Psychosis=Z-transformed aggregated MMPI-2 Scale 8, BIZ, PSY-5-Psy. MMPI-2 Wariness=Z-transformed aggregated MMPI-2 Scale 6, CYN, SOD; N=61.

*p<.05. **p<.01.

interpersonal wariness, the correlation was significant (r (59) = -.40, p < .01). The average correlation for z-transformed aggregated scales was significant (Mr (59) = -.27, p < .05), which supported the hypothesis. However, individually, significant correlations were only found for the wariness scales. Meyer's (Meyer et al., 2000) average correlation for z-transformed aggregated scales for participants with opposite placement on profile scores was r (46) = -.32, p < .05. There was no significant difference between the correlation in the current sample and Meyer's (z = .28, p = ns).

Rorschach and MMPI-2 Correlations Between Conceptually Related and Conceptually Unrelated Psychopathology Constructs in Aligned Participants

Hypothesis 4: Residual and Non-Residual Correlations for Participants Aligned on Factor-Based Scales.

The fourth hypothesis was that for aligned participants, residual and non-residual correlations between conceptually related forms of psychopathology (e.g., MMPI-2 dysphoria and Rorschach dysphoria) would be significantly higher than residual and non-residual correlations between conceptually unrelated kinds of psychopathology (e.g. MMPI-2 dysphoria and Rorschach psychosis). This analysis would help to show construct specific convergence over and above convergence based on general psychopathology and response style.

First, non-residualized correlations for conceptually related psychopathology constructs (e.g., MMPI-2 dysphoria and Rorschach dysphoria) were compared to non-residualized conceptually unrelated psychopathology construct correlations (e.g., MMPI-2 dysphoria and Rorschach psychosis). Shown in Table 20, there was no significant

Table 20

Comparison of Average Pre-residualized Conceptually Related Psychopathology Constructs and Conceptually Unrelated Psychopathology Constructs

Conceptually related vs. Conceptually unrelated (Factor-Based Scales)
$z = .33, p =$ ns (individual scales)
$z = -0.08, p =$ ns (aggregated scales)
Conceptually related vs. Conceptually unrelated (Profile Scales)
$z = -.022, p =$ ns (individual scales)
$z = -.045, p =$ ns (aggregated scales)

Note. Factor-based scales, n = 133; profile scales, n =73.

difference between non-residual conceptually related psychopathology constructs and non-residual conceptually unrelated psychopathology constructs for participants aligned on factor-based scales and profile-based scales for either individual or z-transformed aggregated scales. Thus, the hypothesis was not supported.

Next, residual correlations were calculated for conceptually related and conceptually unrelated constructs using participants aligned on factor-based scales for individual constructs and z-transformed aggregated constructs (see Tables 21 and 22). As with the non-residual correlations, there was no significant difference between residual conceptually related psychopathology constructs and residual conceptually unrelated psychopathology constructs for participants aligned on factor-based scales and the hypothesis was not supported.

Residual Correlations for Participants Aligned on Profile Scales.

As shown in Tables 23 and 24, residual correlations for conceptually related and unrelated constructs for participants aligned on profiles scales were calculated. None of the correlations were statistically significant at the .05 level.

As shown in Table 25, for participants aligned on both factor-based scales and profile scales, the hypothesis that residual conceptually related correlations would be significantly higher than residual conceptually unrelated correlations was not supported which indicates that construct specific convergence could not be established and hypothesis 4 was not supported.

Overall, for all aligned participants, residual and non-residual conceptually related psychopathology constructs were not more highly correlated than residual and non-residual conceptually unrelated psychopathology constructs.

Table 21

Residual Correlations Between Individual MMPI-2 and Rorschach Conceptually Related and Conceptually Unrelated Measures of Psychopathology for Participants Aligned on Factor-Based Scale

MMPI-2 Scales	Rorschach Scales			
	DEPI	S-Con	SCZI	HVI
Scale 2	-.05	.04	.00	-.14
Scale 7	.02	-.02	-.05	-.06
DEP	.19*	.04	.00	-.14
ANX	.19*	.10	-.03	-.05
Psy-5-Neg	.22*	.12	-.07	-.07
Scale 8	.02	.02	-.05	-.09
BIZ	.13	.02	-.07	-.10
PSY	.14	.03	-.07	-.10
Scale 6	.05	.01	-.03	-.07
CYN	.12	.00	.00	-.08
SOD	.06	.15	.00	-.13

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale; N=133.

