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An Empirical Search for Fundamental Personality and Mood Dimensions Within the Rorschach Test

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AN EMPIRICAL SEARCH FOR FUNDAMENTAL PERSONALITY AND MOOD DIMENSIONS WITHIN THE RORSCHACH TEST

by

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This dissertation is dedicated to my memory of Joseph L. Meyer. As a good grandfather should, he had the time to take me fishing when I was young.

VITA

Greg Meyer, the son of J. Eugene Meyer and Joan M. (Brennan) Meyer, was born April 8, 1961, in Chicago, Illinois.

His secondary education was completed in 1979 when he graduated from St. Viator High School, Arlington Heights, Illinois. In 1983 he obtained a Bachelor of Science degree in psychology from the University of Illinois, Urbana, Illinois.

In August, 1984, he entered the doctoral program in Clinical Psychology at Loyola University of Chicago. His Master of Arts degree was conferred from Loyola in May of 1987. His clinical training has taken place at the West Side Veterans Hospital, the Department of Psychiatry at the University of Chicago Hospitals, and the Counseling and Developmental Services at Loyola University. Currently, he has returned to the University of Chicago Hospitals and is completing his year of internship in the Department of Psychiatry.

Finally, he is the author, with John R. Shack, of a paper entitled "Structural convergence of mood and personality: Evidence for old and new directions", which is appearing this year (1989) in the Journal of Personality and Social Psychology.

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INTRODUCTION TO THE PROBLEM

In clinical psychology there are two fairly distinct areas of specialization that reflect two traditions--one of empirical research and formal theory development within academic psychology, and another of clinical service to the general population. This bifurcation is commonly referred to as the "scientist-practitioner split". One of the areas where the dichotomy between these two traditions is most easily observed is in the assessment of personality.

Specifically, the Rorschach Test (or ink blot test) has been the most frequently used test of personality in clinical settings for at least the past thirty years (Brown & McGuire, 1974; Lubin, Larsen, & Matarazzo, 1984; Lubin, Wallis, & Paine, 1971; Sunberg, 1961; Sweeney, Clarkin, & Fitzgibbon, 1987). Despite its popularity with clinicians, experimentally rooted psychologists have virtually ignored its use as a comprehensive personality test because experimental studies have consistently questioned its empirical and conceptual validity (Anastasi, 1982; Gittelman, 1980; Jensen, 1965). Anastasi, in her classic text, Psychological Testing, finds the status of the Rorschach a "curious discrepancy between research and practice" (1982, p. 564) and states: "The accumulation of published studies that have failed to demonstrate any validity for such projective techniques as the Rorschach... is truly impressive. Yet after five decades of negative results, the status of

projective techniques remains substantially unchanged" (p. 589). In a perhaps more personal and hostile charge, Jensen (1965) stated "The rate of scientific progress in clinical psychology might well be measured by the speed and thoroughness with which it gets over the Rorschach" (p. 238).

However, as Anastasi (1982, 1988) has also noted, John Exner, over the course of the past 15 years, has developed his empirically based Comprehensive System for scoring the Rorschach (Exner, 1974, 1978, 1985, 1986). This system integrates and builds upon all of the previous Rorschach systems of scoring and interpretation which have been developed since Hermann Rorschach's untimely death in 1922. The Comprehensive System is designed to address some of the criticisms levied against the Rorschach and has generated renewed interest in the empirical validation of this instrument. Currently it appears that if the Rorschach were ever to be validated it would be validated within Exner's system.

Supporting this potential, a recent meta-analytic review of the Rorschach, Minnesota Multiphasic Personality Inventory (MMPI), and Wechsler Adult Intelligence Scale (WAIS) reported that the Rorschach displayed indices of reliability and temporal stability that were equal to or greater than the MMPI and WAIS. Additionally, it was found that the Rorschach displayed adequate validity coefficients when studies were conducted on the basis of a strong

theoretical rational or on the basis of previous research (Parker, Hanson, & Hunsley, 1988).

If the Rorschach is indeed a comprehensive and valid measure of personality and emotional states--as Exner and others purport it to be, and as some research suggests--then it should be expected to clearly demonstrate the fundamental dimensions of personality and mood which have been found repeatedly by experimentally based research psychologists. Before discussing the Rorschach in detail, the next chapter will focus on the fundamental dimensions of personality and mood that have been established and validated by more empirically rooted psychologists.

PREVIOUS PERSONALITY AND MOOD LITERATURE

Personality Structure

Over the past 40 years the experimental study of personality and mood has relied heavily on factor analytic procedures. In the study of personality, factor analyses of self-report measures have found that the independent dimensions of extraversion (E) and neuroticism (N) are ubiquitous (Costa, Zonderman, McCrae, & Williams, 1985; Eysenck, 1981; Eysenck & Eysenck, 1985; Johnson, Butcher, Null, & Johnson, 1984; McCrae & Costa, 1985; McCrae, Costa, & Busch, 1986). Support for these two personality dimensions dates back to the fourth century B.C. when Hippocrates discussed the four basic temperament types--choleric, sanguine, melancholic, and phlegmatic. Over the centuries, these four temperament types were further described and elaborated by Galen, Kant, and Wundt (see Eysenck, 1970, for a full discussion).

An examination of Figure 1 reveals the connection between the four temperament types and the two dimensions of E and N, for which extensive factor analytic support has been found (see Eysenck, 1981; Eysenck, & Eysenck, 1985). It can be seen that the four temperament types are found when the extraversion and neuroticism dimensions are crossed. The melancholic type of person is low on the extraversion but high on the neuroticism (or instability) dimension of personality. Similarly, it can be seen that

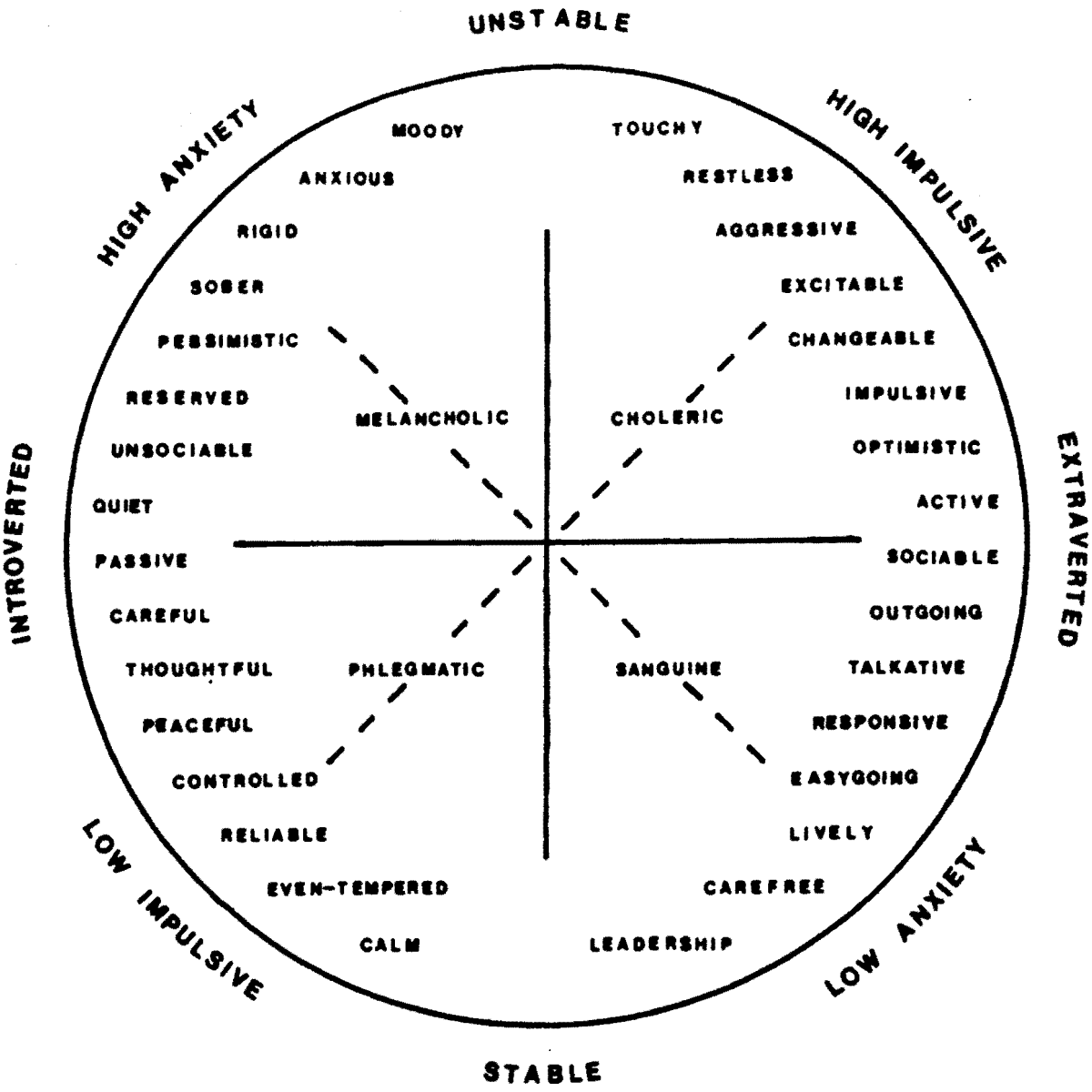

Figure 1. The structure of personality traits showing the dimensions of introversion-extraversion (horizontal axis) and neuroticism-stability (vertical axis) and their relation to the four personality types described by Hippocrates, Galen, and Wundt. The alternative personality dimensions proposed by Gray (1981) are on the diagonals. From Personality and Individual Differences: A natural science approach (p. 50) by H. J. Eysenck and M. W. Eysenck, 1985, New York: Plenum. Copyright 1985 by H. J. Eysenck and M. W. Eysenck. Adapted by permission.

the choleric is high on both the dimensions of extraversion and neuroticism.

In describing the phenotypic expression of the extraversion and neuroticism dimensions of personality, Eysenck and Eysenck (1975) note:

> The typical extravert is sociable, likes parties, has many friends, needs to have people to talk to, and does not like reading or studying by himself. He craves excitement, takes chances, often sticks his neck out, acts on the spur of the moment, and is generally an impulsive individual. He is fond of practical jokes, always has a ready answer, and generally likes change; he is carefree, easy-going, optimistic, and likes to "laugh and be merry." He prefers to keep moving and doing things, tends to be aggressive and lose his temper quickly; altogether his feelings are not kept under tight control, and he is not always a reliable person.
>
> The typical introvert is a quiet, retiring sort of person, introspective, fond of books rather than people; he is reserved and distant except to intimate friends. He tends to plan ahead, "looks before he leaps" and distrusts the impulse of the moment. He does not like excitement, takes matters of everyday life with proper seriousness, and likes a well ordered mode of life. He keeps his feelings under close control, seldom behaves in an aggressive manner, and does not lose his temper easily. He is reliable, somewhat pessimistic, and places great value on ethical standards.
>
> (W)e may describe the typical high N scorer as being an anxious, worrying individual, moody and frequently depressed. He is likely to sleep badly, and to suffer from various psychosomatic disorders. He is overly emotional, reacting too strongly to all sorts of stimuli, and finds it difficult to get back on an even keel after each emotionally arousing experience. His strong emotional reactions interfere with his proper adjustment, making him react in irrational, sometimes rigid ways...If the high N individual has to be described in one word, one might say that he is a worrier; his main characteristic is a constant preoccupation with things that might go wrong, and a strong emotional reaction of anxiety to these thoughts. The stable individual, on the other hand, tends to respond emotionally only slowly and generally weakly, and to return to baseline quickly after emotional

> arousal; he is usually calm, even-tempered, controlled and unworried (p. 5).

Eysenck (1967, 1981) has theorized that the basis for the E and N dimensions of personality largely resides in individual differences in physiology. According to theory, the introversion-extraversion dimension is predisposed by differences in the central nervous system (particularly the Reticular Activating System), while the neuroticism-stability dimension is related to differences in the lability of the autonomic nervous system.

Research on these dimensions of personality has shown them to be stable traits that remain constant over time periods ranging from one to 50 years (Conley, 1985; Costa & McCrae, 1988; Giuganino & Hindley, 1982; Hindley & Giuganino, 1982; Schuerger, Tait, & Tavernelli, 1982). This consistency has been observed in self report studies like those listed above, and also in ratings done by significant others (McCrae, 1982). Additionally, it has been found that the factor structure of the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975, EPQ) is equivalent across a diverse sample of 26 countries from all parts of the world (Barrett & Eysenck, 1984; Eysenck, Barrett, & Eysenck, 1985; Eysenck, Barrett, Spielberger, Evans, & Eysenck, 1986).

Well over 5000 studies have been conducted on these factors of personality (Eysenck, 1981), and across studies significant hypothesized differences have been observed in learning and memory (Eysenck, M.W., 1981), conditionability

(Levey and Martin, 1981), pain tolerance (Barnes, 1975), preferred levels of stimulation (Geen, 1984), social behavior (Wilson, 1981), and in physiology (Robinson, 1982; Stelmack, 1981).

These two factors of personality are incorporated into other prominent theories of personality (Guilford, 1975, cited in Campbell & Reynolds, 1984; McCrae & Costa, 1985) and emerge as second order factors from the 16 Personality Factor Questionnaire (Cattell, Eber, & Tatsuoka, 1970, 16PF), the California Personality Inventory (see Loehlin, 1985), the Multidimensional Personality Questionnaire (Tellegen, 1982), and the Millon Clinical Multiaxial Inventory (Choca, Peterson, & Shanley, 1986; Retzlaff & Gibertini, 1987).

Perhaps most significantly, the factors of intro-version-extraversion and neuroticism-stability have a higher genetic heritability than other personality traits (Loehlin, 1985), though differential heritability is a much debated topic. Almost all adoption, twin, and cross generational studies of heredity note that about half of the phenotypic expression of these traits appears to be due to genetic factors (Fulker, 1981; Loehlin, 1985; Tellegen, Lykken, Bouchard, Wilcox, Segal, & Rich, 1988; Young, Eaves & Eysenck, 1980).

With the aggregate of evidence discussed above it is clear that these dimensions of personality are robust, well

researched variables which fit Buss's (1984) criteria for true within-species individual differences. Additionally, it can be argued that they form a "paradigm" for research on personality (Eysenck & Eysenck, 1985).

While the E and N dimensions are generated in almost all comprehensive objective tests of personality, they are not the only dimensions to have been postulated as salient. Within the same two dimensional space formed by E and N, Gray (1981) has argued that the dominant dimensions are in fact an anxiety and an impulsivity dimension which lie at forty five degree rotations to the E and N dimensions. Gray's orthogonal dimensions are depicted on the diagonals of Figure 1.

Additionally, many researchers have postulated a three- or five-dimensional structure which is purported to underlie normal personality. For example, Eysenck (e.g., Eysenck & Eysenck, 1985), who is the strongest proponent of the E and N dimensions, discusses psychoticism as a third dimension. This factor appears to measure a "toughminded" versus "tenderhearted" personality style. Additionally, others (e.g., Costa and McCrae, 1988; Digman & Takemoto-Chock, 1981), building on the seminal work of Norman (1963), have found empirical support for five dominant dimensions of personality when normal populations are studied. In addition to the E and N dimensions, these researchers have found support for a dimension of Openness to Experience,

Conscientiousness, and Agreeableness.

Another frequently utilized model of personality, the interpersonal circumplex, has progressed through numerous transformations and refinements (Benjamin, 1974; Kiesler, 1983; Lorr and McNair, 1965; Wiggins, 1979, Wiggins & Broughton, 1985) since Leary's (1957) original theoretical delineation. This model is also two dimensional. However, rather than focusing on salient dimensions, it focuses on octants within this two-dimensional space (like slices of a two-dimensional pie) which describe in greater detail different personality types. Nonetheless, this model can be discussed in dimensional terms. The most salient dimension within this model appears to be the dimension that runs between the octants of introversion and extraversion (see Gifford & O'Connor, 1987). The dimension that runs perpendicular to the I-E dimension is one of mistrust versus trust (Kiesler, 1983), or a cold and calculating nature versus a warm and unassuming nature (Wiggins, 1979). This dimension has been hypothesized to be the rough equivalent of Eysenck's dimension of "toughmindedness", and empirically it has been shown to be very similar to the Agreeableness dimension found by McCrae and Costa (1989).

Mood Structure

To date, Watson and Tellegen (1985) and their colleagues have conducted the most comprehensive review and

analysis of mood structure. Their research has demonstrated that two independent dimensions of mood--Positive Affect (PA) and Negative Affect (NA)--form the dominant model for the empirical study of mood. Watson and Tellegen (1985), building on earlier work (Watson, Clark & Tellegen, 1984; Zevon & Tellegen, 1982) that utilized both intra-individual P-type factor analysis and traditional across subject R-type factor analysis, put forth the mood model depicted in Figure 2.

In support of this structure, six previously published studies were reanalyzed (Borgatta, 1961; Hendrick & Lilly, 1970; Lebo & Nesselroade, 1978; McNair, Lorr, & Droppleman, 1971; Russell & Ridgeway, 1983; Thayer, 1967). These studies had found evidence that mood structure was defined by a large number of discrete emotional factors. Prior to Watson and Tellegen's work the focus of many mood studies was on isolating and describing these discrete unipolar mood factors, rather than finding broad dimensions. For example, Izard's research (1977) had suggested that there were 10 basic mood factors--interest, enjoyment, surprise, sadness, anger, disgust, contempt, fear, shame, and guilt. As a result of this focus on small multi-factor conceptions of mood, there had been long debate and confusion over the exact number and nature of the basic emotional factors.