*$p < .05$.

Table 22

Residual Correlations Between Conceptually Related and Conceptually Unrelated MMPI-2 and Rorschach z-transformed Aggregated Measures of Psychopathology for Participants Aligned on Factor-Based Scales

MMPI-2 Scales	Rorschach Scales		
	Dysphoria	Psychosis	Wariness
Dysphoria	.12	-.06	-.05
Psychosis	.09	-.08	-.04
Wariness	.16	-.02	-.09

Note. Rorschach Dysphoria=Z-transformed aggregated Rorschach DEPI and Rorschach S-Con. MMPI-2 Dysphoria=Z-transformed aggregated MMPI-2 Scale 2, Scale 7, DEP, ANX, PSY-5-Neg. MMPI-2 Psychosis=Z-transformed aggregated MMPI-2 Scale 8, BIZ, PSY-5-Psy. MMPI-2 Wariness=Z-transformed aggregated MMPI-2 Scale 6, CYN, SOD; N=133.

Table 23

Residual Correlations Between Individual MMPI-2 and Rorschach Psychopathology Scales for Participants Aligned on Profile Scales

MMPI-2 Scales	Rorschach Scales			
	DEPI	S-Con	SCZI	HVI
Scale 2	-.07	.03	.05	-.11
Scale 7	.05	.08	.00	-.11
DEP	.05	.00	.02	.02
ANX	.00	-.03	.00	.06
Psy-5-Neg	-.02	.02	.01	.05
Scale 8	.15	.18	.00	-.14
BIZ	-.01	.10	.01	.01
PSY	.02	-.02	-.01	-.04
Scale 6	.17	.17	.09	.03
CYN	-.10	-.09	.12	.08
SOD	-.14	-.02	.19	-.13

Note. DEPI=Depression Index; S-CON=Suicide Constellation; SCZI=Schizophrenia Index; HVI=Hypervigilance Index; DEP=Depression Content Scale; ANX=Anxiety Content Scale; PSY-5-Neg=Personality Psychopathology Five Negative Emotionality/Neuroticism Scale; BIZ=Bizarre Mentation Content Scale; PSY-5-Psy=Personality Psychopathology Five Psychoticism Scale; CYN=Cynicism Content Scale; SOD=Social Discomfort Content Scale; N=73

Table 24

Residual Correlations Between Conceptually related and Conceptually unrelated MMPI-2 and Rorschach z-transformed Aggregated Measures of Psychopathology for Participants Aligned on Profile Scales

MMPI-2 Scales	Rorschach Scales		
	Dysphoria	Psychosis	Wariness
Dysphoria	.02	.02	-.02
Psychosis	.10	.07	-.06
Wariness	.01	.18	.00

Note. Rorschach Dysphoria=Z-transformed aggregated Rorschach DEPI and Rorschach S-Con. MMPI-2 Dysphoria=z-transformed aggregated MMPI-2 Scale 2, Scale 7, DEP, ANX, PSY-5-Neg. MMPI-2 Psychosis=z-transformed aggregated MMPI-2 Scale 8, BIZ, PSY-5-Psy. MMPI-2 Wariness=z-transformed aggregated MMPI-2 Scale 6, CYN, SOD; N=73.

Table 25

Comparison of Average Residual Conceptually Related Psychopathology Constructs and Conceptually Unrelated Psychopathology Constructs

Conceptually related vs. Conceptually unrelated (Factor-Based Scales)
$z = .68, p =$ ns (individual scales)
$z = -0.51, p =$ ns (aggregated scales)
Conceptually related vs. Conceptually unrelated (Profile Scales)
$z = -.10, p =$ ns (individual scales)
$z = -.05, p =$ ns (aggregated scales)

Note. Factor-based scales, n = 133; profile scales, n =73.

Hypothesis 5: Rorschach vs. MMPI-2 Correlations with Psychopathology Constructs Compared to Non-Psychopathology Constructs

The fifth hypothesis was that residual and non-residual correlations between constructs that measure conceptually unrelated kinds of psychopathology (e.g., MMPI-2 dysphoria and Rorschach psychosis) would be significantly higher than residual correlations between constructs that do not measure psychopathology (e.g., MMPI-2 SI and Rorschach Pop). Again, the following analyses were designed to disentangle the effects of general psychopathology and response style. These analyses were computed for participants aligned on factor-based scales (i.e., Welsh's A and R-Engagement) and for participants aligned on profile-based scales (i.e., Rorschach: R and Lambda; MMPI-2: F and K).

Rorschach Non-Psychopathology Variables

For the Rorschach, Popular Responses and Zf were chosen as the conceptually unrelated non-psychopathology variables. These variables were chosen because they were not measures of psychopathology and their respective correlations with the FUPC markers were consistent with the study design. Using the entire sample, Popular Responses and Zf were correlated with R-Engagement at a level of $r\ (511) = .12, p < .01$ and $r\ (511) = .71, p < .001$, respectively. For participants aligned on factor-based scales, correlations of R-Engagement with Popular Responses and Zf were $r\ (131) = .15, p =$ ns, and $r\ (131) = .72, p < .001$, respectively. Using profile-based aligned participants, the correlations between R-Engagement and Popular Responses and Zf were $r\ (71) = .19, p =$ ns and $r\ (71) = .81, p < .01$, respectively. Thus, Popular responses served as the variables with relatively low correlations with the Rorschach FUPC and Zf served as the variable with a relatively higher correlation with the Rorschach FUPC. Again, the rationale for

including non-psychopathology variables that have both high and low correlations with their respective FUPC markers is to help disentangle the role of response style variance irrespective of general psychopathology variance. Thus, after alignment, if the non-psychopathology variables that are highly correlated with their respective FUPCs have higher correlations than the non-psychopathology variables that have lower correlations with their respective FUPCs, this higher correlation would be due to response style variance.

MMPI Non-Psychopathology Variables

For the MMPI-2, CON and SI served as the conceptually unrelated non-psychopathology variables. In the entire sample, CON and SI had correlations with Welsh's A of r (511) = -.04, p = ns, and r (511) = .66, $p < .001$, respectively. Using factor-based aligned participants, correlations between Welsh's A and CON and SI were r (131) = -.28, $p < .01$ and r (131) = .63, $p < .001$, respectively. With participants aligned on profile-based scales, correlations between Welsh's A and CON and SI were r (71) = -.39, $p < .01$ and r (71) = .66, $p < .01$, respectively. Thus, CON served as the variable with a relatively low correlation with the MMPI-2 FUPC and SI served as the variable with a relatively high correlation with the MMPI-2 FUPC.

First, using all participants, correlations between Rorschach and MMPI-2 constructs that do not measure psychopathology were calculated. Rorschach Popular correlated with MMPI-2 CON and SI at levels of r (511) = -.03, p = ns, and r (511) = .09, $p < .05$, respectively. Zf correlated with MMPI-2 CON and SI at levels of r (511) = -.01, p = ns and r (511) = -.01, p = ns. Using all participants, there was one significant correlation between the conceptually unrelated non-psychopathology constructs. These

findings were expected and are similar to the correlations found for conceptually related psychopathology constructs when all participants were used.

Relation Between Non-Psychopathology Scales for Participants Aligned on Factor-Based Scales.

For the calculations required for hypothesis 5, residual and non-residual correlations for non-psychopathology constructs were calculated for aligned participants. Using participants aligned on factor-based scales led to correlations between Rorschach Popular Responses and CON and SI of r (131) = .05, p = ns and r (131) = .13, p = ns, respectively. Correlations between Rorschach Zf and CON and SI were r (131) -.12, p = ns, and r (131) = .28, $p < .05$, respectively. Thus, with the factor-based aligned sample, a significant correlation was found between Rorschach Zf and MMPI-2 SI. Rorschach Zf and MMPI-2 SI are the non-psychopathology variables with high FUPC correlations and thus, these findings highlight the fact that for participants aligned on FUPC markers, correlations between any two variables will be high, as long as these variables are both highly correlated with their respective FUPCs. In this case, the significant correlation is due to response style variance irrespective of general psychopathology variance.

With respect to residual correlations, for participants aligned on factor-based scales, residual correlations between Popular responses and CON and SI were r (131) = .02, p = ns, and r (131) = .06, p = ns, respectively. Residual correlations between Zf and CON and SI were r (131) = -.26, p = < .01 and r (131) = -.05, p = ns, respectively. Thus, with participants aligned on factor-based scales, there was one significant negative correlation between Rorschach and MMPI-2 conceptually unrelated non-psychopathology constructs. This indicates that once the effects of alignment are

removed, correlations between conceptually unrelated constructs that do not measure psychopathology are not significantly positively correlated.