However, in the six studies that were reanalyzed (along with three of their own), Watson and Tellegen

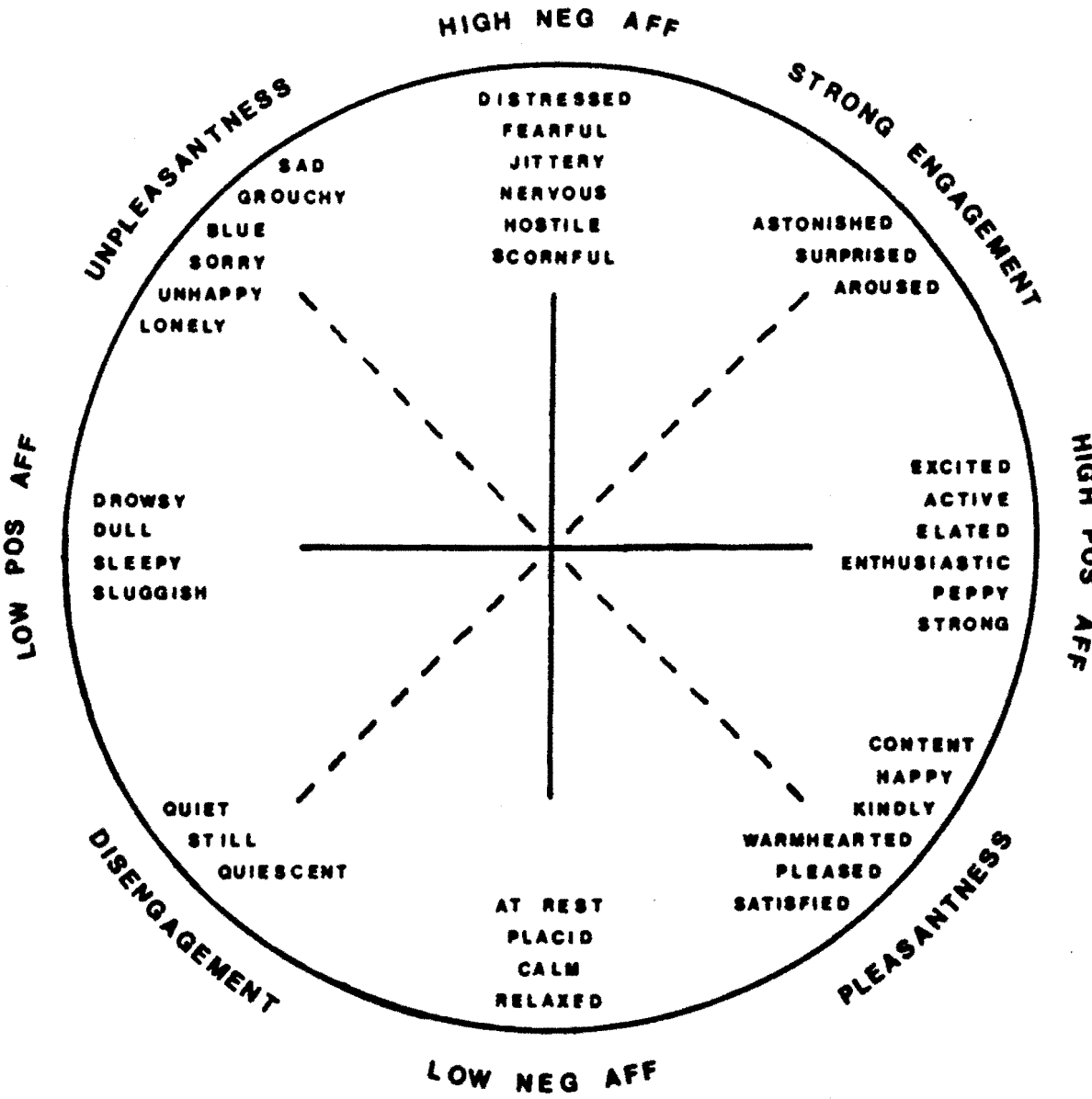

Figure 2. The structure of emotional experience proposed by Watson and Tellegen (1985), showing the major dimensions of Positive Affect (horizontal axis) and Negative Affect (vertical axis) and their relationship to Russell's (1979) alternative dimensions of pleasantness and arousal (engagement) and/or Larsen and Diener's (1987) alternative dimensions of hedonic level (pleasantness) and affect intensity (engagement). From "Toward a consensual structure of mood" by D. Watson and A. Tellegen, 1985, Psychological Bulletin, 98, p. 220. Copyright 1985 by the American Psychological Association. Adapted by permission.

assessed the percentage of common variance that was accounted for by each factor in a principle axes factor analysis. On the basis of preliminary results, it was clear that there was a marked "elbow" at the third factor in each of the mood data sets. This indicated that two large dimensions dominated the data sets, though there was also a number of smaller factors present. Since they were assessing the dominant dimensions of affect, two factors (the two above the "elbow" in the plot of the variance accounted for) were extracted from each of these solutions and rotated to orthogonal structure by the Varimax procedure.

In every solution analyzed by Watson and Tellegen the first two factors accounted for between one half to three quarters of the common variance among mood terms. A visual and quantitative analysis of factor convergence revealed that Positive and Negative Affect were the dimensions being tapped in every study. There were 36 factor convergence correlations between Positive Affect factors across the studies (i.e., the Positive Affect factor from each of the nine studies was paired with the Positive Affect factors across the other eight studies). Out of these 36 congruence coefficients, 29 were above .90 and only one was below .80. Negative Affect fared less well, though still showing clear convergence. Of the 36 intercorrelations, 19 were above .90 and only four were below .80.

With these results it was seen that despite the

confusion and disagreement present when mood was assessed at the discrete, many-factor level, there was a clear convergence and agreement across the reanalyzed studies at the broad, two-factor level of analysis. Additional second-order factor analyses then demonstrated that the many discrete mood factors (e.g., Izard's) were related in a nested and hierarchical fashion to the broader PA and NA dimensions.

In describing the nature of Positive and Negative Affect, Watson and Tellegen (1985) note that these factors are descriptively bipolar but affectively, or experientially, they are unipolar dimensions. This definition emphasizes that it is only the high end of each dimension which represents a state of emotional arousal (high affective experience), while the low end of each dimension reflects a "relative absence of affective involvement" (p. 221). Positive Affect (PA) reflects the extent to which a person is feeling a zest for life or feeling "up" versus "down". High PA indicates states of excitement, enthusiasm and activity, while low PA reflects states of fatigue and sleepiness or quiet, still, and disengaged states. Negative Affect (NA) represents the degree to which a person feels upset or unpleasantly aroused versus peaceful or relaxed (e.g. distressed, hostile and nervous on the high end versus calm and relaxed on the low end).

As is the case with the two-dimensional model of

personality, there are rotational disagreements between two-dimensional models of mood. In contrast to the dimensions of PA and NA discussed by Watson and Tellegen, Russell (1978, 1979, Russell and Ridgeway, 1983), as well as Diener and his colleagues (Diener, Larsen, Levine, & Emmons, 1985; Larsen and Diener, 1987), have proposed that the two basic affective dimensions are Degree of Arousal/Engagement (or affect intensity) and Pleasure-Displeasure (or hedonic level). These dimensions are found at a forty five degree rotation to the PA and NA dimensions (see Figure 2). It will be noted that this rotation of mood dimensions is similar to Gray's rotation of Eysenck's E and N model of personality.

Based on the overall average loading for each of the mood terms Watson and Tellegen (1985) analyzed, they selected the terms presented in Figure 2 as those that most clearly define each of the four dimensions of affect which can be represented in this two-factor space (Positive Affect, Negative Affect, degree of Pleasure, and degree of Engagement).

It has been noted (e.g., Watson, Clark, & Tellegen, 1984) that in a two-dimensional factor analytic solution there is not an a priori correct position for the dominant dimensions. Theoretically, orthogonal dimensions could be placed at any position within this space. The worth of one solution over another must therefore be demonstrated by the

significant pattern of relationships that are found from any particular two-dimensional solution. As it stands now, the personality dimensions of E and N and the mood dimensions of PA and NA account for the bulk of the published research and have generated the most frequently used and psychometrically sound scales; hence these factors were used in the present study.

As in the study of personality, there has been some support for an additional large mood dimension. Researchers who have extracted a third salient dimension of mood in their factor analytic work have termed this dimension Potency, Dominance, Aggression, or Attention-Rejection (Averill, 1975; Bush, 1972, 1973; Russell and Mehrabian, 1977; Schlosberg, 1952). Watson and Tellegen (1985), believe this dimension is small, and not replicable across studies. However, in any particular factor analytic solution, the size of the factor depends on the number of items which are present to define it. Much previous and almost all current mood research has not specifically included terms that are good markers of this third dimension. Despite this, I have recently factor analyzed mood terms that were selected a priori to define PA and NA and this third mood dimension. When this was done, the hypothesized third dimension was clearly evident in the data. In addition, the nature of this third mood dimension appeared very similar to the personality dimensions of Toughminded-

ness versus Tenderheartedness (Eysenck), Agreeableness (Costa and McCrae), Trust versus Mistrust (Kiesler), and Calculating versus Unassuming (Wiggins). The similarity and overlap between mood and personality models will be discussed more fully below.

Convergence of Personality and Mood Structure

The focus of much of my previous research (Meyer, 1987; Meyer & Shack, in press) has been to demonstrate that the dominant two-dimensional model of personality (E and N) and the dominant two-dimensional model of mood (PA and NA) in fact share a unified structural basis. That is, even though one's self-report of mood is different than one's self-report of personality (an issue to be taken up in more detail later), the underlying dimensions from each realm are identical. When mood and personality data are factor analyzed simultaneously it is found that extraversion and Positive Affect merge into a single dimension, while neuroticism and Negative Affect merge into a separate dimension. A comparison of Figure 1 and Figure 2 demonstrates the conceptual similarity of the personality and mood domains--in terms of both dominant dimensions and alternate rotations.

The trait dimension of Negative Affect/Neuroticism has been analyzed fairly extensively in the research literature. Terming this dimension "Negative Affectivity", Watson and

Clark (1984) conducted a massive review of the research scales which assess this construct. Like Eskimos who have a large array of words for subtle variations in snow and ice quality, psychological investigators have focused an incredible amount of attention and research on the development of numerous scales with numerous different names to measure negative affective states (e.g., anger, hostility, depression, anxiety, and neuroticism). Watson and Clark have proposed, as has Millon (1981), that while these assessment measures have dissimilar names and distinct literatures built up around them they are in fact describing the same underlying phenomena.

Watson and Clark have found that measures of negative affective traits intercorrelate so highly they must be seen as manifestations of the same underlying construct--Negative Affectivity. The intercorrelations obtained between the 12 most highly convergent measures of the 18 measures Watson and Clark reviewed are shown in Table 1. As can be seen from the table, measures of anxiety and neuroticism lie at the high end of this dimension and contrast strongly with measures of social desirability and repression, which are at the low end of this dimension.

Describing their "trait" construct of Negative Affectivity, Watson and Clark report the following:

> Taken together, the data reveal a dimension of stable and pervasive individual differences in mood and self-concept. High-NA individuals are more likely to report distress, discomfort, and dissatisfaction over

Table 1.

Intercorrelations between the 12 measures that best define Negative Affectivity (From Watson & Clark, 1984).

Scale	Scale											
	1	2	3	4	5	6	7	8	9	10	11	12
1. TMAS	82[a]											
2. A	85	88[b]										
3. PT	88	87	89[a]									
4. SD	-81	-86	-81	81[a]								
5. R-S	88	87	74	-88	91[b]							
6. ER-O	—	—	-88	87	—	91[a]						
7. Sc	73	77	82	-78	76	—	93[a]					
8. Pn	71	72	74	-76	75	—	71	79[a]				
9. A-Trait	73	—	81	—	80	—	72	—	90[a]			
10. EPI-N	72	81	—	-60	81	—	—	—	73	82[c]		
11. MPI-N	72	—	62	—	75	—	42	—	—	71	84[a]	
12. IPAT	74	44	44	—	76	—	—	—	76	76	75	81[b]

Note. Decimals have been omitted. TMAS = Taylor Manifest Anxiety Scale (Taylor, 1953); A = Anxiety (Welsh, 1956, 1965); Pt = Psychasthenia (McKinley & Hathaway, 1942); SD = Social Desirability (Edwards, 1957); R-S = Repression-Sensitization (Byrne, 1961; Byrne, Barry, & Nelson, 1963); ER-O = Ego Resiliency-Obvious (Block, 1965); Sc = Schizophrenia (Hathaway, 1956); Pn = Psychoneurosis (Block, cited in Dahlstrom, Welsh, & Dahlstrom, 1975); A-Trait = State-Trait Anxiety Inventory A-Trait Scale (Spielberger et al., 1970); EPI-N = Eysenck Personality Inventory Neuroticism Scale (Eysenck & Eysenck, 1968); MPI-N Maudsley Personality Inventory Neuroticism Scale (Eysenck, 1962); IPAT = IPAT Anxiety Scale (Krug, Scheier, & Cattell, 1976).

[a] coefficient alpha or Kuder-Richardson estimate of internal consistency.

[b] Split-half reliability. c Parallel forms reliability.

> time and regardless of the situation, even in the absence of any overt or objective source of stress. As a result, trait NA scales have a consistently strong relation with state measures of anxiety and general negative affect, even when the state scales are completed after a lapse of several years. High-NA subjects are more introspective and honest with themselves, dwelling particularly on their failures and shortcomings. They also tend to focus on the negative side of others and the world in general. Consequently, they have a less favorable view of self and other people and are less satisfied with themselves and with life (p.483).

According to Watson and Clark (1984), individual's who are low on the trait of Negative Affectivity are:

> more content and satisfied with life and eschew the ruthless honesty of high-NA individuals, both with regard to self and others, in favor of smoothing over life's rocky road. They focus on themselves less and, when they do, are more pleased with what they find, enabling them to maintain a better mood, a more favorable self-view, perhaps to the point of glossing over (repressing?) some harsh truths. Similarly, they have a more positive view of others and, in the interest of smooth social intercourse, are more conforming and conventional (p. 484).

After presenting evidence of convergence, the authors cited both reliability and validity data for their construct of Negative Affectivity. The validity data confirmed the summary descriptions quoted above, while the reliability data indicated that the trait of Negative Affectivity remains stable for about six months (r's between .80 and .86), after which there is a drop in consistency. However, even after one to two years the stability coefficients remain at approximately .60.

Paralleling the work of Watson and Clark, a number of independent researchers have demonstrated the same conver-

gence of supposedly disparate measures of negative affectivity and neuroticism (e.g., Gotlib and Meyer, 1986; Meites, Lovallo, & Pishkin, 1980; Tanaka-Matsumi & Kamoeka, 1986; and see Cole, 1987). In each of these studies it was reported that measures of anxiety, depression, hostility, and neuroticism correlated so highly with each other that they could not be considered assessments of distinct constructs.

Unfortunately, a full integration of research on the extraversion/Positive Affectivity dimension has not been conducted (though see Hepburn & Eysenck, 1989; Meyer & Shack, in press; Watson & Clark, in press). This lack of integration is probably influenced by the fact that there simply has been much less research emphasis and scale development on this trait dimension. However, conceptually, this dimension has not been overlooked. The extraversion-positive affectivity dimension is one operationalization of the broader reactive-reflective dimension of personality (Shack, 1980). In a variety of theoretical accounts of personality, this dimension (appearing under a variety of different names) has served as the primary bulwark for differentiating individuals (e.g., see Blatt & Shichman, 1983; Jung, 1971; Kagan, 1984; Kretschmer, 1925; Reich, 1949; Scarf, 1986; Shack, 1980; Shack, Conrad, & Meyer, 1988; Shapiro, 1965; Sheldon, 1949).

Important Differences in the Self-Report of Mood and Personality

The observed overlap between personality and affective structure does not, however, imply that research scales measuring mood and personality are measuring exactly the same thing. Mood can fluctuate markedly in response to transient life events and therefore can be measured as a "state". Additionally, one can have a general predisposition to experience particular emotions and, therefore, mood can also be measured as a "trait". Personality, on the other hand, is generally measured as a durable disposition that reflects individual differences--a trait. Meyer and Shack (in press) have demonstrated that state mood, trait mood, and personality all share the same underlying two-dimensional structure. This finding holds despite the fact that state mood correlates moderately to trait mood (as it should) and at times only minimally to personality. Trait mood, on the other hand correlates very strongly, though not perfectly, to personality.

The imperfect correlation between two traits that share the same underlying structure may result because different modalities are being assessed when mood is compared with personality (see Meyer & Shack, 1988). Both personality and mood can be measured with self-report instruments. However, subjects are asked to report different kinds of information in each case. When someone is

asked to respond to questions about their personality they appear to refer to propositions they have regarding their self. That is, they refer to rather well explicated self-schemas (Alba and Hasher, 1983). For personality inventories the process of self-report may be to start with general beliefs about the self ("I believe I'm a nice person") and deduce from these general beliefs how to respond to particular questions about behavior ("Therefore, if I saw someone in distress I'd probably lend a hand if at all possible").

This process of self-report is potentially very different than the process an individual would go through to respond to a mood questionnaire. Particularly when an individual is asked to report on their state mood, the process would tend to be more inductive ("What are the feelings that I've been having in the past day? What am I feeling right now") and tied to actual internal experiences ("That's right, I was as angry as a hornet yesterday" or "Right now I just feel really happy"). These responses are less subject to the influence of self-schema predications that the individual may have about how they "should" or "would" be. Reporting trait mood would appear to fall somewhere between the reporting of personality traits or mood states, and to be subjected to both the deductive and inductive processes discussed above.

Despite the different response processes and different modalities of experience that are enacted with self-reports

of mood and personality, there is still enough covariation across modalities to demonstrate a convergence of structure across mood states, mood traits, and personality traits. This can be considered evidence for the robust nature of the extraversion/Positive Affect and Neuroticism/Negative Affect dimensions.

In summary, extensive investigation within the "scientist" branch of psychology has revealed that the E and N dimensions of personality are ubiquitous, robust, and genetically based. Similarly, it has been demonstrated that the PA and NA dimensions of mood form the pervasive and broad foundation for emotional experience. Further, even though there are alternative two-dimensional models in the personality and mood domains, there is a single core structure (E/PA and N/NA) that unifies both realms and gives rise to complimentary phenomena in each area (Meyer & Shack, in press). Thus, there is sufficient evidence that E and PA, and N and NA are the fundamental dimensions of self-rated mood and personality.

In addition, recent and growing evidence has suggested that a third dimension will soon join this two dimensional paradigm (see Meyer & Shack, in press; Zuckerman, Kuhlman, & Camac, 1988). This dimension is one of socialized, conscientious, interpersonal warmth, contrasted with impulsive, under-socialized, detached, interpersonal coldness. When this dimension is fully articulated in both the personality

and mood domains, a concise but comprehensive three dimensional structure of normal personality and emotional experience will be available.

Finally, it was noted that even though there is a common core structure to the mood and personality domains, experiences in, and measurements of these realms are not identical. Personality traits are stable, pervasive aspects of behavior, that, when measured by self-reports, give an index of ones self-conception or self-schema. Emotional states, on the other hand, are transient experiences, responsive to external events, that, when measured by self-reports, are inductive judgments that are less tied to cognitive representations of the self.

The differences between the Rorschach test and the types of self-report measures discussed above will be elaborated in the next chapter. However, when we come to the chapter on Rorschach variable interpretation, it will become clear that the Rorschach is traditionally interpreted in a fashion very consistent with the E/PA and N/NA paradigm.

THE RORSCHACH

Preliminary Issues

The Rorschach is considered a "projective" test in contrast to the "objective" tests that have been designed to measure E, N, PA, and NA. Most assessment devices are dichotomized into objective or projective tests on the basis of how much structure and direction is given to form the subject's response. The more literal, direct, and clear the test stimuli, and the more the response options are structured, the more objective the test. In contrast, the more ambiguous and imprecise the test stimuli, and the more undefined and unstructured the response options, the more projective the test. A number of related issues come to the fore when projective test data is compared to objective test data--as will be the case for a component of this study. Three issues will be addressed here: 1) psychometric properties and issues, 2) the nature of self-report measures, and 3) the different levels of analysis that may be involved in objective and projective tests.