Relations Between Non-Psychopathology Scales in Participants Aligned on Profile Scales.

Using participants aligned on profile scales led to correlations between Rorschach Popular Responses and CON and SI of r (71) = -.28, p < .05 and r (71) = .16, p = ns. Correlations between Rorschach Zf and CON and SI were r (71) = -.26, p = ns and r (71) = .22, p = ns, respectively. Thus, with the profile-based aligned sample, there were no significant positive correlations between Rorschach and MMPI-2 non-psychopathology constructs.

For participants aligned on profile-based scales, residual correlations between Popular responses and CON and SI were r (71) = -.32, p < .05 and r (71) = .20, p = ns, respectively. Residual correlations between Zf and CON and SI were r (71) = -.43, p < .05 and r (71) = -.08, p = ns. Thus, for participants aligned on profile-based scales, there were no significant positive residual correlations. Overall, there were no positive residual correlations for aligned participants.

Comparison of Conceptually unrelated Psychopathology Constructs and Non-Psychopathology Constructs.

Overall, as described above, there were no significant positive residual or non-residual correlations between Rorschach and MMPI-2 constructs that are conceptually unrelated and that do not measure psychopathology. Shown in Tables 26 and 27, for both aligned groups, residual and non-residual correlations between Rorschach and

Table 26

Comparison of Average Non-Residual Conceptually Unrelated Psychopathology Constructs and Non-Psychopathology Constructs

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Conceptually Unrelated vs. Non-Psychopathology (Factor-Based Scales)

$z = .70$, p = ns (individual scales)

$z = .16$, p = ns (aggregated scales)

Conceptually Unrelated vs. Non-Psychopathology (Profile Scales)

$z = .61$, p = ns (individual scales)

$z = -.47$, p = ns (aggregated scales)

Note. Factor-based scales, n = 133; profile scales, n =73

Table 27

Comparison of Average Residual Conceptually Unrelated Psychopathology Constructs and Non-Psychopathology Constructs

Conceptually unrelated vs. Non-Psychopathology (Factor-Based Scales)
$z = -.41, p =$ ns (individual scales)
$z = .57, p =$ ns (aggregated scales)
Conceptually unrelated vs. Non-Psychopathology (Profile Scales)
$z = -.81, p =$ ns (individual scales)
$z = -1.27, p =$ ns (aggregated scales)

Note. Factor-based scales, n = 133; profile scales, n =73

MMPI-2 conceptually unrelated psychopathology constructs were not significantly higher than correlations between non-psychopathology conceptually unrelated constructs. Thus, hypothesis 5 was not supported. This suggests that response style may have a greater influence on convergence than general psychopathology. In other words, since by definition, there is no influence of general psychopathology in correlations between non-psychopathology variables, the resulting correlations, if any, are due to response style variance.

CHAPTER V

Discussion

The major goal of this study was to contribute to the resolution of the debate regarding the convergence of MMPI-2 and Rorschach conceptually related constructs (e.g., Meyer, 1996; Petot, 2005) by determining whether, and under what conditions, construct specific convergence can be established. It was hoped that the findings would help lend support to Meyer's (1999) position that construct specific convergence between the Rorschach and MMPI-2 could be achieved. This, in turn, could help researchers and clinicians have more confidence in the results of cross-method studies and assessments. This overarching goal was separated into three lower-order goals. The first was to determine whether Meyer's (1996, 1997, 1999) and Meyer et al.'s (2000) findings about the convergence of similarly named MMPI-2 and Rorschach constructs would be consistent in a new sample. The second goal was to determine whether construct specific convergence could be obtained by conducting analyses that compared conceptually related constructs independently of the influence of response style and general psychopathology. The third goal was to separate and help to clarify the relative influences of response style and general psychopathology on the convergence of similarly named constructs on the MMPI-2 and the Rorschach.

Replication – Hypothesis 1

With respect to the replication, the findings from this study converged with Meyer's (1996, 1997, 1999) and Meyer et al.'s (2000) in several ways. First, Meyer's (1992) factor analysis of the Rorschach was replicated with similar results. Second, as

outlined in Hypothesis 1, when the entire sample was used, there was generally no correlation between similarly named constructs on the MMPI-2 and the Rorschach. Third, significant correlations between similarly named constructs were obtained when the analyses are limited to participants aligned on FUPC markers. Fourth, when participants with opposite placement on FUPC markers were used, correlations between similarly named constructs were negative and significant. These will be discussed in turn.

The lack of association between similarly named Rorschach and MMPI-2 constructs when the entire sample was used was expected and consistent with Meyer (1999). Again, as has been repeatedly shown in the literature (e.g., Archer & Krishnamurthy, 1996), studies attempting to correlate Rorschach and MMPI-2 constructs generally do not show convergence. Meyer and others (e,g, Finn, 1996; Ganellen, 1996; Meyer, 1996) have explained the lack of convergence as due to the fact that response style has a large effect on Rorschach and MMPI-2 scores, and that response styles are uncorrelated between measurement methods. In addition, Meyer and others have argued that Rorschach and MMPI-2 similarly named constructs (e.g., depression) do not necessarily measure the same underlying constructs. For example, MMPI-2 depression has high face validity and measures self-report of depression, whereas Rorschach depression measures underlying dysphoria, which may not be manifested on a self-report measure (Bornstein, 2001).

Replication - Hypothesis 2

The second hypothesis was that when the analysis was limited to participants who have similar rank order placement on FUPC markers, similarly named MMPI-2 and

Rorschach constructs (e.g., depression) would be positively correlated to a significant degree. This finding was supported in three of four patterns of correlations. For participants aligned on factor-based scales, the average correlations for individual scales and for z-transformed aggregated scales were significant. For participants aligned on profile scores, the average correlation for individual scales was not significant while the average value for z-transformed aggregated scales was significant. Overall, the factor-based scales (i.e., Welsh's A and R-Engagement) proved to be more effective in establishing construct specific convergence than the profile scores (i.e., MMPI-2 F and K; Rorschach R and Lambda). This may be because of the larger sample size of the factor-based scales compared to the profile scales (133 vs. 73) and the consequent increase in power. It may also be because the factor-based scales were originally constructed as measure of FUPCs and are more highly correlated with their respective FUPC than are the profile scales, which were constructed purely as measures of response style.

With respect to the comparison with Meyer's (Meyer et al., 2000) sample, there were two significant differences between the average correlation of the individual scales and of the z-transformed aggregated scales for participants aligned on factor-based scales. In both cases, Meyer's correlations were higher. This is an important finding given that the z-transformed aggregated scales are considered more accurate than the individual scales and because the factor-based scales are more accurate measures of the FUPCs than are profile scales (individual and aggregated). The aggregated factor-based scales are considered the best way of comparing construct convergence. Also, because these correlations were smaller in the current sample, the residualized correlations are

also smaller. This will be discussed later. There were no other significant differences between the correlations in the current sample and Meyer's.

The influence of response style and general psychopathology inherent in the manner in which alignment comes about (i.e., choosing participants with the same rank order positions on FUPC markers) makes it such that constructs with the same name (e.g., MMPI-2 dysphoria and Rorschach dysphoria) generally correlate to a significant degree.

Although the average correlations conformed to expectations in three of four sets of correlations, looking at the individual constructs is warranted. First, the finding that significant correlations (at the .05 level) were found for the constructs of dysphoria but not for psychosis or wariness is curious. Correlations between R-Engagement and Rorschach SCZI (.27) were smaller than those between R-Engagement and Rorschach DEPI (.36), S-Con (.36), Dysphoria (.42), and HVI (.54). For participants aligned on profile scores, the correlation between R-Engagement and Rorschach SCZI (.24) was likewise smaller than correlations between R-Engagement and DEPI (.33), S-CON (46), Dysphoria (.46) and HVI (.61). This resulted in a diminished effect of alignment on the psychosis variables. Thus, the correlations between psychosis variables were likewise reduced. The reason for lowered correlations between R-Engagement and SCZI compared to R-Engagement and other Rorschach variables may have been due to the fact that SCZI had a more limited range than the other variables (3.6 compared to an average of 6.02 for dysphoria and wariness). Correlations between Welsh's A and psychosis variables were as high as those between Welsh's A and dysphoria and wariness variables,

thus the Rorschach response style variable correlation with Rorschach SCZI does not hold for the MMPI-2 variables.