Typically, the more rigorous, defined, and explicit the test stimuli and the response options (i.e., the more objective), the better the psychometric properties of the test. From a psychometric perspective, it is argued that a test must first and foremost display high reliability (usually measured by internal consistency estimates), because the magnitude of the validity coefficients is

dependent on the magnitude of the reliability coefficients. Projective tests have broadly been criticized for claiming validity without demonstrating reliability. However, some objective scales, such as those on the MMPI, suffer from serious measurement problems, while other projective tests have been scored reliably and have demonstrated validity--for example, the TAT scoring systems by McAdams (1984), Winter (1973), Stewart (1982), and McClelland, Atkinson, Clark, & Lowell (1953); the Sentence Completion Test scoring system by Loevinger (1976); and the Rorschach scoring system by Exner (1974, 1978, 1986). As an example of the latter, Parker (1983), in one of his meta-analytic reviews of Rorschach reliability and validity reported that "reliabilities in the order of .83 and higher and validity coefficients of .45 or .50 and higher can be expected for the Rorschach--when hypotheses supported by empirical or theoretical rationales are tested using reasonably powerful statistics" (p. 227).

From a slightly different angle on the measurement issue, McClelland (1980) cogently argues that much of the internal consistency displayed by objective tests comes from: 1) a potentially false "set" where people believe they are supposed to be consistent, so they try to be; 2) by asking the same question in many different ways; and 3) by asking questions about the past for which the answers should not vary. He believes that these factors lead to spuriously

high estimates of reliability for the construct assessed by an objective self-report test. Alternatively, he argues that these factors are not in operation with projective tests and, therefore, the reliability estimates for these tests are spuriously low. In contrast to the general psychometric argument that reliability must be high for a test to display validity, McClelland turns the equation around and argues that if validity coefficients are fairly high, reliability must necessarily be high, even if internal consistency estimates do not capture this reliability.

A second important point to be considered when comparing objective and projective tests is the impact of self-report. The more objective a test, in general, the more an individual's responses to the test are self-reports. Self-reports necessarily only give the subject's view of himself. These self-schemas are important in their own right, but self-reports are dependent on 1) what the subject actually knows about himself, and 2) what the subject is willing to share of that self-knowledge (see Tellegen, 1985). A conscious view of self is limited, in some instances dramatically so, even if the subject has the best intentions of communicating openly with the examiner and has no desire to distort or misrepresent information.

On the Rorschach, as a projective test, the individual taking the test has little or no idea about how their responses to the 10 cards of inkblots will be interpreted

(with the possible exception of some content). This is very different from self-report tests, in that on self-report tests the subject, even if s/he is not sure exactly what the test is measuring, has knowledge of the questions being asked and is able to make a conscious decision about how much or how little s/he wants to reveal to a particular question. Supporters of the Rorschach recognize that one of its potential benefits is that it circumvents some of the traditional concerns about self-report bias (e.g. social desirability, faking "bad", or faking "good"; see Exner, 1978).[1]

All bias in responding is not removed from the Rorschach, however. This test appears to be quite sensitive

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[1] Exner (1978) notes that subjects have great difficulty faking schizophrenic protocols, suggesting that even when subjects consciously attempt to bias their records they cannot do so. However, Exner also reports (1978, pp. 43-45) significant differences in Rorschach response frequency when comparing the protocols of subjects scoring high and low on the K scale (subtle defensiveness) of the MMPI. He attributes these scoring differences to the effects of social desirability. However, when he compared the means from these two groups he reported an analysis of variance to test the differences. When I carried out the appropriate t-test, the group differences were not significant for a two-tailed test with alpha at .05.

to the influence of the examiner, the ambience created between examiner and subject, and the willingness of the subject to articulate what s/he perceives. Despite the presence of these other influences on Rorschach responses, it is still unclear whether the relative combination of Rorschach test variables as a "gestalt" becomes altered under these conditions. Therefore, it is still unclear whether the interpretive significance of a protocol would be altered under these conditions of bias.

The point of this brief discussion is that the Rorschach test operates in a realm different than that of self-report measures. Both Leary (1957) and McClelland (1980) have discussed at some length the different levels at which objective and projective tests operate. Leary (1957) discussed three different levels of the individual from which data could be drawn. Level I was the "observational level", in which an individual's behavior and actions could be rated by an observer. Level II was the self-report or "conscious level", in which individuals rated or revealed themselves on questionnaires, checklists, or in interviews. The final level, Level III, was the "private level", in which data about the individual was collected from projective techniques like the Draw a Person Test (DAP), the Thematic Apperception Test (TAT), the Sentence Completion Test (SCT), and the Rorschach Test. Significantly, Leary believed that the same dimensions of personality would be

present regardless of the level under consideration.

McClelland (1980) echoes this distinction among levels of personality data, and focuses particularly on the differences between Level II (objective self-reports) and Level III (projective tests). Instead of the terms "objective" and "projective", McClelland prefers the terms "respondent" and "operant", because he believes that what is captured by the unstructured nature of projective tests are a sample of the spontaneously generated thoughts of an individual. He considers these thought samples "operants", in the Skinnerian sense, because it is not possible to exactly identify the stimulus that elicits them. Instead, they are spontaneously generated responses which, when displaying a particular tendency or trend, serve to motivate behavior. In turn, he believes that motives drive, direct, and select behaviors toward a particular end.

It is important to note that what are scored as operants in the various TAT scoring systems are the thematic contents of thought, not one's style of thought or manner of apperception. McClelland argues convincingly that these spontaneously generated contents of thought are theoretically distinct from both the contents of the self-schema and from the trait indexes of personality style--both of which can also be tapped by respondent self report measures. Because the domains of Level II and III are theoretically distinct, he argues that researchers should not expect

measures from Level II to correlate with measures from Level III in a multitrait-multimethod validity matrix.

In terms of the correspondence between the three levels of personality discussed by Leary, most research has focused on the empirical convergence between the same dimensions measured by other-ratings (Level I) and by self-reports (Level II). Results have shown that, at best, the convergent correlations between self-reports and ratings made by others who know the subject well are in the .50 to .60 range (McCrae, 1982).

The correspondence between the private self, or perhaps more appropriately labeled the "unconscious" self (Level III), and the conscious self (Level II), has never been fully addressed. Part of the reason for this has been due to the fact that these realms have been considered theoretically distinct. Part of the reason undoubtedly also has to do with the fact that there are only a few "operant" scoring systems for the TAT, DAP, SCT, or Rorschach. Of these, even fewer scoring systems also have conceptual overlap with the personality dimensions obtained from "respondent" measures. Without the same dimensions being measured across the different levels, there can be no assessment of correspondence.

The little research bearing on this issue suggests that there is minimal correspondence across these two particular levels. McClelland (1980) reports that there

have been numerous studies that have assessed the construct "need for achievement" in both operant and respondent fashions. However, there has been virtually no correlation observed across operant and respondent measures of this construct. (Zeldow, Daugherty, & McAdams [1988] have discussed the conceptual overlap between the agentic power motive and the communal intimacy motive, both operant TAT measures, with the traditional respondent measures of masculinity and femininity, respectively. However, I am not aware of any direct correlation of these scales across levels of analysis.) In contrast, McCrae and Costa (1980) have found that their respondent measure of the dimension "openness to experience" did, as hypothesized, correlate significantly in seven of ten instances with the operant measure of ego development obtained from the SCT. However, the magnitude of correlations in this study was not high.

What implications these different levels of analysis will have for the present study are unclear. At the very least, if there is no correspondence between the Rorschach, as a Level III test, and self-report measures of personality or mood, as Level II tests, the Rorschach should still display an internally consistent two-dimensional factor structure of E/PA and N/NA. That is, the Rorschach should demonstrate internal validity, whether or not it also demonstrates external validity.

At the same time, however, it does not seem that the

Rorschach will show a lack of correspondence with self-report measures of personality and mood. This is suggested for two reasons. First, the mood variables to be included in this study are less subject to the "self-schema" deductive processing that is typical of many respondent self-report measures. Second, the personality data to be included in this study are concerned with stylistic traits, rather than particular contents of experience. In the context of discussing the Rorschach as a projective test, Exner (1974) says: "this does not mean that the data of the Rorschach are exclusively projective in nature, for that is not the case... the response is a composite of a perceptual procedure and a projective response" (pp. 221-222). To the extent that stylistic personality factors influence the "perceptual procedures" which are scored on the Rorschach, there will be overlap from both domains.

It will be noted that the "perceptual procedures" that are operationalized in Exner's Rorschach scoring system make the test distinctly different from the TAT based scoring systems. The TAT systems operationalize only the content of perception, not the style of perception. Theoretically, the content of perception (or McClelland's operants) could have less direct overlap with personality style. We will turn now to a more detailed discussion of the data obtained from the Rorschach.

The Test Itself

Six distinct systems have been developed to score the Rorschach: Beck's, Hertz's, Piotrowski's, Klopfer's, Rappaport's, and Exner's. Particularly within the Exner system, the Rorschach test can be utilized in two relatively distinct ways. First, the Rorschach can be scored to yield information on the content, style, and quality of an individual's perceptual field. With this data, an assessor can gain information about a subject's personality style and the quality of his adaptive functioning. Second, the Rorschach can be utilized as a more psychodynamically rich tool. In conjunction with the content of perception, one can trace the subject's opening responses through to his closing responses. With this information, the examiner, if s/he is willing to take the inferential leap, can gain a unique picture of the subject's unconscious conflicts and complexes, as well his style of contending with these issues.

The latter way of utilizing the Rorschach gets at operant and thematic issues. Used in this fashion, the Rorschach is a tool of interviewing that works on a more tacit level of personality organization than traditional interviews or respondent questionnaires. In my mind, the latter fashion of using the Rorschach, with its focus on content and thematic lines, is most similar to the scoring systems developed for the TAT.

Returning to the scores which can be obtained from the Rorschach, there are three important categories. First, it yields information on how, or with what particular style, an individual perceives and organizes his or her experience (scores of Location, Determinants, and Organizational Activity). Second, it yields information on how well, or with what kind of quality, the individual perceives and organizes (scores of Form Quality, Developmental Quality, and Special Scores). And third, it yields information on what, or the actual content, that the individual perceives and organizes (scores of Content and Popular). The premise of the Rorschach is that how, how well, and what an individual perceives and organizes in an ambiguous situation (the ink blots) tells the examiner much important and useful information about the psychological composition of the individual.

The personality and mood data discussed previously, however, generally only yield information on how, or with what particular style, an individual experiences the world. The personality and mood data explain very little about the content, and almost nothing about the quality (in a normative sense), of this experience. Therefore, the Rorschach data that would be most likely to show the structural dimensions of extraversion/Positive Affect and neuroticism/Negative Affect would be the style data. This data is composed of Location scores, Determinant use, and Organiza-

tional Activity.[2] These scores, it seems to me, are most distinctly facets of what Exner referred to as the "perceptual procedures" captured by the Rorschach.

In the next chapter, the scoring procedures and traditional interpretations for the Rorschach style variables will be given. This information will be integrated with predictions about where the Rorschach scores should fall within the two dimensional E/PA and N/NA model.

A subsequent chapter will then review the reliability and general validity evidence for the Rorschach. This will be followed by a chapter that reviews the specific validity evidence for the style variables to be analyzed in this study. An additional chapter will be devoted to some of the general problems and validity issues in Rorschach research, and a final chapter will cover previous factor analytic explorations of the Rorschach.

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[2] One of the Rorschach Special Score indices, the Morbid score, appears to be a mix of style and content. Since it may provide potentially valuable information on style it will be analyzed in the present study along with the other style variables.

RORSCHACH SCORING AND TRADITIONAL INTERPRETATION

LOCATION SCORES:

Whole Response (W). This response is scored when all portions of the ink blot are used in the subject's verbal response. W is purported to measure the ability to organize components of the environment into a meaningful concept (Exner, 1974, p. 235). Additionally, it is interpreted as a psychological willingness to approach complex stimuli in a global manner.

Common Detail Response (D). This response is scored when a subject utilizes a frequently identified area of the blot. D is purported to measure the ability to react to the "obvious" characteristics of the environment. If someone gives predominantly D responses he is viewed as being preoccupied with the obvious and is reluctant or unable to test out the full potential of his resources.

Unusual Detail Response (Dd). This response is scored when a subject employs an infrequently identified area of the blot in her response. Frequent Dd responding is purported to measure several processes: 1) a retreat from the ambiguities of the environment that operates by creating a more narrow focus which is easier to manage; 2) an obsessive approach to the world; or 3) a form of perfectionism.

As a single dimension, the location scores have an uncertain placement in the hypothesized two-dimensional mood

and personality space. However, W responses may reflect a more extraverted/High PA cognitive style, while Dd responses may typify a more introverted/Low PA cognitive style. Evidence for this suggestion emerges from a variety of studies that have examined the influence of induced PA on cognitive processes. It has been found that induced PA results in greater capacities to integrate and relate divergent material, and a greater ability to categorize information more inclusively (see, for example, Isen, Daubman, & Nowicki, 1987).

Space Response (S). This response is scored when a subject utilizes a white space in his/her response to the blot. As such, it is not part of the same continuum as the other three location scores (e.g. complexity and globality) and it is scored in addition to the W, D, or Dd response. S is purported to measure oppositional tendencies that may reflect either healthy assertiveness or the desire to remain independent in relation to task demands. Given that the introvert is often at odds with his surrounding environment, either through a lack of attention to the external world, or through the active cultivation of a psychological barrier or personal "territory" that keeps the impinging environment at bay (Jung, 1971; Keirsey & Bates, 1984; Shack, 1980), S responses may be indicative of low E/PA. However, as S becomes more elevated, these responses are believed to represent a trait-like feature of the personality that "can

easily give rise to hostility or anger when autonomy is threatened" (Exner, 1986, p. 383).

S, therefore, can be seen as reflecting introversion, or, as it increases, experiences of high negative affect. Consequently, this variable would be expected to fall in the melancholic quadrant of the two factor model. However, if a three dimensional solution was found for the Rorschach, S would also be expected to function as a cornerstone in defining the "toughmindedness" (Eysenck), non-agreeableness (Costa and McCrae), and interpersonally cold (Wiggins or Kiesler) dimension discussed earlier.

ORGANIZATIONAL ACTIVITY (Z) SCORES:

Z Frequency (Zf). Organizational Activity (Z) is scored whenever an individual gives a Whole (W) response or a response that establishes some sort of meaningful relationship between two or more disparate elements of the inkblot (including white spaces). This score is interpreted as cognitive energy or initiative which utilizes one's capacity for analyzing and synthesizing the environment in a careful and precise manner (Exner, 1986). When introverts attend to the environment, they are often characterized as attentive to details and fine differentiations, and are noted for their careful, thorough, and precise evaluations (see Eysenck, 1981; Shack, Conrad, & Meyer, 1988; Shapiro, 1965). Therefore, this definition of Zd suggests, though

not strongly, an introverted/low PA phenomenon.

Z Frequency Summation (ZSum). Each occurrence of Organizational Activity is given a specific weight to index the degree of synthesis or integration present in the response. The weight is determined by the card the response occurred to and by the type of Organizational Activity involved (W response, integration of white space, meaningful relationship made between adjacent details of the blot, or meaningful relationship made between distant details of the blot). The ZSum is simply the total of these differentially weighted Organizational Activity responses. Because these are weighted scores, the Zsum is purported to be a more precise index of organizational activity than Zf.

Estimated Summation of Z Frequency (Zest). This is the predicted sum of weighted Z scores. Predictions are made on the basis of the frequency of Z alone, irrespective of the type of organizational activity that ocurred in a response. The Zest is an index of how much integration or synthesis would be expected on average for a set number of responses. However, it offers nothing of interpretive value by itself.

Organizational Efficiency (Zd). The Zd score is a function of the two previous scores. It is found by subtracting the Zest from the Zsum; thereby determining if the subject organizes the blots more or less than average. Interpretively, this variable is somewhat ambiguous.

Originally, Exner (1974) postulated that low Zd values were indicative of organizational strivings which fell short of their mark and were accompanied by negative affects such as anxiety or depression. High Zd scores, on the other hand, were construed as reflecting organizational capacities that went beyond what was normally expected and were accompanied by positive affective states. As such, this conceptualization of Zd paralleled the N/NA dimension. More specifically, low Zd scores would have been found within the melancholic quadrant, while high Zd scores would have been found in the sanguine quadrant.

More recently, however, Exner (1978, 1986) considers the Zd score to reflect a cognitive style. High Zd individuals are referred to as "overincorporators". These people are described as having a ruminative, deliberate, cautious, and "well thought out" style of response to the environment. Low Zd scorers, on the other hand, are referred to as "underincorporators". They are seen as having a style of scanning the environment quickly, potentially missing critical bits of information in a complex array and responding impulsively.

In terms of the two-dimensional structure of personality and mood this interpretive shift is a significant one, as it involves an almost complete reversal of the Zd dimension within the two-dimensional space. In its present formulation, based on additional research, the Zd dimension

appears analogous to the reflection-impulsivity dimension of personality outlined by Kagan (1984). In theoretical accounts and in empirical studies this dimension has been related to the introversion-extraversion dimension of personality (see Eysenck & Eysenck, 1985; Jung, 1971; Zuckerman, Kuhlman, & Camac, 1988). Therefore, in the two dimensional model, the Zd dimension from the Rorschach would be expected to run from the introverted/low PA end (high Zd) to the extraverted/high PA end (low Zd). Because the Zd score incorporates Zf and is less subject to response frequency effects than Zf, this is the Organizational Activity variable that will be included in the present study.

DETERMINANT SCORES:

Pure Form (F) and Lambda. Pure form answers are scored when a response is generated exclusively by the form features of the blots. This score, in a sense, is also the "default" score given when no other determinants are articulated in a response. However, when any other determinants (except movement and pairs) are utilized in a percept, an indication is made as to how much form is utilized in combination with the other determinants. The pure form response is typically used interpretively as "the proportion of pure form responses" that occur in a given subject's protocol. This proportion is referred to as Lambda and is

believed by Exner to be a "stylistic variable".

Exner (1978) suggests that a high Lambda indicates the tendency to avoid complexities in a stimulus situation, especially when the consequences of a response are not predictable. Further, he (1986) notes that high Lambda reflects a deliberate, conscious thought processing style that is a form of affect delay. Individuals who score highly on this index are purported to approach the environment in an economical manner that may often place them at odds with the expectations and demands of the world. A low score on this index is purported to reflect three phenomena (Exner, 1986). First, a low score may indicate a person who is willing or prone to become over-involved in complexities, or who is unable to back away from complexities and can become emotionally labile. In contrast, the high Lambda person would typically avoid stimulus complexities and display a lack of responsiveness to the outer environment. Second, the low scorer may be an individual who actively accomplishes and achieves in order to avoid error or failure. Finally, the low Lambda may reflect an individual who is adaptive and flexible in his or her approach to coping with challenges.