The generally low conceptually related correlations between interpersonal wariness scales may be due to Meyer's (1996) belief that these variables are conceptually less related than are the constructs of dysphoria and psychosis. In this case, the lower correlations would be expected based on the fact that the construct overlap between Rorschach and MMPI-2 interpersonal wariness is less clear. Thus, even with alignment, the correlations are smaller than those for the dysphoria construct.

Replication - Hypothesis 3

The third hypothesis was that for participants who had opposite placement on FUPC markers, correlations would be negative and significant. For participants aligned on profile scores, significant negative correlations were found for S-Con and Scale and for HVI and CYN and SOD. Using z-transformed aggregated scales, a significant negative correlation was found for the interpersonal wariness variables and the average correlation of all three construct areas was also significant. Also, for the factor-based scales, the findings replicated Meyer's (Meyer et al., 2000) and there were no significant differences in the correlations for the current sample and Meyer's.

Conceptually Related and Conceptually Unrelated Psychopathology Constructs - Hypothesis 4 (Goal 2).

The fourth hypothesis was that for aligned participants, residual and non-residual correlations between conceptually related psychopathology constructs (e.g., MMPI-2 and Rorschach depression) would be higher than correlations between conceptually unrelated psychopathology constructs (e.g., MMPI-2 depression and Rorschach psychosis). The

rationale for these analyses was to determine the effect of specific construct convergence (e.g., MMPI-2 dysphoria and Rorschach dysphoria) over and above correlations based on response style and general psychopathology. In other words, for the conceptually unrelated constructs, alignment matches them on both response style and general psychopathology inherent in the FUPC markers (e.g., Welsh's A and R-Engagement). This is contrasted with the conceptually related constructs that are also matched on response style and general psychopathology in addition to construct specific convergence. Prior to residualizing the correlations, conceptually related correlations were compared to conceptually unrelated correlations. For participants aligned on both factor-based scales and profile scales, conceptually related correlations were not significantly different than conceptually unrelated correlations for either individual scales or z-transformed aggregated scales. Thus, even with alignment, specific construct convergence could not be established and the hypothesis was not supported. This is what is typically seen when scales from the same method family are correlated (e.g., MMPI-2 and MCMI-II) and is consistent with Meyer et al.'s (2000) findings.

Turning to the analysis of residualized correlations, again, there were no significant differences between conceptually related correlations and conceptually unrelated correlations. Thus, construct specific convergence did not add anything to the match due to response style and general psychopathology. What this suggests is that the pattern of correlations between psychopathology constructs is general rather than construct specific. Essentially, after alignment, any constructs that measure psychopathology and that are highly correlated with their respective FUPC markers will be highly correlated with each other. Again, this is problematic because an individual

with a high score on the MMPI-2 depression scale may also display a high score on the Rorschach psychosis sacle. As mentioned above, one goal of personality assessment measures like the MMPI-2 and Rorschach is to help with specific psychopathological diagnoses rather than only identifying the presence or absence of psychopathology.

Conceptually Unrelated Psychopathology Construct and Non-psychopathology Constructs - Hypothesis 5 (Goal 3).

The final hypothesis was that residual and non-residual psychopathology constructs would be significantly higher than residual and non-residual non-psychopathology constructs. The rationale for this set of analyses was to determine the effect of response style variance separately from general psychopathology variance. The analyses were performed with non-psychopathology variables that have both higher and lower correlations with the FUPC markers. If the non-psychopathology variables that are conceptually unrelated and that have relatively high correlations with their respective FUPC markers correlated with each other to the same extent that conceptually unrelated psychopathology variables did, then it could be determined that the correlations for the non-psychopathology scales is due to response style variance rather than general psychopathology variance. If, after alignment, the correlations for constructs that are unrelated and that do not measure psychopathology are smaller than the constructs that are unrelated but do measure psychopathology, then the reason for these higher correlations would be general psychopathology variance inherent in the FUPC markers.

First, it is noteworthy that for participants aligned on factor-based scales, correlations between MMPI-2 Social Introversion and Rorschach Zf were significant. These were the variables chosen for their high correlations with respective FUPC

markers. Neither of these variables measures psychopathology, yet they are significantly correlated with each other. Since the variables do not measure psychopathology, the only reason for explaining this association is the response style component of the FUPC alignment. This suggests that regardless of the conceptual similarity of the constructs and irrespective of whether they are measures of psychopathology, constructs will be positively correlated if they are highly correlated with their respective FUPCs.