In a variety of accounts (Eysenck & Eysenck, 1985; Jung, 1971; Shack, Conrad, & Meyer, 1988; Watson, in press), the introvert has been described as one who retreats from environmental ambiguity, delays or constricts his affect,

and lacks responsiveness to the outer environment. In contrast, the extravert has been described as one who is capable of becoming enmeshed in his external world and emotionally labile, or also adaptive and flexible in his approach to the world, and more actively motivated toward achievement and accomplishment. Therefore, from the framework of the two-dimensional model, it appears that the high Lambda person is the more introverted/low PA person, while the low Lambda individual is the more extraverted/high PA individual. However, this is a rather tentative suggestion, given that Lambda lacks a clear fidelity of interpretation, and given there is a broad range of personality descriptions involved.

Human Movement (M). Human movement responses are scored whenever the response involves human or human-like activity (e.g., sitting, walking, smiling, etc.). The human movement response is interpreted as an active or deliberate (but not necessarily conscious) form of ideation that acts as a delay process to keep the individual from yielding to more spontaneous impulses or responses. Thus, responses of this sort indicate a style of "cautious defensiveness through which the world, and potential responses to it, are 'sorted through'" (Exner, 1974, p. 263). Further, Exner (1986) says of the high M scorer: "This deliberate directing of one's inner life breeds images and/or fantasies that become the basis of decision making concerning the selection

of responses for a given constellation of stimuli. Response tendencies may be thwarted and/or displaced into continuing ideational activity, or they may be externalized, either directly or indirectly, into behaviors" (p. 329).

The human movement response also forms one half of a very important piece of Rorschach data. Rorschach (1921) proposed that the ratio between human movement responses, on the one hand, and the weighted sum of color responses, on the other hand, provided an index of the individual's underlying preferential style of response to the environment. He termed this ratio the Erlebnistypus. People with a preponderance of human movement responses in their ratio were referred to as introversive. Alternatively, people with a preponderance of color responses in their ratio were termed extratensive.

Rorschach believed that each of these response styles reflected a constitutional predisposition, and research has shown these styles to be quite stable over time (Exner, 1978). The introversive is seen as one who is more cognitively ideational, inwardly focused, deliberate, and reflective in his approach to the world. Introversives are also described as people who exert greater control over their feelings and prefer "to delay final decisions until they can mentally view alternatives and potential results. They rely heavily on their own ideation for decisions and direction, and ....are able to derive gratification from

their inner life more easily than others do" (Exner, 1986, p. 325). From the perspective of the integrated two-dimensional model it can be seen that the introversive, high M scorer on the Rorschach is essentially the introverted/low PA person.

Animal Movement (FM). This category is scored when the response is of an animal involved in a species appropriate activity. The animal movement response is interpreted as a less mediated response to internal impulses than the M response. FM scores are "purported to manifest a sense of urgency, in which the subject becomes psychologically aware of impulses striving for a more immediate gratification" (Exner, 1974, p. 264). That is, FM represents mentation that is activated by a need press. Additionally, a preponderance of these scores in a protocol is believed to represent an individual who is governed by a strong need for immediate gratification of impulses and who displays a lack of foresight and longer term goals. FM, if it shares overlap with the two-dimensional model, may be expected to fall within the Choleric quadrant.

Inanimate Movement (m). This category of movement is scored when responses involve the movement of inanimate, inorganic, or insensate objects. Earlier, inanimate movement responses were interpreted by Exner (1974) as reflecting a similar sort of need press as animal movement responses. They were differentiated, however, in that m

responses were believed to reflect states of tension, distress, or hostility which arose because the needs that were pressing had not been satisfied by the subject's interactions with the environment. Exner (1978, 1986) has modified this interpretation of m slightly in his more recent work. Now m is considered to reflect transient experiences of stress where the subject feels disrupted, distressed, and out of control. As such, m seems more clearly and directly tied to the high end of the N/NA dimension.

Active or Passive Movement (a; p). All movement responses are further differentiated in terms of whether the movement in the response is active or passive. The "benchmark" for the differentiation of active or passive movement is the action "talking", which is always scored as a passive movement. The type of movement which predominates in a Rorschach protocol is believed to indicate the style of ideational fantasy that an individual will adopt when encountering adjustment difficulties. Exner (1974, 1978, 1986) has postulated that when the ratio of a to p or p to a exceeds 3:1 there is evidence for a cognitively constricted or rigid style of thought. Ratios that fall below this level of discrepancy indicate a cognitive flexibility. Additionally, some evidence has been presented suggesting that passive movement scores in excess of active movement scores are predictive of behavioral passivity where the

individual allows others to "take charge" or make decisions. It is unclear where this variable would fall within a two-dimensional factor analytic solution and whether it would show overlap with the E/PA N/NA model.

General Movement. Typically, each of the movement scores are considered discrete categories of responses. However, an argument can be made that they form a continuum of movement scores with m signifying the most unmodulated or the "rawest" form of movement and M signifying the most modulated or the most refined form of the same process. This argument could be made because each instance of movement is a similar sort of projection onto the inkblot, as the blots are really static. Looked at from this view, the movement scores could reasonably be coded on a psychological continuum. However, Exner (1974, 1978, 1986) maintains that the FM and m responses are a "different breed" (1978, p. 104) of psychological operation than the M responses and suggests that the movement scores should be treated as distinct categories. It will be instructive to evaluate whether the content-based scoring of movement responses receives any support from the present factor analytic investigation.

Chromatic Color (Cn; C; CF; FC;). These responses are scored whenever subjects incorporate the chromatic qualities of color in their response. The scores differ by the degree to which form dominates the percept--from no form, where the

naming of a color is the response itself (Cn), to the percept that is created mostly by form but which utilizes color as well (FC). Five of the ten Rorschach cards have chromatic color blots, and three of these five are composed exclusively of chromatic color. Interpretively, color responses are seen as indices of emotional excitability. When form dominates the color response, it is taken as an indication of affect modulation. When form plays a minimal role in the color response, it is interpreted as a tendency toward lability or impulsiveness. Originally, Rorschach had postulated that chromatic color responses could be interpreted in the same fashion for all types of affect. Exner (1974) disagrees, however, and reports: "Color answers are not... related to all affects. They tend to disappear in depression, an obviously painful affect state" (p. 281). This suggests that the chromatic color responses may be less tied to the negative affective states, and more directly related to the positive emotional tones.

As mentioned earlier, the weighted sum of color responses (with weightings determined by the degree of form dominance in the response) forms the second term in the Erlebnistypus. When a protocol is dominated by color responses (in contrast to human movement) the individual is referred to as extratensive. Extratensives are posited to respond with an emotional mode of coping, including affective discharge, and are seen as "doers" in a problem solving

situation as they explore many possibilities quickly and often make many errors. Extratensives are seen as relying more on external feedback in decision making processes than introversives. Additionally, "they are more prone to invest affect into their decision operations and, as a consequence, are more likely to use interaction with the world as a source of information and/or gratification. In other words, they are more oriented to seek and/or respond to external stimuli when formulating coping responses" (Exner, 1986, p. 329). Given these descriptions, it is easy to see that the extratensive is conceptually very similar to the extraverted/high PA individual.

Affective Ratio (Afr). This category is not scored directly from a response to the inkblots. Instead, the score is derived from the ratio of the number of responses made to the last three cards compared to the number of responses made to the first seven cards. Since the last three cards are composed of all chromatic colors, this is an additional index of color responsiveness, though it does not depend on the articulation of the color determinant in a response. Interpretively, this is seen as a difficult variable to conceptualize. However, Exner (1978) suggests that the affective ratio is a stable stylistic variable which involves "a psychological receptiveness to emotionally toned stimuli" (p.127). With just this definition the Afr would be expected to fall in the Choleric quadrant of the

two-dimensional model. However, Exner's most recent, most definitive, but most ambiguous statement on the Afr is that it "reflects the proneness to invest effort in the cognitive processing of those (affectively toned) stimuli, and the level of processing itself becomes a form of response, which in turn serves as a stimulus to other responses" (italics in the original, 1986, p. 381). Given this rather enigmatic statement it becomes impossible to place the Afr in the two-dimensional model with any degree of certainty.

Achromatic Color (C'; C'F; FC'). These responses are scored whenever subjects incorporate the achromatic qualities of color (white, grey, black) into their response. Like chromatic color scores, achromatic color scores differ by how much form dominates the perception. Seven of the ten Rorschach cards have blots of achromatic color. Interpretively, achromatic color responses have been seen as a form of affective constraint, or a hesitancy to openly and directly express emotional experiences to the environment. Exner (1974, 1978) points out that this constraint or containment is not necessarily indicative of anxiety or depression, though these may be concomitants of the experience, as the individual is seen as psychologically "biting his tongue" which can lead to irritation. "It is the irritation that is represented by the C' variable, which, experientially can probably take any of several forms, ranging from a vague uneasiness or discomfort to a much more

marked experience of tension" (Exner, 1986, p. 341).

Given the description of this variable as indicating affective constraint, it would appear that achromatic color responses would typify an individual on the introverted side of the model. However, this score would seem to be capable of fluctuating within the middle range of scores on the N/NA dimension, since anxiety or depression are seen as potential concomitants of the affective inhibition. Given this, its placement in the overall model would be in the melancholic quadrant, if it does not load solely on the low E/PA dimension.

Texture from Shading (T; TF; FT). These scores are assigned to responses in which the shading features of the blots contribute to a tactile sensation or image (soft fur, heat, bumpy rocks). Again, they differ in the degree to which form plays a part in the formation of the response. Interpretively, a preponderance of T responses is believed to indicate the high degree of emotional arousal which accompanies a strong need for affective interpersonal contact (Exner, 1974, 1978, 1986). Individuals' with high scores on this determinant are believed to "experience loneliness or stronger than usual needs to be dependent on others" (Exner, 1986, p. 339). An absence of texture responses in a protocol is interpreted as emotional isolation and interpersonal impoverishment. The individual with no T is believed to be more concerned with defining his or

her own interpersonal space, and is possibly no longer striving for meaningful relationships with others.

In light of the two-dimensional model, texture responses would appear to bear correspondence to the interpersonal orientation of the extraverted individual. However, in and of itself, the T response would seem to more specifically delineate a third dimension of interpersonal warmth. As noted before, this third dimension appears more akin to Eysenck's reversed psychoticism dimension, Costa and McCrae's agreeableness dimension, Wiggins's or Kiesler's warm and unassuming dimensions, and McAdams's operant measure of the intimacy motive.

Dimensionality from Shading (V; VF; FV) or Vista Responses. These scores are assigned to responses where the shading features of the blot contribute to the formation of depth perception or dimensionality. The degree to which form dominates the perception is again scored. Over the years the interpretation of this variable has remained consistent (Exner, 1974, 1978, 1986). It is seen as representing "the presence of discomfort, and possibly even pain, that is being produced by a kind of ruminative self-inspection which is focusing on perceived negative features of the self" (Exner, 1986, p. 342). This "introspection with a negative conclusion" would appear to fairly cleanly load high on the neuroticism/negative affect dimension, and this contention is supported by a variety of research on the

cognitive processing associated with high levels of neuroticism or negative affect (see Isen, 1984; Johnson & Magaro, 1987; Martin, 1985)

Diffuse Shading (Y; YF; FY). These scores are assigned when responses utilize the light and dark contrasts of shading and when the percepts do not include features of either texture or dimensionality. Again, the degree to which form is incorporated into the percept is also scored. The Y variable is seen as transient and state-related. It is interpreted as being "related to emotional experiences that are fomented by situations of helplessness, loss of control, and/or concerns about the possibility of being unable to respond effectively. Apparently, the affect associated with Y can take a variety of forms, such as anxiety, apprehensiveness, tension, or simply a state of uneasiness" (Exner, 1986, p. 338). Given this description, it would be expected that Y would load cleanly on the high end of the neuroticism/negative affect dimension in the integrated two-dimensional model.

Dimensionality from Form (FD). These scores are given for responses in which the impression of depth, distance, or dimensionality are created solely through the form features of the blots (shading features are not present). Obviously this scoring must be dominated by form. The interpretation of the FD response has remained relatively consistent over the past fifteen years (Exner, 1974, 1978, 1986). These

responses are believed to indicate a non-emotional introspective process where the individual takes a distancing, objective view of the self. To the extent that this interpretation is true, the FD variable should clearly anchor the introverted/low PA dimension.

Pairs (2), Reflections (rF; Fr), and the Egocentricity Index. Pairs are scored when the subject gives a response based on the symmetry of the blot in which two identical objects are reported. The degree of form domination is not recorded with this score and it is coded separately from the other determinants. Reflections are scored when the subject gives responses that indicate one side of the card is a reflection or mirror image of the other side of the card. The predominance of form in the object being reflected is also incorporated into this score.

Pairs and reflections are generally interpreted together in what Exner (1974, 1978, 1986) has termed the Egocentricity Index (3r + [2]/R). Reflection responses are seen as a more primitive form of the pair response, and are differentially weighted and summed with the pair responses to form this index. It is suggested that the egocentricity index represents a measure of psychological self-focusing or self-concern. When this index is high, it is purported to indicate a self-centeredness that may be a more "juvenile, narcissistic-like tendency to overestimate personal worth". A low index, on the other hand, is seen as representing a

"negative self-esteem...probably because of a sense of failure to meet desires and/or expectations for oneself" and is related to depressive experiences (Exner, 1986, p. 396). In many ways this variable, at its low end, appears similar to the Vista response (high N/NA). At the same time, the description of a high egocentricity index appears somewhat similar to Watson and Clark's (1984) description of the individual low in Negative Affectivity. On the surface then, this variable should define the low end of the N/NA dimension.

Blends. Blends are scored when the subject gives a response that incorporates more than one determinant. Each determinant is then coded with the other determinants that make up the overall percept. In particular, Exner (1986) discusses two types of blends: blends of shading responses (including achromatic color), and blends of shading and chromatic color responses. He believes that both of these types of blends represent, in some respects, the extreme opposite of pure form responses. Blends of shading are seen as a more tormented experience of negative affect. Thus, this score should fall on the high end of the N/NA dimension. Blends of chromatic color and shading are purported to reflect a mixed or confused emotional experience, possibly indicative of ambivalence. In the two dimensional model, it is the choleric (high on both E/PA and N/NA) who would generally experience these periods of intense but

mixed PA and NA (see Hepburn & Eysenck, 1989).

Morbid (Mor). The morbid response is one in which the subject identifies an object in either of two fashions. First the object may be described as dead, destroyed, ruined, spoiled, damaged, injured, or broken. Second, a clearly dysphoric feeling or characteristic, such as a "sad tree", an "unhappy person", or a "gloomy house" may be attributed to the object. This scoring is considered by Exner to represent either a negative and possibly damaged self-view, or a decidedly pessimistic outlook on the world and on the subject's self within that world. Consistent with the research cited earlier, it is expected that scores of Morbidity would fall on the high end of the N/NA dimension.

Hypotheses based on traditional Rorschach interpretation

On the bases of these traditional interpretations for the Rorschach variables, and given the expectation that the Rorschach should tap major dimensions of personality and mood, hypotheses were generated for this study.

It was seen above that some Rorschach variables have less expected overlap with the two dimensional model than others. In particular there is ambiguity regarding the placement of the Active to Passive Movement Ratio, the Affective Ratio, Animal Movement scores, and location scores of Common Details. There is, however, a fairly high degree

of certainty with the following variables: Morbidity, Inanimate Movement, Vista, Diffuse Shading, Blends of Shading, Human Movement, Form Dimensionality, Organizational Efficiency, Achromatic Color, Lambda, Chromatic Color, Texture, Color-Shading Blends, Whole Responses, Unusual Detail Responses, White Space Responses, and the Egocentricity Index.

On the bases of the information in this chapter, the following hypotheses were generated for the present study (see Figure 3).

1) Scores of Morbidity (Mor), Inanimate Movement (m), Dimensionality From Shading (V), Diffuse Shading (Y), and Blends of Shading (Sh-B) all load positively on a single dimension of neuroticism/Negative Affect.

2) The egocentricity index (Ego) defines the negative pole of this N/NA dimension.

3) Scores of Human Movement (M), Form Dimensionality (FD), Unusual Detail (Dd), Lambda (L), and Organizational Efficiency (Zd) define the low end of the extraversion/Positive Affect dimension.

4) Whole Responses (W), Chromatic Color scores (C), and Texture scores (T) (to a lesser magnitude) load on the high end of the second dimension of extraversion/Positive Affect.

5) Color-Shading blends (C-Sh-B) are predicted to load positively on both the first and second factors (in the

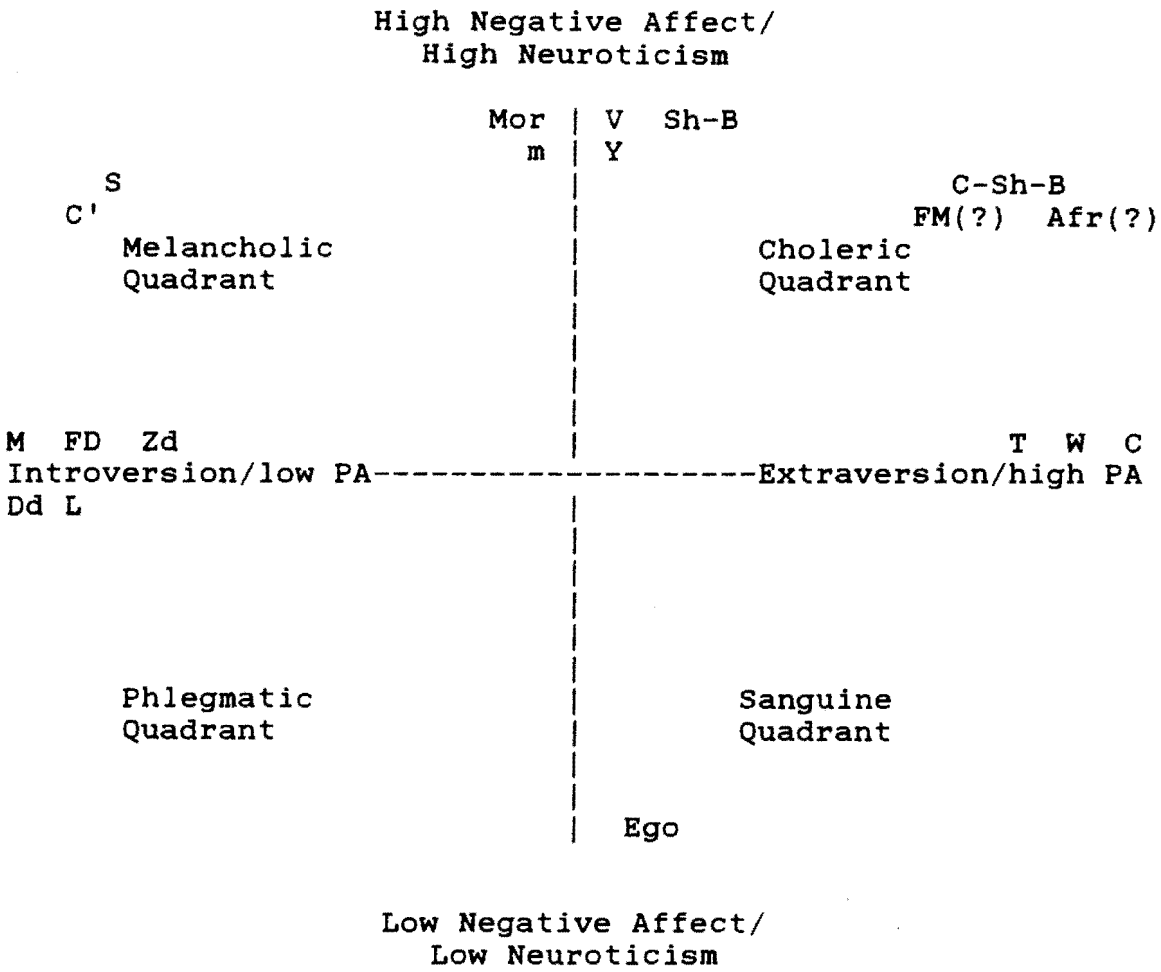

Figure 3. The hypothesized two-dimensional factor analytic solution for the Rorschach style variables.

Note: Zd = Organizational Efficiency, M = Human Movement, FM = Animal Movement, m = Inanimate Movement, C = Sum of Color Response, T = Sum of Texture Responses, C' = Sum of Achromatic Color Responses, Y = Sum of Diffuse Shading Responses, V = Sum of Vista Responses, L = Lambda, Afr = Affectivity Ratio, Ego = Egocentricity Index, W = Whole Response, Dd = Unusual Detail Response, FD = Form Dimensional Response.

Choleric quadrant). With less predictive certainty, it is also expected that the Affective Ratio (Afr) and scores of Animal Movement (FM) would load in a similar fashion.

6) White Space Responses (S) and Achromatic Color scores (C') are predicted to load highly on the first dimension (N/NA) and low on the second dimension (E/PA), placing them in the Melancholic quadrant.

7) No specific predictions are made for the Active to Passive Movement Ratio or the Usual Detail Location Responses.

8) If a three dimensional solution is obtained from this data, it is predicted that the third dimension will be bipolar (like the other two), and defined on one end by scores of Texture and on the other end by scores of White Space and Lambda.

9) It is predicted that the Rorschach dimensions are more directly correlated with mood measures than personality measures. This prediction is made because both the mood measures and the operant Rorschach data are less subject to the influence of cognitive self-schemas.

10) A factor analysis of mood, personality, and Rorschach data will demonstrate that all three sources of data converge in the expected fashion on two dimensions.

These hypotheses have a solid foundation in traditional Rorschach theory, particularly when traditional

variable interpretation is coupled with the pervasive and robust nature of the E/PA and N/NA model of personality and mood. However, as will be seen, a fine-grained examination of the experimental Rorschach literature--with a particular focus on the evidence for variable interpretation and on previous factor analytic studies of the Rorschach--left these hypotheses suspect. Prior to delving into the literature which challenges these hypotheses, positive evidence for the Rorschach's reliability and general validity will be reviewed.

Split-half

A handful of studies have examined the internal consistency of the Rorschach test. In a review of this research, Holzberg (1977) noted that several studies found high reliabilities when employing an odd-even split of the traditional Rorschach cards. The split-half reliabilities for specific determinants ranged from .66 to .97 and averaged about .85. Unfortunately, this respectable evidence for internal consistency was contradicted by several other studies which reported significant but low split-half reliabilities.

Exner (1978, 1986) has criticized the split-half approach to reliability on the grounds that the cards are not equivalent stimuli, as they differ in complexity and the types of responses they are likely to generate. Given this, Exner's own reliability research has focused on the test-retest and interscorer reliability of the Rorschach.

Interscorer

To address interscorer reliability, Exner (1986) reported data from two studies. The first study utilized 20 scorers who coded 25 non-patient records, while the second study utilized 15 scorers who coded 20 psychiatric records. Exner reported that the scorers were "trained examiners" (p. 132), but he did not indicate how much training or experi-

ence these raters had. Across all Comprehensive System variables, the interscorer agreement in the first study ranged from 87% (Diffuse Shading with Form, YF) to 99% (Pure Texture, T; Overall Vista, V, VF, or FV; Popular, P; Contamination, CONTAM; and Color Projection, CP). Similarly, in the second study, the interscorer agreement across all Comprehensive System variables ranged from 89% (Passive Movement, p; and Diffuse Shading with Form, YF) to 99% (Pure Texture, T; Overall Chromatic Color, C, CF, or FC; Pure Vista, V; Pairs, 2; Popular, P; Contamination, CONTAM; Perseveration, PSV; and Morbid, MOR).

In terms of the variables to be utilized in the present study, the average interscorer agreement was 94.5% in the first study, and 94.9% in the second study. The range of percent agreements are very respectable and indicate that Exner's Comprehensive System can be accurately coded by trained examiners.

Test-retest

Exner (1986) reported that over 30 temporal consistency studies of the Rorschach have been conducted at his Rorschach Research Foundation. These studies, some of which have not been published, have varied in their retest interval (from a few days to 39 months) and the population under study (children, adolescents, adults, patients, and non-patients). A summary of the test-retest reliabilities

for variables relevant to this study are presented in Table 2. All of the data reported in this table come from studies of non-patient adults.

It can be seen that most variables display a remarkably high degree of temporal consistency. This consistency extends even over a three year period, as only eight of the 21 variables have three year retest reliabilities that average less than .79. Four of these eight variables--Pure Form, Animal Movement, Passive Movement, and Achromatic Color--display quite high consistency over time, though they tend to have retest reliabilities in the .70 range.

Two other determinants--Color Form responses (CF) and indices of unmodulated affect (Pure Color and Color Naming, C + Cn)--show more variation over time, with correlations in the .55 to .65 range. In part, the greater variability seen with these determinants may be due to the fact that they are simply discrete aspects of the overall affective continuum. Additionally, of all the variables listed in Table 2, the indices of unmodulated affect have the lowest frequency of occurrence in the records of non-patients (only occurring in approximately 1 out of 10 protocols). Both of these factors would contribute to low retest correlations. With this in mind, if the aggregated score of general affective responding (Sum of Weighted Color Responses, Sum C) is examined it can be seen that there is a high degree of test-retest consistency.

Table 2. Test-retest correlations from Exner (1978, 1986) for selected Rorschach variables over varying time lengths.

Symbol	7 dys (n=25)	3 wks (n=35)	2 mos (n=25)	1 yr (n=50)	3 yrs (n=100)
R	.86	.84	.84	.86	.79
Zf	.88	.89	.81	.85	.83
F	.68	.76	.74	.74	.70
M	.81	.83	.85	.84	.87
FM	.63	.72	.74	.77	.72
m	---	.34	---	.26	.39
a	.91	.87	.82	.83	.86
p	.84	.85	.78	.72	.75
FC	.93	.92	.83	.86	.86
CF	---	.68	---	.58	.66
C + Cn	---	.59	---	.56	.51
CF + C + Cn	.82	.83	.73	.81	.79
Sum C	.85	.83	.78	.82	.86
T	---	.96	---	.91	.87
C'	---	.67	---	.73	.67
Y	---	.41	---	.31	.23
V	---	.89	---	.87	.81
L	.73	.76	.86	.78	.82
Afr	.93	.85	.89	.82	.90
(3r + (2))/R	.91	.90	.85	.89	.87

Note. All subjects were non-patient adults. R = Responses, Zf = Organizational Frequency, F = Pure Form, M = Human Movement, FM = Animal Movement, m = Inanimate Movement, a = Active Movement, p = Passive Movement, FC = Form-Dominated Color, CF = Non-Form-Dominated Color, C + Cn = Pure Color and Color Naming, CF + C + Cn = Sum of Non-Form-Dominated Color, Sum C = Sum of Weighted Color, T = Sum of Texture, C' = Sum of Achromatic Color, Y = Sum of Diffuse Shading, V = Sum of Vista, L = Lambda, Afr = Affectivity Ratio, (3r + (2))/R = Egocentricity Index.

The two determinants that had the greatest variability over all retest intervals--Inanimate Movement (m) and Diffuse Shading Responses (Y)--are both purported to be indices of transient anxiety-like states. Thus, their low retest reliability is in accord with theoretical expectations.

The trait consistency observed in most of the Rorschach variables suggests that they assess consistent stylistic aspects of personality. This is in contrast to other scoring systems for projective measures, such as the TAT. With TAT scoring systems the retest correlations tend to hover in the .35 to .45 range, even over relatively brief retest intervals (see, for example, McAdams, 1982; McClelland, 1980; Stewart, 1982).

META-ANALYSIS OF THE RORSCHACH

Parker, Hanson, and Hunsley (1988) provide data that are pertinent to review at this point, as their data forms a bridge between reliability and validity issues. By culling the Journal of Personality Assessment and the Journal of Clinical Psychology between the years 1970 and 1981 these authors conducted a meta-analytic review of 411 studies which used either the Rorschach, MMPI, or WAIS. Their purpose was to assess the reliability (internal consistency and interscorer agreement), trait stability (test-retest reliability) and convergent validity evidence for these

three measures. The WAIS was selected as a comparison test for the Rorschach and MMPI because "it is commonly considered to be one of the most reliable and valid tests used in clinical psychology" (p. 368).

In terms of validity, the authors differentiated between "convergent validity" studies and "unknown validity studies". Convergent validity studies were those conducted on the basis of a theoretical rationale or previous empirical evidence. Unknown validity studies were those that were conducted without an a priori theoretical or empirical rationale. The Parker et. al findings for studies that utilized a correlational design are presented in Table 3.

From this table several features are worth noting. In accord with traditional psychometric theory, across measures it was found that reliability values were significantly greater than stability values. In turn, stability values were significantly greater than convergent validity values. Finally, the convergent validity values were significantly greater than unknown validity coefficients.

In comparing the three tests, it was found that the average reliability for the Rorschach did not differ from that of the WAIS, though the WAIS reliability was significantly higher than the MMPI. The stability of the Rorschach was higher than that of the WAIS and the MMPI, though these differences were not statistically significant. The convergent validity value for the Rorschach was not signifi-

Table 3. Estimates from correlational statistics of the reliability, stability, convergent validity, and unknown validity for the WAIS, MMPI, and Rorschach. Taken from Parker, Hanson, and Hunsley (1988).

Measure	Estimated *r*	# findings	# subjects
Reliability			
WAIS	.87	12	1,759
MMPI	.84	33	3,414
Rorschach	.86	4	154
Stability			
WAIS	.82	4	93
MMPI	.74	5	171
Rorschach	.85	2	125
Convergent Validity			
WAIS	.62	26	3,441
MMPI	.46	30	4,980
Rorschach	.41	5	283
Unknown Validity			
WAIS	.33	15	2,594
MMPI	.24	51	7,949
Rorschach	.07	12	1,158

Note. WAIS = Wechsler Adult Intelligence Scale; MMPI = Minnesota Multiphasic Personality Inventory.

cantly different than the value for the MMPI, though the WAIS convergent validity value was significantly greater than both of the others. Finally, in terms of the magnitude of results from studies conducted without a theoretical or empirical rationale, the WAIS was significantly higher than the MMPI, which in turn was significantly higher than the Rorschach.

These authors also found comparable convergent validity findings from studies that utilized an analysis of variance design or a t-test design. However, the proportion of variance that could be accounted for in these studies tended to be less than that found in correlational designs because these statistics are less powerful.

The overall thrust of this meta-analysis is twofold. First, it indicates that the Rorschach is generally as reliable a trait measure as the WAIS and MMPI. This adds to the impressive interscorer reliability and test-retest reliability presented earlier. Second, it indicates that Rorschach studies conducted on the basis of a sound theoretical or empirical rationale can be expected to yield quite acceptable evidence of validity.

This is all well and good. However, a disturbing factor apparent in Table 3 is that most of the Rorschach correlational studies were conducted without a clear theoretical or empirical rationale (5 with and 12 without). This problem also plagues the MMPI, though not to as great

an extent. Parker et. al., (1988) indicated that an additional eight Rorschach studies with a sound theoretical or empirical rationale were conducted utilizing a t-test or ANOVA design. However, the authors did not indicate how many studies utilizing these mean difference designs were conducted without a rationale. It may be surmised that there were a great many, as frequently Rorschach studies simply look at mean differences on a variety of Rorschach variables across different patient groups--without clear hypotheses about the way the data should behave. This is unfortunate because Table 3 indicates that little of value is obtained with research of this variety.

The morass of Rorschach research is further confounded by the fact that different studies utilize different scoring systems. This often makes cross-study comparisons difficult, if not impossible. I have attempted to circumvent some of this problem by focusing solely on Exner's Comprehensive System for scoring and interpreting the data variables. Theoretically, since Exner's system purports to utilize the best features from each of the previous systems of Rorschach scoring (e.g., Beck, Hertz, Klopfer, Piotrowski, and Rappaport, Gill, and Schafer), and since Exner's system is the most psychometrically grounded, this system should provide the best test of the Rorschach's validity. The drawback of this, however, is that much of Exner's data remains unpublished, or non-refereed (in his

books), and somewhat sloppy or contradictory when it is published. These issues will be taken up again in more detail after the interpretive evidence for each of the variables relevant to this study are reviewed.

VALIDITY EVIDENCE FOR SPECIFIC RORSCHACH VARIABLES

In this section I will utilize Exner's texts (1976, 1978, 1986) to review the interpretive validity evidence for variables relevant to this study. Unless specifically noted, the information presented below comes from Exner's most recent text (1986).

LOCATION SCORES

Whole Responses (W). W is purported to measure one's ability or willingness to organize the potentially complex components of the environment into a meaningful concept. Exner reviews very little research conducted on any of the location variables. However, of the research that is reviewed, most focused on the Whole Response. Initial research efforts on this variable tended to focus on its relation to intelligence. Early studies reported a significant correlation between Whole Responses and measures of IQ. However, later data tended not to support this position, at least with general measures of IQ. Exner, without convincing data, argues that the relationship between W and intelligence is mitigated by the Developmental Quality of responses. Obviously, the interpretive evidence for this variable rests primarily on logical deductions rather than empirical evidence.

Common Detail Responses (D). D is purported to measure the ability to react to the "obvious" characteristics of the environment. If one gives predominantly D

responses it is suggested that the individual is preoccupied with the "obvious" and is reluctant to test out the full potential of his or her resources. The only evidence presented on this variable came from contrasted group studies. It has been found that depressed and schizophrenic individuals give lower proportions of Common Detail responses than outpatients or nonpatients. Further, it has been found that schizophrenics give significantly more D responses after a remission of their disorder. This evidence, taken together, was interpreted as demonstrating that distress and disorganization due to pathology causes an inability to be economical in approaching the world. The data, however, leave much to be desired.

Unusual Detail Responses (Dd). A high frequency of Dd is purported to measure: 1) a retreat from the ambiguities of the environment, 2) an obsessive approach to the world, or 3) a form of perfectionism. Evidence for this variable is again scanty, and the results of only four studies are presented by Exner. It has been found that Dd is significantly higher in male paretics compared to nonpatients, female prostitutes shortly after their arrest, and in subjects who had consumed substantial quantities of alcohol. Finally, it was reported that Dd is related negatively to "external adjustment" but positively to "internal adjustment". These four studies hardly lend conclusive support to the three interpretations of the Unusual Detail response.

Space Response (S). S is purported to measure oppositional tendencies of either healthy assertiveness, or, as S becomes more elevated, it is seen as representing a trait-like feature of the personality that "can easily give rise to hostility or anger when autonomy is threatened" (Exner, 1986, p. 383). Evidence for this interpretation of the Space response has not been entirely consistent. In accord with hypotheses, S has been found to increase after "hypnotically inducing conflict", and a significant positive correlation has been found between this variable and scale 4 of the MMPI. Space responses have also been found to occur most frequently in the records of paranoid schizophrenics. This group of subjects, along with adolescent conduct disorders, borderline personality disorders, inpatient depressives, and neurologically impaired children with marked learning disabilities, are the only criterion groups found to have four or more Space responses in more than 15% of their records.

While it is consistent for S to be elevated in adolescents with conduct disorders, and perhaps even in borderline and depressed patients, it is not at all clear why this variable should be higher for neurologically impaired children (unless it is argued that learning disabilities lead to greater frustration and then to greater hostility). Given the interpretation of the Space response, it is also unclear why nonpatient adolescents have a lower frequency of

this response and why "hysteroids" have a higher mean on this variable (when compared to nonpatient adults). In summary, it appears that some evidence is present for the interpretive validity of the Space response, though it is hardly conclusive.

ORGANIZATIONAL ACTIVITY

Organizational Frequency (Zf) and Organizational Efficiency (Zd). Organizational Frequency is interpreted as cognitive energy that utilizes one's capacity for analyzing and synthesizing the environment in a careful and precise manner. Organizational Efficiency is an extension of Zf and is considered to reflect a cognitive style. High Zd scorers are referred to as "overincorporators" and are purported to have a ruminative, deliberate, cautious, and "well thought out" response style. Low Zd scorers, on the other hand, are referred to as "underincorporators" and are purported to have a style of scanning the environment quickly, responding impulsively, and potentially missing critical bits of information in complex stimuli. Almost no research was conducted on these variables prior to Exner's Comprehensive System. Since Organizational activity is scored when two or more parts of the ink blots are integrated in a response (signaling Developmental Quality Scores of "+" or "v/+") it is not surprising that Zf correlates significantly with the sum of DQ+ and DQv/+ ($r = .42$). More interesting research

is presented on the Zd variable, however.

It has been found that during a "Simon Says" game children who are underincorporators (Zd scores below -3.0) made significantly more errors than children in the middle range of Zd scores, while overincorporating children (Zd scores above 3.0) made significantly fewer errors than the children in the middle range. Similarly, 14 of 15 children who were diagnosed as "hyperactive" and who had abnormal EEG patterns were found to be underincorporators. Underincorporators have also been found to be more likely to guess about movie titles, book titles, and proverbs when only parts of words are displayed. Additionally, underincorporators have been found to 1) make more errors in a timed administration of the Minnesota Paper Form Board, 2) retrace their visual scanning paths more frequently when looking at a target face for 750 milliseconds, and 3) tend to overestimate the passage of time when seated in a darkened room. In contrast, overincorporators have been found to underestimate the passage of time, and to take longer to complete Form B of the Trail test. These data are all fairly consistent and support the interpretation placed on the Zd variable.

DETERMINANT SCORES

Lambda (L). Exner (1978) has suggested that a high Lambda score indicates the tendency to avoid the complexities of a stimulus situation when the consequences of a

response are not predictable. Further, he (1986) has noted that a high Lambda score reflects a deliberate, conscious thought processing style that is a form of affect delay. In support of this interpretation he cited a number of developmental studies and contrasted group studies. The developmental studies reported that Lambda was higher in children and tended to decrease as age increased. Lambda also increased under intoxication and was higher in alcoholics than "psychopaths". This data, while potentially supporting the proposition that high Lambda indicates a tendency to avoid the complexity of a stimulus situation, all runs counter to the notion that Lambda reflects a form of affect delay. Other evidence is only slightly more supportive. It was found that paranoid schizophrenics have higher values on Lambda than other schizophrenic groups, and several studies have found that this index tended to be higher for schizophrenic patients at discharge than at admission. In summary, the interpretive evidence for Lambda is not very compelling.