In the current sample, for participants aligned on factor-based scales and profile scales, the conceptually unrelated psychopathology variables (e.g., MMPI-2 depression and Rorschach wariness) did not correlate at a level higher than the non-psychopathology variables that have high correlations with their respective FUPCs (i.e., MMPI-2 SI and Rorschach Zf). The residual correlations for the conceptually unrelated psychopathology variables were not more highly correlated than the non-psychopathology variables. Again, this suggests that the influence of response style is significant and may contribute to more variance than does general psychopathology variance inherent in the FUPCs. The goal was to separate the influence of general psychopathology and response style that is inherent in the FUPC markers in order to determine the relative influences of each on the convergence of MMPI-2 and Rorschach variables. The results suggest that response style variance (error variance) has at least as big an effect on the convergence as does general psychopathology variance (general true score variance).

Implications of Findings

On a general level, as explicated by Meyer et al. (2000), response style needs to be taken into account whenever researchers compare measures from different method

families. When response style is not considered, correlations between conceptually related variables may be obscured and the researcher who is not considering the role of response style may make spurious conclusions about the findings. For example, in a sample of participants who display a defensive style on both the Rorschach and MMPI-2, it is expected that convergence between similarly named constructs will be high. In this case, the convergence is due to participants displaying a defensive response style on both tests, rather than construct-specific convergence. The researcher may be unaware of the moderating influence of response style and may erroneously conclude that construct convergence has been found when it has not.

Further, it is expected that, in general, congruence between measures from different method families will not correlate when response style is ignored. It is also expected that constructs from tests from the same method family (e.g., MMPI-2 and MCMI-II) will be spuriously correlated because of the influence of response style. Because FUPC markers are highly correlated in tests from the same method family, similarly named constructs (e.g., depression) will likewise be correlated, whether or not they measure the same construct. This is what Campbell and Fiske (1959) outlined in the seminal paper on conceptually related and discriminant validity. The implications of this finding are that studies attempting to validate a new measure by correlating it with an existing measure of the same method family (e.g., self-report) will necessarily find high correlations between similarly named constructs that may be due to error variance (response style correlation) rather than true construct convergence.

Second, in this study, there was no evidence of construct-specific convergence. In contrast to Meyer's (e.g., 1999) contention that appreciable correlations between

specific constructs can be found under certain circumstances, no such construct-specific correlations were found. Instead, the findings suggest that convergence between constructs on the MMPI-2 and Rorschach are general and reflect the large influence of response style and general psychopathology. This is in agreement with previous studies (e.g., Archer & Krishnamurthy, 1993; Petot, 2005) indicating that there are no consistent relationships between constructs on the MMPI-2 and on the Rorschach. Thus, the findings lend support to the assertion by Ganellen (1996) that Rorschach and MMPI-2 constructs are unrelated and provide different but complementary information about a respondent's personality and psychopathology. For example, MMPI-2 depression indices may tap into specific symptoms associated with DSM-IV (APA, 2004) diagnoses of depression such as sleep difficulties and lack of interest in previously enjoyed activities, whereas Rorschach depression indices may tap into less consciously mediated depression symptoms such as irritability and underlying feelings of dysphoria (Ganellen, 1996).

Clinical Implications

Given that both tests provide non-redundant information about the respondent's personality, it is important that clinicians include both the MMPI-2 and the Rorschach (or two other personality measures from different method families) in personality assessment batteries to provide a more complete picture of the respondent's personality. Although this is already the case for many assessment psychologists (e.g., Lindgren, Carlsson, & Lundback, 2008), the findings from the current study add support to this assertion. The findings also highlight the need for a clear understanding of what MMPI-2 and Rorschach measures actually quantify. Thus, high scores on Rorschach depression

indices do not have the same meaning as do high scores on MMPI-2 depression indices and thus clinicians using these measures need to be knowledgeable of the indices they are interpreting (see, for example, Ganellen, 1996).