Human Movement (M). With regards to Human Movement, Exner notes that this has probably been the most researched of all Rorschach determinants. However, he cautions that it is often inappropriate to look at this determinant in isolation, as much research does, since it is a complex and multi-faceted variable. Exner believes that the multi-faceted nature of M has led to most of the inconsistency in

the research surrounding this variable. The human movement response is interpreted as an active or deliberate (but not necessarily conscious) form of ideation that acts as a delay process to keep the individual from yielding to more spontaneous impulses or responses. In this regard, it appears conceptually similar to Lambda. However, the correlation between these two variables has been in the negative .20 range (see Exner et. al. 1984; Mason et al. 1985).

A number of studies have examined the relationship between M and intellectual operations. Early studies focused on a significant positive correlation between M and IQ scores. However, more recent large sample studies conducted by Exner have not found a significant relationship between these two variables. Instead, a significant positive relationship has been observed between Human Movement responses and the frequency of organizational activity (Zf) in a Rorschach protocol (correlations range from .31 to .43). M has also been associated with abstract thinking capacities, creativity, and the Jungian dimensions of intuition and perception, though a number of conflicting findings have been reported in regards to M's positive association with creativity.

It is clear that Human Movement responses become more frequent as children age, which suggests developing cognitive operations are involved in the production of M. A

number of studies have also found that the frequency of M is positively related to daydreaming and fantasy production. Further, sleep or REM deprivation causes an increase in Human Movement responses, and M is positively related to reaction time delays in the Rorschach. All of this data is suggestive of a relationship between human movement responses and ideational capacities or needs.

A variety of studies have examined the relationship between M and kinesthetic activity, under the assumption that human movement responses on the Rorschach may be related to motoric movement. Some studies have reported significant increases in M when motor activity has been inhibited, though all types of movement responses tend to increase in these situations.

Finally, the evidence from studies of contrasted groups has only been somewhat supportive. The frequency of Human Movement responses is higher in patients who are hallucinating than in patients who are delusional but not hallucinating. This variable is also higher in paranoid schizophrenics with interpersonal delusions than in paranoid schizophrenics with somatic delusions. Additionally, M is higher in manic patients and lower in depressed patients. All this data is somewhat, though not clearly, supportive of the notion that human movement is related to ideational activity.

Animal Movement (FM). The animal movement response is

interpreted as a less mediated response to internal impulses than the M response. It is believed to reflect what is often an urgent, unmet need press. For evidence of this interpretation, Exner reviews the results of seven of his own studies, and a handful of studies conducted by other authors. Exner has reported that FM is significantly higher in two groups. The first of these was a group of juvenile offenders retested after sixty days of a confinement which was to last for an "indeterminate period" of time. As expected, the retests showed a significant increase in Animal Movement scores. The second group was a sample of volunteers who were physically bound to chairs with 32 leather straps for as long as they could tolerate. It was reported that the only type of movement the confinement left room for was the blinking of eyelids and wiggling of toes. These subjects were tested a week prior to the confinement and again immediately prior to their release. As theory would predict, Animal Movement was significantly higher at the second testing than the first. Both of these studies suggest that the FM variable may be related to unmet inner needs.

In a separate study, FM was also found to be significantly and positively correlated with a need for achievement measure in a sample of medical students tested just prior to their first anatomy exam (rho = .41). Exner also reported the following in support of the interpretation placed on

Animal Movement: there was a non-significant increase in the number of FM responses for a sample of obese hospitalized weight-loss patients after 10 days of receiving only fluids to eat; a slightly higher mean was found for 480 conduct disorder adolescents when compared to nonpatients; a greater frequency of FM was found in the discharge records of patients who eventually were re-hospitalized; a greater frequency of FM was found in the records of "low level" heroin addicted prostitutes when compared to a matched sample of non-prostitutes; and a greater frequency of FM was found in the records of adolescent chronic amphetamine user when compared to adolescent chronic marijuana users.

To summarize, from Exner's own work there is some supportive evidence for the FM construct, though a greater proportion of the studies reported non-significant results, and the last two studies reviewed have an ambiguous, at best, relation to the construct.

Other researchers have reported that FM is significantly correlated with measures of defensiveness, irresponsibility, aggressiveness, distractibility, assaultive behavior, and scale 8 (schizophrenia) of the MMPI; all of which do not clearly suggest that Animal Movement responses indicate unmet need presses.

Inanimate Movement (m). Interpretatively m is considered to reflect transient experiences of stress where the subject feels disrupted, distressed, and out of control.

Research has been fairly uniform and supportive of this position. A number of studies have focused on establishing a baseline measure for subjects and then retesting them just prior to or during a stressful event. These stressful events have included a severe storm for 20 Israeli seamen, the first ECT treatment for 20 inpatient depressives, the first jump for 20 Army paratroopers, elective surgery for 25 patients, and the ninth month of long-term psychotherapy. Across each of these stressful situations the number of inanimate movement responses increased in Rorschach protocols. Additionally, several of these studies included follow-up retests, all of which uniformly indicated that the level of m returned to the pretest range after the stressor abated. The low retest correlations obtained with m also support the interpretation that this variable reflects transient, state-related processes.

Active or Passive Movement (a; p). The type of movement which predominates in a Rorschach protocol is believed to indicate the style of ideational fantasy that an individual will adopt when encountering adjustment difficulties. Exner also believes that when the ratio of a:p or p:a exceeds 3:1 there is evidence for a cognitively constricted or rigid style of thought.

Little research is reported on this variable. However, the data available is consistent with the above interpretations. In terms of cognitive flexibility, one study found

that subjects with a strong imbalance in this ratio were less able to think of uses for eight household items in combination with each other (keys, toothpick, golf tee, etc.). A second study utilized paid female subjects and had them record daily ten minute daydream fantasies. The type of activity for the protagonist of each of these daydreams was then rated. It was found that the subjects with balanced movement ratios had fantasies where the protagonists were both active and passive and tended to shift their activity within a particular daydream. In contrast, the subjects with a:p ratios that were greater than 3:1 in either direction--indicating a rigidity of activity--had more daydreams where the protagonist's activity was in the same direction as their Rorschach protocols, and the protagonists tended not to shift their mode of action within a daydream.

Finally, Exner reports that there is no stable evidence for direct behavioral correlates of active movement. He believes this is primarily because most subjects tend to have more active than passive movement scores. However, in a study of outpatients and in a separate study of assertiveness training subjects, it was found that subjects with more passive than active movement responses were rated as behaviorally more passive by therapists or blind videotape observers.

Color (C). Color responses are seen as indices of

positively toned emotional excitability. Exner notes that a great deal of research on the color response has focused inappropriately on the so-called "color-shock" hypothesis. This hypothesis posits that some subjects have a startle reaction to the "affectively laden" colored inkblots (cards VIII, IX, and X). The color-shock hypothesis has not generally been born out in research, primarily because the startle reaction has been observed with the same blot figures represented in achromatic color. This suggests that it is the complexity of the stimuli, not the color per se, which causes this "startle" phenomenon.

Exner cites reviews that conclude color responses are associated with passivity and the absence of cognitive delay processes, though he does not cite specific data in this regard. However, some developmental data on Color is presented. The results appear fairly consistent and indicate that young children typically respond to the blots with pure color responses. As development occurs, color responses tend to become increasingly dominated by form and by adulthood most color responses are form-dominated. It is this type of data which is used to support the notion that non-form-dominated color responses are more indicative of unmodulated affective responding than form-dominated responses. Other evidence supporting this contention has come from research which demonstrated that non-form-dominated color responses are correlated with measures of impul-

siveness or aggressiveness and occur with a greater frequency in subjects who do not delay responses to a problem solving task. Conversely, it has also been found that form-dominated color responses occur with a much greater frequency that non-form-dominated color responses in affectively inhibited psychosomatic outpatients.

Instead of examining the differences of form- and non-form-dominated color responses, some research has focused on the weighted sum of all color responses. Evidence has shown that subjects who are higher on this variable are more hypnotizable, more likely to alter their judgments to conform to the judgement of an experimental confederate, more likely to utilize words related to the environment, and more likely to score higher on Zuckerman's measure of sensation seeking (rho = .48). All this evidence is consistent with Exner's interpretation of the color response, and with the notion that Color represents the high end of the extraversion/PA dimension. The correlation observed between color and sensation seeking is particularly striking in this regard.

The Erlebnistypus (EB). A greater proportion of research has focused on the Human Movement or Color responses in isolation than in conjunction with each other in the EB. However, some evidence related to the EB is available. The EB is the ratio formed between the number of M responses on the one hand, and the sum of weighted color

responses on the other hand. When M predominates, the individual is considered introversive and is seen as more cognitively ideational, inwardly focused, deliberate, and reflective in his approach to the world. When a protocol is dominated by color responses, the individual is referred to as extratensive. Extratensives are posited to respond with an emotional mode of coping, including affective discharge, and are seen as "doers" who rely more on external feedback in decision making processes than introversives.

Rorschach first conceived of the EB as a constitutionally grounded response preference. With adults, the introversive or extratensive response style does seem to be quite stable over time. In his retest studies Exner has found that only two of 77 subjects changed their preferred response style over a three year period, while, in a different sample, only one of 39 subjects changed response style over the course of a one year period.

However, the same picture does not emerge as clearly in studies of children. Children tend to be predominantly extratensive, and the EB style tends to vary considerably over time. This evidence does not suggest that there is a clear genetic predisposition for EB response styles. However, this criticism of Rorschach's original postulate is mitigated somewhat by the finding that children who develop an introversive style by the age of eight remain consistent with this style at least through the age of 14 (after which

data is not available). Thus, while the EB does not appear to be a trait that is manifested from birth onward, normal adults display a clear preference for one style or the other and markedly introversive children tend to remain so, at least through early adolescence.

Theory suggests that the introversive and extratensive styles should both be adaptive styles of coping with the environment, though operating in different ways. One line of evidence which supports this position is the fact that more than three fourths of non-patient adults have a clearly preferred EB style, while schizophrenic, depressives, and character disorders have a much higher proportion of ambitents--or individuals without a clear coping style.

In one study on the EB, Exner and his associates found that introversives performed as well as extratensives in a problem solving task. However, there were clear differences in the problem solving strategy adopted by these two groups of subjects. The introversives delayed the most and made the fewest number of overall responses prior to reaching the correct solution. This suggested that they clearly surveyed the task prior to responding. The extratensives, on the other hand, made more responses with less delays, although they reached the final solution in the same amount of time.

In a similar vein, another study found that both introversives and extratensives performed equally well on a cognitive task when the environment was quiet. However,

background noise interference disrupted the performance of extratensives, suggesting that they were more attuned to the external environment than introversives.

It is interesting to note that this finding is in accord with Rorschach's and Exner's understanding of the extratensive, but it is the opposite of what Eysenckian theory would predict for an extravert. In Eysenck's theory the introvert, not the extravert, should be most disturbed by commotion in the environment because of the greater level of arousal in his nervous system (see Geen, 1984). Despite this theoretical discrepancy, Exner has also found that a sample of 100 outpatients with "hysteroid features" contained 54 individuals with extratensive styles, and only eleven individuals with introversive styles. This directionality is what would be predicted theoretically by both Exner and Eysenck.

Exner and his associates conducted a recent study to assess the hypothesis that extratensives are more likely to utilize interaction with the world as a source of information and gratification than introversives. In this study 15 introversive and 15 extratensive college students were videotaped during seven minute structured interviews. Supporting the hypothesis, it was found that the extratensives displayed significantly more postural-gestural behaviors (leaning forward, hand gestures, etc.) than introversives when the videotape interactions were scored by

three blind reviewers.

Finally, Exner (1986) also presents data which he interprets as indicating that introversive subjects attempt to exert greater control over their emotional responding than extratensives. However, he makes this interpretation from two studies which found that heart and respiratory rates were more variable for introversive subjects than extratensive subjects during a cognitive problem solving task. In this situation, the criteria, in my mind, do not seem to be clearly related to the interpretation placed on them.

Affective Ratio (Afr). Interpretatively, Exner suggests that the Affective Ratio is a stable stylistic variable which involves receptiveness to emotional stimuli or a proneness to cognitively process emotional stimuli. Only a handful of studies have been conducted on this variable, and the data they provide on the interpretive significance of the Affective Ratio are hardly conclusive. It has been found in a nonpatient adult sample that the mean of the Affective Ratio is significantly lower in introversive subjects than extratensive subjects, and that ambitents have a mean which falls between each of these two groups. This suggests that an emotional responsiveness is being indexed in the Afr. The same patterning, without significant differences, has been observed in outpatient groups where introversives have the lowest mean, extratensives the

highest, and ambitents fall in the middle range.

However, with outpatients, the introversive and extratensive groups tend to be markedly bimodal on the Affective Ratio. This fact, combined with the fact that the Afr has been found to occur with significantly higher values in subjects who have difficulty expressing emotions (as measured by the frequency of Achromatic Color responses on the Rorschach) has led Exner to conclude that the variable reflects a cognitive processing of affective stimuli, which may be distinct from the expression of affect. Again, the data leaves much to be desired.

Achromatic Color (C'). Interpretatively, achromatic color responses have been seen as a form of affective constraint or a hesitancy to openly and directly express emotional experiences. This affective constraint may be accompanied by discomfort or tension. It has been found when comparing diagnostic groups to a normative sample of nonpatients that the C' responses occur less frequently in the records of "character problems", twice as frequently in depressive, obsessive, psychosomatic, and schizoid records, and three times as frequently in passive-aggressive and "psychopathic" records. This data tends to confirm the notion that C' represents a form of affective constraint.

In contrast, however, Exner has also found in a sample of first admission affective disorder patients who had been placed on suicide watch that C' occurs less frequently in

the records of subsequent suicide attempters than non-attempters. Achromatic Color responses have also been found to occur significantly more frequently in a sample of adolescents evaluated for "acting out" offenses, when compared to a nonpatient sample of adolescents. Exner interprets these data as supporting the notion that C' indicates affective constraint. However, to me, these data appear contrary to what would be hypothesized.

Texture (T). A preponderance of T responses are interpreted as strong interpersonal strivings, possibly in response to loneliness, and possibly indicative of dependency. An absence of Texture in a protocol is interpreted as emotional isolation, interpersonal impoverishment, and concern over defining interpersonal space.

The experimental data on Texture has been fairly consistent and orderly in supporting the interpretation of this variable. Approximately 90% of all nonpatients give one Texture response in their protocol. Texture has been found to be higher in children with restrictive (versus democratic) or overprotective (versus rejecting) mothers. In some of his own work, Exner has found that Texture responses are more frequent in a sample of recently divorced or separated adults, a sample of children who were recently orphaned and placed in foster homes for the first time, and first admission depressed patients who reported having a transitional object in childhood (as compared to first

admission depressed patients who reported no transitional objects). The absence of T responses has been observed in children with extensive transient foster home experiences, and in children who had experienced an absent parent prior to the age of eight. Texture has also been related to the seating distance and tendency to speak to an experimental collaborator when subjects are in a waiting room setting. Subjects with no T in their Rorschach records sat further away and rarely spoke to the collaborator. Interestingly, it has also been found that subjects who were without Texture in their protocols had an increase in these responses after six to nine months of therapy, regardless of the type of therapy.

Vista (V). Interpretatively, Vista responses are seen as representing discomfort or pain that is the result of ruminative and negatively toned self-evaluations. Only a handful of studies have been conducted on this variable, though all of the data appears convergent and supportive of its general interpretation. Evidence has shown that Vista responses are very rare in childhood, though they increase in frequency beginning in early adolescence. Vista responses are also much more common in the records of severely depressed inpatients (occurring in 80% of the records) than in the records of normative nonpatients (27% of the records), Character Disorders (17%), and schizophrenics (33%). It has also been found that V responses occur with a greater

frequency in stutterers, in alcoholics compared to "psychopathic personalities", in subjects after six months of uncovering psychotherapy, in subjects who make suicidal gestures within 60 days of testing, and in subjects who commit suicide within 60 days of testing. While almost all of this data comes from contrasted group studies, it does support the notion that Vista represents a painful introspection.

Diffuse Shading (Y). Interpretatively, the Y variable is seen as a state-related index of anxiety, tension, or uneasiness that is caused by a sense of helplessness or loss of control. This variable is, therefore, similar to m, and like m, the retest correlations for Y indicate that it is in fact state-related. However, the interpretive validity evidence is much more contradictory and mixed in the case of Y. A number of naturally occurring stress studies have indicated that Y, like m, is elevated under stress conditions. This has been found with first year medical students prior to their first anatomy exam, with cardiac patients who knew they were at risk for an additional infarct, with elective surgery patients prior to surgery, and with long-term therapy patients after nine months of treatment. A few studies have also reported increases in Y when anxiety has been induced in a laboratory setting. Additionally, Y has been found to be significantly higher in patients who have been admitted with Acute Post-traumatic Stress Disorder than

two to three weeks post admission.

While all this evidence is supportive, numerous studies of both induced and naturally occurring stress have contradicted the "shading equals anxiety" hypothesis, and no evidence has been found that Y is related to self report measures of anxiety. The latter finding is not necessarily damaging, given the different domains of personality that may be being sampled with Rorschach and self-report measures. However, the studies of induced or naturally occurring stress that found no relationship, or even opposite relationships, between stress and Y cast doubt on the fidelity of this variable.

Form Dimensionality (FD). This variable is interpreted as a non-emotional introspective process where the individual takes a distancing, objective view of the self. This variable was developed by Exner after he noticed that this type of response tended to occur frequently in a sample of outpatients engaged in psychotherapy and in a sample of subjects who had been placed on a suicide watch. Subsequent studies have tended to bear out the interpretation placed on this variable. It has been found that FD is significantly higher in introversive as compared to extratensive subjects (across patient and nonpatients). Additionally, a sample of wait-listed subjects seeking psychotherapy were split into two groups on the basis of Form Dimensional scores. These subjects were then videotaped during a group designed to

focus on plans and objectives for treatment. The subjects high on FD were found by blind raters to give significantly more self-directed statements and significantly more statements focusing on the past and present than subjects low on FD. Additionally, FD has been found to increase over the course of psychotherapy and to decrease after termination. Finally, FD correlated significantly with therapist ratings of subject's "self-awareness" at the tenth session of therapy (r = .37).

Egocentricity Index (3r + (2)/R). It is suggested that the egocentricity index represents a measure of psychological self-focusing or self-concern. When this index is high it is purported to indicate a self-centeredness that overestimates personal worth. A low Egocentricity Index is believed to represent a negative self-esteem that is associated with depressive experiences. The scoring for this variable began "fortuitously" with Exner in the late sixties. In two studies it was found that the variables comprising this score were higher in groups of homosexuals and antisocial characters than in depressives or normals.

Based on this evidence, it was proposed that these determinants indicated over-involvement with the self. To test this hypothesis further, two additional studies utilized the Rorschach and responses from a sentence completion test. When split into extreme groups on the basis of whether responses on the SCT referred to "self" or

"other", it was found that the group with the high number of "self" responses had a much greater frequency of pair and reflection responses. This finding held for both studies, though significance tests were not reported. Subsequent research was then conducted on the egocentricity variable with applicants for an engineering position. It was found that applicants who spent more time viewing themselves in front of a mirror prior to their interview had significantly higher scores on this index than applicants who spent little time doing this. Similarly, a significant correlation (rho = . 67) was found between the number of personal referents (I, me, my) used during the applicants' transcribed interviews and their egocentricity scores.

Evidence that the egocentricity index decreases over the course of childhood development is also used to support the notion that the index relates to self-involvement, as children, more so than adults, are viewed as self-centered. However, it appears that either end of this index can relate to self-involvement, as this scale is higher than average in performing artists and theatrical dancers, while it is low in the protocols of subjects with obsessive styles (obsessive-compulsives, depressives, phobics, and psychosomatics), the records of effected adult suicides, and in subjects who view themselves as being far from their ideal self. The data reviewed appear fairly consistent with the interpretation put forth for this variable.

Shading Blends. Responses which incorporate more than one of the shading determinants (C', V, Y, or T) are seen as indicating a tormented negative affective experience. Exner reports that these responses are very rare, occurring only twice in the records of 600 nonpatient adults, not at all in a sample of character disordered subjects, and very rarely in schizophrenic protocols. However, these types of blends have been found to occur more frequently in the records of depressed subjects and the records of first admission inpatient substance abusers. This is the only data presented on the nature of this variable.

Color-Shading Blends. Blends of color and shading are purported to reflect a mixed or confused emotional experience, possibly indicative of ambivalence. These blends occur much more frequently than simple shading blends, appearing at least once in 42% of the 600 adult nonpatient protocols. This frequency, however, is again much higher in depressive samples (occurring in approximately 70% of the records) and in the records of subjects who have attempted or completed suicides. This is the limited data available on this variable.

Morbid Responses (Mor). This variable is interpreted as reflecting either a negative view of self, or a pessimistic outlook on the world and the self within that world. Relatively little research has been conducted on this variable. In support of theory, this variable shows the

greatest frequency of occurrence in the records of depressed patients, for both adults and children. In addition, an elevated number of Morbid responses have been related to the increased probability of an effected suicide. As would be expected, Morbid Responses have also shown a significant negative correlation with the Rorschach egocentricity index (-.41) which is purported to measure a self-centeredness that tends to overestimate personal worth. However, Morbid Responses also occur with a much greater frequency in children's responses than adult's, and there is no explanation for why this is the case.

In summary, there is fairly consistent evidence to support the interpretation of Zd, m, active to passive movement, C, T, V, FD, the Egocentricity Index, and Morbid. There is more mixed or little available evidence for the interpretation placed upon W, D, Dd, S, M, FM, C', Y, Shading Blends, and Color-Shading Blends. Finally, there is a fair amount of contradictory evidence for Lambda and the Affective Ratio.

GENERAL RORSCHACH VALIDITY ISSUES

Problems with contrasted groups

It was seen that the Rorschach variables to be used in this study vary in the degree to which experimental evidence validates their interpretation. A great portion of the ambiguity surrounding some variables is a direct result of the fact that contrasted diagnostic groups have been used for hypothesis validation. While this sort of approach can provide initial clues to the underlying processes that a Rorschach variable may measure, it is a very unrefined form of measurement as so many qualities can vary across diagnostic categories.

In addition, it can be surmised that many of the contrasted group studies were conducted without a priori hypotheses about what variables should differ across groups. This "panning for gold" method is often only interested in discerning if any differences emerge, regardless of whether the differences are interpretable in light of any theory.

Finally, another problem with much of the contrasted groups data just reviewed is that only selective differences can be discussed. Many Rorschach variables may show differences across diagnostic groups, but the fashion in which Exner presents his data leaves open the question of what else in a protocol changed over the groups. In other words, only selective data is presented in any of Exner's validity sections. This problem is not specific to Exner's

research, as a perusal of the literature reveals that most studies present only selected bits of data out of the broader number of variables that were under investigation.

The problem of response frequency

One of the most important factors which may influence whether or not significant differences are observed on Rorschach variables across two or more groups is the average number of responses given within a particular group. Since Rorschach data is frequently evaluated in terms of mean differences, it is important to know the impact of response frequency on the frequencies of scoring categories. In fact, one of the most consistent findings in Rorschach research is that response frequency is highly correlated with many rorschach determinants (e.g. Fiske & Baughman, 1953). This makes sense because there is a part-whole relationship between many scoring categories and total R. For example, the sum of the location scores W, D, and Dd must equal R. Given this, it is not surprising to find that R has consistently correlated with some location scores, determinants, and content categories. For example, response frequency has correlated with: D, F (pure form), and the number of content categories in the .8 to .9 range; Dd in the .7 to .8 range; and M, FM, T, V, and Y in the .5 to .7 range (see Consalvi & Canter, 1957; Cox, 1951; Lotsof, Comrey, Bogartz, and Arnsfield, 1958; Shaffer, Duszynski, &

Thomas, 1981; Williams & Lawrence, 1953, 1954; Wittenborn, 1950a, 1950b). As Cronbach (1949) has pointed out, with this degree of relatedness between R and other Rorschach scores, it makes little sense to test the differences in means on scoring categories unless the mean number of responses is also equated.

How to contend with the problem of response frequency has been debated considerably in the Rorschach literature. Some researchers have argued that R is a statistical artifact that biases response categories and therefore must be controlled for--like word frequency in some TAT scoring systems (e.g., Cronbach, 1949; Glickstein, 1959; Shaffer et al., 1981). Others have argued the opposite position, stating that R is the result of determinant use (where high determinant use causes high R) and therefore reflects an important individual difference variable in its own right. From this perspective Wittenborn (1959) argued that R should not be controlled for in the Rorschach data any more than total IQ scores should be controlled for in a correlation matrix of intelligence subtests.

Contending with response frequency becomes a very salient issue when factoring Rorschach data, because if R is not controlled in some fashion it becomes the defining feature of the first and/or second factor extracted from the correlation matrix. If this first factor or two is considered biased then it can be thrown out, but if response

frequency is considered an important individual difference variable it must be interpreted in some fashion.

Even within the group of researchers who argue that R constitutes bias and should be controlled for, there is little agreement as to what is the best technique for controlling R. Cronbach (1949) suggests several options. The first is to score only a certain number of responses to each Rorschach card. This approach is one of the defining features of the Holtzman inkblot technique (Holtzman, Thorpe, Swartz, & Herron, 1961), and has been used in several factor analytic investigations of the Rorschach (e.g., Haggard, 1978). The second approach is to analyze subgroups which are equated on their number of responses. This procedure is clearly appropriate for tests of mean differences, but it is of little aid in factor analytic research. The final procedure suggested by Cronbach is to transform all scores and analyze the resulting normalized profile of scores. This procedure has been utilized by several investigators undertaking factor analyses of the Rorschach (e.g., Consalvi & Canter, 1957; Haggard, 1978; Schori & Thomas, 1972), particularly because these normalized scores also compensate for some of the difficulties involved in correlating highly skewed distributions--the state of many of the Rorschach scoring categories.

Some investigators have tried to step around the problem of response productivity in their factor analyses of

Rorschach scoring categories by simply eliminating R from the correlation matrix (e.g. Borgatta & Eschenbach, 1955; Coan, 1956; Stotsky, 1957). However, this does not diminish the impact of response productivity, as R still impacts the observed relationship between other variables left in the matrix and it still results in the appearance of a "response productivity" factor (see Borgatta & Eschenbach, 1955).

Another approach to controlling for response frequency in factor analytic solutions has been to make all scoring categories simply a ratio of R (e.g. W%, Dd%, M%, etc.; see Adcock, 1951; Geertsma, 1962; Wishner, 1959). This procedure has also been used commonly when testing for mean differences across groups. However, this approach has been termed "indefensible" by Kalter and Marsden (1970) because it 1) creates an entirely new variable (the percentage) that differs in interpretation from the original and that may still be significantly correlated with R, and 2) the sign and magnitude of the correlation between the percentage and some third variable depends on the rate of change in the original variable relative to the rate of change in R across all subjects.

As a solution to this problem Kalter and Marsden advocate a complicated procedure where the "pure" effects of response productivity--independent of the correlation between R and a Rorschach score--are partialed from the data. What this means is that instead of partialling the

effects of R from all variables in a matrix, what is partialed is the effects of R minus the variable it is correlated with. For example, R minus Dd is partialed from all Dd scores, then R minus D is partialed from all D scores, then R minus F is partialed from all F scores, and so on. Once this is completed for all variables with a significant part-whole correlation, the partialed variables are intercorrelated. The authors believe this corrects the "rate of change" problem.

Kalter and Marsden do not advocate simply partialling the effects of R from all variables, because they believe this assumes that the variance shared by R and another Rorschach variable can be attributed solely to R. This assumes that R causes variability in other Rorschach variables. They rightly believe that if we assume R causes this correlation then we contradict the dictum that correlation does not equal causality. However, their resolution of the response productivity dilemma (partialling R minus the variable from the variable) makes the same assumptions about causality, though in a slightly more complicated form.

Partialling the simple effects of R has been advocated by a number of authors for several reasons. First, it is a relatively simple procedure. Second, it leads to much more normalized distributions of the resulting partialed variables. Finally, it appropriately makes the average correlation of a matrix of Rorschach variables nearer to zero,

rather than nearer to .3 or .4 as is otherwise the case (Glickstein, 1959; Shaffer et al., 1981; Slemon, Neiger & Quirk, 1965).

The unfortunate consequence of partialling R or using any of the other techniques for controlling R--with the possible exception of using percentages--is that it makes the results of the study interesting for research purposes, but impractical for clinical use. For example, determinant scores with R partialed have no companion on a Rorschach summary sheet. The same is true for scores that have been partialed with "R minus the score", and for normalized scores. Likewise, if results of a study are only applicable to subjects with a particular range of scores, the results will have little application to clinical practice. Finally, many clinicians are only interested in the Rorschach because it is such an ambiguous task. To suggest that only a certain number of responses be elicited or scored for each card would seriously compromise the unstructured nature of the test and would likely not be adopted by practicing clinicians. Given this, all of the procedures suggested for controlling R in research--with the possible exception of percentages--would be of little value to the practicing Rorschach clinician.

This situation has led Wittenborn to lament that "one has the unhappy choice of studying the Rorschach 'as it is' (not controlling for R), of studying it 'as it isn't'

(controlling for R in some fashion), or of ignoring it altogether" (1959, p. 77).

An ideal resolution to this dilemma, from my perspective, would be to find out if the factor structure of the Rorschach studied "as it is" is consistent with the factor structure of the Rorschach studied "as it isn't". Using percentages of scores is perhaps the best solution for controlling for R for the practicing clinician, since this procedure is already used frequently for a number of summary variables. However, utilizing ratios for correlational analyses is fraught with psychometric difficulties of nonlinearity and non-normality. On the other hand, partialling the simple effects of R seems to be a good psychometric solution to the response productivity dilemma, even though it is studying the Rorschach "as it isn't".

If it could be determined that the factor structure of the Rorschach with R partialed is essentially the same as the factor structure of the Rorschach with R controlled by ratios, then the dilemma between choosing a technique applicable to clinical practice versus a technique applicable to statistical analysis would be solved. Further, if it was found that the factor structure of the Rorschach with R partialed was the same as the factor structure of the Rorschach without R partialed <u>but after the effects of R had been accounted for in the first factor or two</u>, then the dilemma between studying the Rorschach "as it is" or

studying "as it isn't" would be solved. These questions have not been addressed previously in the literature and are beyond the scope of the present study. However, they deserve serious consideration by both Rorschach researchers and Rorschach clinicians.

The problem of different Rorschach scoring systems

A further validity problem with Rorschach research is the fact that there is no single system for scoring the test. The systems most commonly used in research are the Beck, Klopfer, and, more recently, the Exner systems. Many of the scoring categories are similar across these systems, though they have slight variations in scoring criteria and Exner's Comprehensive system includes a fair number of scores that have not been utilized by any other system.

Of more central concern perhaps is that the scoring systems differ in the procedures used for administration of the test. Klopfer and Exner simply present the subject with the first card and say "what might this be". Beck follows these basic instructions but in addition tells the subject that he may keep the card as long as desired and should tell everything that he sees on the card. Obviously, this procedure produces a much greater number of responses in Beck protocols. Additionally, as we have seen with the previous research cited, an increase in R will also increase the relative proportion of D, Dd, and F responses in a

protocol (see Exner, 1974, pp. 26-30). In terms of factor analytic research what this suggests is that analysis of protocols administered and scored in the Beck system should result in a larger response productivity factor.

The problem of discrete versus continuum scoring

An additional problem that needs to be addressed is one that is not restricted to Exner's Comprehensive System, but appears to plague much of the Rorschach research. This problem revolves around the fact that values within a scoring category are often treated as independent and distinct units. Frequently, a determinant scoring category is analyzed separately according to the degree of form that dominates the response. For example, within the category of color, C (pure form) is often analyzed in correlations or t-tests separately from CF (non-form-dominated-color), which is analyzed separately from FC (form-dominated-color). A similar problem is found with the other determinant categories as well as in the scoring for Location, Developmental Quality, and Form Quality. In the category of Location, for example, W is often treated as if it were independent of D and Dd, when in fact W, D, and Dd are all mutually exclusive categories on the location continuum (see Murstein, 1960).

It seems to me that this is a serious mistake, especially in a correlational or factor analytic design. This would be akin to giving someone a test question, such as

"how happy are you", and then treating the responses "very happy", "happy", and "somewhat happy" as if they were answers to distinct questions rather than all responses to the same item. These items are simply not independent of each other, even though a semblance of independence is gained when summary scores from across the whole protocol are utilized. From a psychometric perspective, the options for every category of response should simply be differentially weighted and then summed to obtain an overall item score. The summed score should then be utilized in the computation of statistics.

Some researchers factor analyzing the Rorschach have consciously adopted this procedure (for all scores except movement and location) for the reasons listed above (e.g., Borgatta & Eschenbach, 1955), while others have adopted it for some determinant scoring categories because they occur with such a low frequency of occurrence that it is impractical to include them in an analysis individually (e.g., Lotsof, 1953; Lotsof et al., 1958; Mason, Cohen, & Exner, 1985; Sultan, 1965; Wittenborn, 1950a, 1950b).

A hesitation to fully adopt this procedure, however, comes from the belief that the distinctions within a scoring category are very salient interpretatively. Some support for this notion has been found empirically where FC, for example, has been found to be much more highly and positively correlated with M than any of the other color scores (see

Wittenborn, 1950a).

Potential instability of the Rorschach correlation matrix

In the literature a number of studies have published the correlation matrices of Rorschach determinants. The matrices are not fully comparable because they come from different subject samples, are scored by different systems, utilize different variables, at times present raw data and at other times present percentage ratios, at times use discrete categories within a determinant and at other times use the sum of all categories for a determinant, and at times present the data without R partialed while at other times present the data with R partialed.

Despite these discrepancies, however, in two separate studies Exner and his associates have presented the inter-correlations among a variety of Comprehensive System variables (Exner, Viglione, & Gillespie, 1984; Mason, Cohen, & Exner, 1985). Both studies (n = 100, and n = 186) were conducted with non-patient adults, and both reported correlation matrices with the effects of response frequency partialed.[3] The matrices, therefore, should be comparable to each other and, if the scoring system is valid, both matrices should show the same pattern of correlations. Nine

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[3] The matrix from Exner et al. (1984) reported the average of two correlation matrices from the same subjects retested after a period of three years.

variables were comparable across studies (Human Movement, Animal Movement, Form Dominated Color, Popular, Lambda, Affective Ratio, Egocentricity Index, Organizational Frequency, and the Percentage of Good Form Quality) which meant that each matrix had 36 comparable intercorrelations. Approximately 80% of the intercorrelations were stable across both matrices. However, seven pairs of correlations were significantly different from each other across the two studies (correlations were r to Z transformed, alpha = .05, two-tailed). The worst discrepancy occurred between the pairing of form-dominated-color and animal movement. The correlation between these two variables differed by a magnitude of .70 across the two studies. This is an incredibly large discrepancy and may have been due to the omission of a negative sign in one of the matrices. However, even if this pair of scores is excluded, the raw correlations between the Affective Ratio and the Egocentricity index differed by a magnitude of .50 across the two studies. The other discrepancies were less extreme, though the raw correlations differed by a magnitude of .30 to .40. These findings suggest that even with a relatively large sample of subjects, some of the Comprehensive System scores, particularly the ratios such as the Affective Ratio and the Egocentricity Index, may yield erratic results.

PREVIOUS FACTOR ANALYSES OF THE RORSCHACH

Exner's Analysis

One of the correlation matrices discussed above occurred in the context of a broader factor analytic study utilizing the Comprehensive System (Mason, et al., 1985). In this study Rorschach protocols were culled from three different samples of subjects: non-patients (*n* = 186), schizophrenics (*n* = 155), and depressives (*n* = 102). Like much of the Rorschach research, this study was designed simply to see if there were observable differences (in Rorschach factor structure) across these three groups. No *a priori* hypotheses were generated to suggest what the Rorschach factor structure should be, why there should be differences in this structure across groups, and why certain variables should be included in this analysis and other excluded.

In addition, there were numerous problems with the fashion in which the factor data was presented and interpreted. For example, the authors did not partial response frequency from the data they factored, even though *R* was partialed from the 27 variable correlation matrices that accompanied the article. Additionally, they made no reference to the criteria that was used, if any, for determining the number of factors to retain and extract in each sample of subjects. Instead, they selected three factors from each of the samples and rotated these factors

to an orthogonal solution. However, they gave no reason for conducting an orthogonal rather than oblique factor rotation, gave no indication of the eigenvalues for each factor, and gave no indication of the proportion of variance that each factor accounted for (though in each sample of subjects the three factors combined accounted for approximately 45% of the total variance).

The authors also did not present the full array of factor loadings for each variable across the three factors extracted. Instead they reported simply what they considered to be significant loadings on each factor. This resulted in a number of factors that only displayed the loadings for four or five variables, making factor interpretation difficult.

Additionally, and relevant to this study, they did not analyze the style, content, and quality features of the Rorschach data separately. Finally, they did not appear to have a full grasp of the statistical strategy they were employing, as they interpreted the factor data in terms of the criterion groups rather than in terms of underlying dimensions.

Despite these considerable problems, the non-patient data from this study are presented in Table 4. Factors were extracted via Principal Components analysis. This procedure begins by selecting the factor that accounts for the most variance among the variables. Once this is done, it selects

Table 4. The factor structure of selected Rorschach variables in a non-patient adult sample (n =186; from Mason, Cohen, & Exner, 1985).