Also, when interpreting findings from the MMPI-2 and the Rorschach in a given individual, FUPC marker findings need to be taken into account. For example, high interpersonal wariness values on the MMPI-2 for an individual with a low value on Welsh's A will be different than the same high interpersonal wariness values for an individual with a high value on Welsh's A. In the former case, the findings may suggest that the individual is not distressed by his apparent interpersonal difficulties and/or it may suggest that the individual's interpersonal difficulties are the main/only psychopathological difficulties s/he experiences. It may also suggest that the individual experiences interpersonal wariness as ego-syntonic (i.e., as not resulting in dysphoria or difficulty). In the latter case, it can be expected that on the MMPI-2, when Welsh's A values are high, a number of psychopathological scales will likewise be elevated. Again, this is because of the significant overlap or common variance inherent in the MMPI-2 and other self-report inventories. As such, a high score on dysphoria scales, for example, for an individual with high scores across a number of construct areas may suggest that the individual approached the test in an open, undefended, or perhaps exaggerated manner, endorsing a very high number of psychopathological statements, rather than dysphoria itself being a major issue. In other words, elevations on one scale need to be looked at with elevations on other scales, most notably, Welsh's A.

Limitations

The findings from the study are limited by a number of methodological issues. First, there is the possibility of Type I errors given the multiple calculations. Meyer (1996, 1997, 1999; Meyer et al., 2000) did not correct for the multiple comparisons and the current study followed this procedure given that correcting for the number of calculations would make the replication more difficult to compare with Meyer's. Second, although the Rorschach protocols from child custody cases were used in actual cases, raw protocols were not available and therefore interrater validity could not be established.

In terms of external validity, the majority of the data comes from parents involved in child custody cases and therefore, the findings may not be the same as it would be for other samples. In particular, the scores and indexes were more limited in range than a clinical sample. This may be due to motivated defensive responding on the part of the respondents.

Further, one of the MMPI-2 interpersonal wariness variables from Meyer's studies (e.g., 1999), "inability to disclose" was not available because it was not included in the datasets used for the study, and the analyses were therefore performed without it. It is not expected that this affected the results in any significant way since scales were examined individually and in aggregated form and it is unlikely that this scale would have increased or decrease correlations enough to affect the result. However, this assumption could not be verified because Meyer (1999) did not provide analyses regarding the relative influences of individual scales within construct areas (i.e.,

interpersonal wariness) and the influence of the "inability to disclose" variable could not be determined.

For the Rorschach, the SCZI index was used as the psychosis scale rather than the newer Perceptual Thinking Index (PTI). This was done to replicate Meyer's study as closely as possible.

Future Directions

It would be valuable to replicate the findings with other samples. Again, as highlighted by Meyer, it would be valuable to see whether the findings hold for adolescent populations, as well as non-clinical samples. Also, the argument that FUPC markers contain both general psychopathology and response style variance could be investigated in other constructs. The datasets used for the analyses only a limited number of MMPI-2 variables. It would be useful to test the findings with other non-psychopathology MMPI-2 variables or variables from different tests. As described by Petot (2005), using Meyer's (1999) did not result in convergent correlations between constructs that do not measure psychopathology. This is consistent with the findings from the current study.

The fact that construct specific convergence could not be established with different assessment methods suggests that the measures under question (e.g., depression) do not measure the same thing. Future research is needed to clarify which specific features of depression are assessed by the MMPI-2 and which are assessed by the Rorschach. Depression on the MMPI-2 is not the same as depression on the Rorschach. This suggests that we do not have a complete understanding of the constructs we are using. It may be, as hypothesized by Lindgren, Carlsson, and Lundback (2008)

that we need to study constructs at a smaller or more specific level. For example, they looked at the relations between written statements about personality compared to Rorschach indices that are purported to measure those statements. They did not find convergence, even after having aligned the participants. In this case, the efforts were not successful, but this line of research whereby the unit of analysis is smaller than previous studies (e.g., depression; Meyer, 1999) may be a fruitful avenue of research to help our understanding of cross-method assessment.

Concluding Remarks

Overall, the goal of separating the various influences responsible for construct specific convergence in aligned participants was partially accomplished. Although the hypotheses were not all supported, the results suggest that: 1. Construct-specific convergence between tests from different method families (i.e., MMPI-2 and Rorschach) could not be established with the sample used and the procedures employed. The relation between psychopathology constructs seems to be general rather than specific and similarly named constructs on the MMPI-2 and the Rorschach do not measure the same thing. 2. The influence of response style (error variance) inherent in the FUPC markers has at least as much influence on the convergence of constructs as does the general psychopathology variance (true score variance at a general level) component.

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