Factor 1		Factor 2		Factor 3	
Var.	Loading	Var.	Loading	Var.	Loading
Dd	.80	DQ+	.84	FC	.70
X+%	-.71	Zf	.75	CF	.68
DQo	.69	M	.66	H	-.62
R	.66	R	.64	M	-.57
Y	.62	H	.59		
V	.60	D	.59		

Note. Var. = Variables; Dd = unusual detail location; X+% = percent of responses that are of good form quality; DQo = ordinary developmental quality of percept (discrete part of the blot with natural form demand is selected; R = response frequency; Y = shading; V = vista; DQ+ = synthesized developmental quality (two discrete parts of the blot are identified, at least one with a form demand, and are articulated as being related; Zf = frequency of organizational activity; M = human movement; H = human content; D = common detail location; FC = form dominated color response; CF = color dominated form response.

the next largest uncorrelated factor within the remaining variance. This process is reiterated until the factor extraction criteria is reached; in this case after the third factor. After the factors were extracted they were rotated through the Varimax procedure which retains uncorrelated factors at the same time it attempts to form dimensions that maximize convergent and discriminant loadings.

From Table 4 it appears that, at least in part, the first two factors in the non-patient sample are response frequency factors. Given that response frequency was not controlled for prior to the factor analysis of the Rorschach, it is only natural, even necessary, that the first factor or two accounted for this variable.

From the data in Table 4 it appears that Response frequency may have two distinct components, as the sizable loading of R on the first two factors suggests. The first factor appears to be an "infrequency" factor as Dd, Y, and V all occur rarely in normal adult records. Poor form quality (X-%) also occurs rarely in this group of subjects. This variable was not entered into the factor analysis, but its opposite, the X+%, anchors the opposite end of the first dimension. Of significance, even when R is partialed from the data, the highest correlation between the X+% and any other independent variable is a negative correlation between X+% and Dd. This occurs because both X+ and Dd scores are obtained from normative "frequency of response" tables. X+

represents "good" form quality that occurs frequently and Dd represents "unusual" locations which occur infrequently. DQo also loads highly on the first factor, suggesting that when unusual parts of the blot are identified they have a specific form quality, but tend not to be integrated with other parts of the blot. In summary, the first factor indicates that when subjects give a large number of responses, the first thing this generates for the overall protocol is an increased number of "low frequency" variables.

In the Mason et. al. study the essential components of this first factor were replicated in the sample of depressives and the sample of schizophrenics.

The second factor in Table 4 is also one that I would suggest is an artifact of response frequency, though it has a slightly different flavor than the first factor. Since the first factor has removed the impact that high responding has on the number of unusual, discrete, poor form quality responses, the next effect of high response frequency appears to be an increase in synthetic (DQ+, Zf) ideational responses (M, H) to obvious features of the blot (D). In terms of the underlying dimension, factor two is a dimension of synthetic ideation which depends on response frequency. Protocols with relatively few responses are characterized by an absence of synthetic ideation, while a large number of responses generates more synthetic ideation. This factor, with slight variations, was also observed in the depressive

and schizophrenic data sets.

How one interprets the first two factors in Table 4 depends on whether R is considered a biasing artifact that should be controlled and discarded, or whether it is considered an important indicator of personality in its own right.

In terms of the latter interpretation, the first two factors taken together suggest that high frequency responding is found with two general features of personality organization. First, individuals who are somewhat anxious (Y) and disdainful in their self-conception (V), tend to generate a large number of responses to unusual (Dd and X-%) and isolated (DQo) parts of the blot. Second, a large number of responses also tend to be generated by more reflective and ideational individuals (M, H) who integrate and synthesize (DQ+ and Zf) commonly used parts of the cards. Unfortunately, this only gives us a view to the factors that are related to extensive responding to the blots. It does not tell us anything about general individual differences that go beyond response style.

Fortunately, the third factor in this analysis seems to be clear of the response frequency bias. Examining the four variables reported to load on this factor it can clearly be seen that what emerged was the familiar introversive-extratensive dimension (M and H versus FC and CF) which is expected to correspond to the introversion-extraversion

dimension of personality and Low PA-High PA dimension of affect.

A fourth dimension was not extracted by these authors, so it is unclear whether a dimension of neuroticism/negative affect was present in the data. It is also worthwhile to note that a comparable introversive-extratensive dimension did not emerge in the analysis of Rorschach data from schizophrenic or depressive patients, suggesting that this dimension may only be characteristic of a non-patient population.

In summary, even though there are many problems with the Mason et. al. study, the research supports the notion that when response frequency is controlled in Rorschach data the first dimension that appears in a normal population is the introversion-extroversion dimension.

This was an encouraging finding for the hypotheses of the present study, as it was from this data and from the interpretive information presented earlier that hypotheses for this study were generated.

Other Analyses

Reading the Mason et al. study one could easily conclude that this was the first factor analytic exploration of the Rorschach, since no other studies were cited in the reference section of this paper. However, this is hardly the case. Over forty studies have factor analyzed Rorschach

data in some fashion or another. Most of these studies were published in the 1950's when factor analysis was emerging as a technique of data analysis, though a few have been published since this time.

Of the forty published studies, a large number utilized procedures that were significantly different from the traditional Rorschach procedures (e.g., use of new "homemade" ink blots, group administration of the Rorschach) so that review of their findings would be inappropriate. An additional number utilized only a few Rorschach variables, or analyzed their data in an unusual fashion (e.g., Q-type factor analyses, analyses of ratings of Rorschach protocols rather than of actual Rorschach variables), so this data was not reviewed either. Finally, several apparently pertinent articles could not be obtained because they were published in obscure journals that could not be located in the Chicago area.

After elimination of the above studies, eighteen were left for review (Adcock, 1951; Borgatta & Eschenbach, 1955; Coan, 1956; Consalvi & Canter, 1957; Cox, 1951; Geertsma, 1962; Lotsof, 1953; Lotsof, Comrey, Bogartz, & Arnsfield, 1958; Mason, et al., 1985; Schori & Thomas, 1972; Shaffer, Duszynski, & Thomas, 1981; Singer, Wilensky, & McCraven, 1956; Sultan, 1965; Williams & Lawrence, 1953, 1954; Wishner, 1959; Wittenborn, 1950a, 1950b). Two of these studies were simply reanalyses of previously published data

with additional factors extracted (Coan, 1956; Geertsma, 1962), and two of these studies provided data on more than one sample (Adcock, 1951; Mason, et al., 1985). Adcock provided data on two small groups of non-patients in an effort to look for cultural differences, while Mason, et al., as mentioned above, provided data on three relatively large samples of subjects--normals, inpatient schizophrenics, and inpatient depressives.

None of the 18 studies were directly comparable to each other because they differed in one or more of the following ways: 1) whether they attempted to control for R or not; 2) the system used for scoring (Beck, Klopfer, or Exner); 3) the population under study; 4) the Rorschach variables included for analysis; 5) other variables analyzed in conjunction to the Rorschach (e.g., IQ scores, MMPI scales, behavior ratings, etc.); 6) the method of factor extraction; 7) the number of factors extracted; and 8) the presence and type of factor rotation (orthogonal or oblique).

Probably the most serious of these considerable differences is the different number of factors extracted across these Rorschach solutions. There is no reason to doubt that the factor structure of the Rorschach is hierarchical, so that many oblique factors will combine under a second- or third-order factor analysis to reveal higher-order dimensions. Given this, comparing a seven factor

solution to a two or three factor solution without knowledge of these nested relationships is tenuous at best.

What can be done, however, is to review the rotated and un-rotated solutions to these various analyses in order to determine if particular patterns occur, particularly among the early factors extracted, as these account for the greatest proportion of variance among the Rorschach variables. This type of systematic review of factors has not been undertaken in either of the previous two reviews of Rorschach factor analytic research (Dana, Hinman, & Bolton, 1977; Murstein, 1960).

The response frequency factor

All studies were examined for evidence of a response frequency factor. A search for this factor necessitated that the study which partialed R from the correlation matrix be excluded (Shaffer, et al., 1981). Additionally, the three studies which treated their variables as proportions of R were set aside for later examination (Adcock, 1951; Geertsma, 1962; Wishner, 1959).

In an effort to distil the data for presentation, it was arbitrarily decided that a significant loading on this factor would be in excess of +/- .50 and a near significant loading would be in excess of +/- .40. Prior to examining the data, determinants from other scoring systems were "translated" as cleanly as possible into their appropriate

scoring category in the Exner system.

If rotated and non-rotated solutions were published for the same study it was decided to utilize the solution where R loaded most strongly on a single factor, in an effort to localize the effects of response frequency. Of the sixteen factor analytic studies remaining (treating each of the Mason et al. samples as a separate study), fourteen had either a rotated or non-rotated solution where R loaded significantly on only one factor. The two studies that had R loading on more than one factor presented only the rotated factor matrix (Wittenborn, 1950b; Mason, et al., 1985, non-patient sample). Presumably in these studies the un-rotated factor solution would have had a single factor with a strong loading from R. However, since this could not be determined, both factors that had significant loadings from R in these studies were examined.

The results of this examination are presented in Table 5 (see the note following Table 5 for a full explanation of the notation). It can be seen that despite the different subject populations, scoring systems, factor analytic methods, and number of factors extracted there is a remarkable degree of consistency for this factor across the different studies. The percentage row at the bottom of Table 5 refers to the percent of studies where the determinant loaded significantly on the response frequency factor (for the split factor solutions a determinant was considered

Table 5. The response productivity factor across studies.

Study	R	D	Dd	F	#C	DQo	M	FM	m	Zf	S
1) Sultan, 1965											
	X	X	X	X	NA	NA	(X)	--	X	NA	(X)
2) Williams and Lawrence, 1953											
	X	X	X	X	NA	NA	X	X	X	NA	--
3) Williams & Lawrence, 1954											
	X	X	X	X	NA	NA	X	(X)	--	NA	NA
4) Wittenborn, 1950a											
	X	X	X	X	NA	NA	X	X	X	NA	X
5) Coan, 1956											
	NA	NA	NA	X	NA	NA	X	X	X	NA	X
6) Singer, et al., 1956											
	X	NA	NA	NA	NA	NA	X	X	NA	NA	X
7) Consalvi & Canter, 1957											
	X	X	X	NA	X	NA	NA	(X)	(X)	NA	NA
8) Lotsof, et al., 1958											
	X	X	NA	X	X	NA	--	--	(X)	NA	--
9) Schori & Thomas, 1972											
	X	X	X	NA	NA	NA	?	NA	NA	?	NA
10) Borgatta & Eschenbach, 1955											
	NA	X	X	NA	NA	NA	(X)	NA	NA	(X)	--
11) Cox, 1951											
	X	X	X	X	NA	NA	NA	(X)	NA	NA	NA
12) Lotsof, 1953											
	X	NA	NA	NA	NA	NA	--	NA	NA	NA	NA
13) Mason, et al., 1985 (schizo)											
	X	X	X	NA	NA	X	?	?	?	?	NA
14) Mason, et al., 1985 (depressed)											
	X	X	X	NA	NA	X	?	?	?	?	NA
Split Factor Solutions											
15) Wittenborn, 1950b											
	X	(X)	X	X	NA	NA	--	--	(X)	NA	--
	X	X	--	--	NA	NA	X	X	--	NA	--
16) Mason, et al., 1985 (normal)											
	X	?	X	NA	NA	?	?	?	?	?	NA
	X	X	?	NA	NA	X	?	?	?	X	NA
Percent of Studies											
	100	100	100	100	100	100	73	65	69	75	25

(table continues)

Table 5 (continued).

	FC	CF	C	sC	FT	TF	sT	OTHER SHADING	OTHER VARIABLES
1)	X	(X)	(X)	NA	X	--	NA	sY+V+FD+r	Original
2)	X	X	--	NA	(X)	X	NA	sV, sY	W, VIQ, PIQ
3)	X	--	--	NA	--	X	NA	sV	
4)	X	--	--	NA	X	--	NA	sC'sY	Original
5)	X	--	--	NA	X	--	NA	sC'sY (FD)	
6)	(X)	--	NA	NA	NA	NA	NA		MP, TAT-T, WS
7)	NA	NA	NA	NA	NA	NA	NA	FC+FC'	
8)	NA	NA	NA	--	NA	NA	(X)		A+Ad
9)	?	?	NA	NA	NA	NA	NA		F+FM+m
10)	NA	NA	NA	--	NA	NA	NA		Pop, H+Hd
11)	NA	NA	(X)	NA	NA	NA	NA	sY+V+FD+r+C'| X+, F+	
12)	NA	NA	NA	X	NA	NA	NA	sY+C'	
13)	?	?	?	NA	NA	NA	?		
14)	?	?	?	NA	NA	NA	?	sY	
Split Factor Solutions									
15)	--	(X)	--	NA	--	(X)	NA	(sY)	
	X	--	--	NA	--	--	NA	(FD) (sC')	
16)	?	?	?	NA	NA	NA	?	sY, sV	X+%
	?	?	?	NA	NA	NA	?		DQ+, H
Percent of Studies	93	28	14	33	58	42	50		

Note. X indicates a loading of .50 or greater; (X) indicates a loading between .40 and .50; NA indicates that the variable was

Table 7. The cognitive investment/synthetic intelligence factor.

Study	Variables
1) Lotsof, 1953	OSPE-IQ, Verbal productivity, sV+FD, (W%), (M), (sY+C')
2) Shaffer, et al., 1981	W, Zf
3) Geertsma, 1962	W%, Zf% vs. D%
4) Shori & Thomas, 1972	W, Zf
5) Borgatta & Eschenbach, 1955	Zf, M, W, VIQ, Reasoning, Word Fluency, (Pop), (sC)
6) Consalvi & Canter, 1957	VIQ, Matrices, M+, FV+FT+FD, (W+) vs. F% (A%)
7) Cox, 1951	IQ, W, Architectural content, Geology and Mountain content, (CF-) vs. A, (F), (Dd), (R), (Ad), (F-)
8) Mason, et al., 1985 (depressed)	ZF, DQ+, M, W, m, H, sSpecial-scores vs. F%
9) Mason, et al., 1985 (normal)	DQ+, ZF, M, R, H, D
10) Lotsof, et al., 1958	W, sY+C'+V+FD, Pop, (Mazes, but no other IQ) vs. (Dd)
11) Coan, 1956	No location or intelligence measures included

Note. Parentheses indicate that the variable had a loading greater than +/- .30, all other variables have a loading greater than +/- .40.

Table 8. The general emotional investment/responsiveness factor.

Study	Variables
1) Lotsof, 1953	sC, sY+C', #Verbs, (W%)
2) Shaffer, et al., 1981	C, CF vs. Ad, F% or FY+FC', FC, FV+FD vs. F%, F-, Sex content
3) Geertsma, 1962	C+CF% vs. Dd%, F+FM+m% or sY+C'%, FC'% vs. F+FM+m%
4) Shori & Thomas, 1972	FC, CF, FY+FC', FV+FD
5) Borgatta & Eschenbach, 1955	sC, Nature content, S, W, sY+C'+T, sV+FD
6) Consalvi & Canter, 1957	C+CF+C'+C'F, Y+YF+T+TF+V+VF, (W+) vs. F%, A%
7) Cox, 1951	C, CF-, sY+C'+V+FD, Miscellaneous cont., Water cont. vs. School-not reform program, Hd, Ad, F+
8) Mason, et al., 1985 (depressed)	DQv, C+Cn, C-Sh-Bl, vs. Egocentricity index, X+%
9) Mason, et al., 1985 (normal)	FC, CF vs. M, H
10) Lotsof, et al., 1958	sC, (#Content) vs. (M)
11) Coan, 1956	CF, (C), (sV+FD), (T+TF) vs. M, (FC)

Note. Parentheses mark a variable with a loading greater than +/- .30, all others have a loading greater than +/- .40.

dominated determinants (C or CF, T or TF). Therefore, FY and FC' may be expected to load more strongly on this factor if they were analyzed separately from Y+YF and C'+C'F.

Interestingly, the response frequency factor showed little relation to variables external to the Rorschach, suggesting that it is in fact a factor of bias that should be controlled for. In one study (Williams and Lawrence, 1953) the response frequency factor was found to also be defined by W (the only solution of the 16 for which this is the case) and by measures of verbal and performance IQ. The significant loadings for the IQ variables may suggest that response frequency is related to intelligence. However, six other studies examined IQ in relation to the Rorschach determinants. Not one of these studies reported a significant loading of IQ on the response frequency factor in the solutions where R was not split and where R loaded most strongly on a single factor.

Similarly, Williams and Lawrence (1954) examined the correspondence between the Rorschach and the MMPI. They only extracted four factors, thereby maximizing the chance that the two measures would share common dimensions. However, they found that the response productivity factor was unrelated to any MMPI variables. The only external criteria that the response frequency factor may be related to is the quickness to perceive human movement in other inkblots, the tendency or the capacity to write slowly in a

controlled fashion, and the tendency to transcend a TAT card when telling a story by bringing in characters or events that are not depicted in the actual picture (Singer, et al., 1956). However, these findings have not been replicated.

Surprisingly, in the Rorschach studies that used percentages in an effort to control for R there was still a response frequency factor in the data, though it had a markedly different flavor than the factor outlined above. The three studies (Adcock, 1951, Geertsma, 1962, and Wishner, 1959) provided a total of four factor analytic solutions, though the Geertsma analysis was a reanalysis of Wishner's data. In any case, all four solutions still included R in the subsequent factor analysis and all four solutions found a bipolar response frequency factor. One side of the factor was defined by R and Dd%, while the opposing side was defined by W%, Popular%, and the percent of content that was Animal (A% or A+Ad%). This factor may indicate that a curvilinear relationship is present between R and the other variables that load on this factor. As R increases there is a continued increase in R corrected Dd scores but a more dramatic decrease in R corrected W, Popular, and animal responses. In other words, using percentages appears to under-compensate for the effects of R on Dd, but overcompensate for the effects of R on W, Popular, and animal responses.

The Cognitive/Emotional Investment Factor

The second factor common to all analyses is more difficult to grasp for a number of reasons. First, as additional factors are extracted from a solution, loadings tend to become less pronounced and of a lower magnitude. Second, after the first factor, the effect of the extraction method, the rotation method, and the number of factors extracted become more pronounced (e.g., a neuroticism superfactor in study A can break down into three smaller correlated factors of anger, depression, and anxiety in study B).

Third, as smaller factors are extracted and rotated, the types of variables included in the analysis become much more influential. For example, if a factor is highly dependent on W to define one end of the factor and Dd to define the other, it makes little sense to search for this factor in a study which did not include location scores in its analysis.

Finally, even with similar variables included in an analysis, the complexity of the Rorschach data is such that many variables have loadings on more than one orthogonal factor. In the language of factor analysis, the Rorschach determinants lack "simple structure". This fact, in conjunction with the fact that there is an inherent indeterminacy involved in factor selection and rotation means some solutions may break down what is a single factor (A) in

study X into two separate factors (B and C) in study Y. This phenomenon can occur even if the same number of factors are extracted in both studies.

A number of the influences discussed above come into play with the second Rorschach factor. In its broadest form, one pole of this bipolar second factor is characterized by Whole responses, non-form dominated color responses, organizational activity, some shading variables (particularly texture), and intelligence. The other pole of this factor is defined by indices of non-invested responding (pure F, or F% which is essentially Exner's Lambda) to small areas of the inkblot (Dd or d; the latter is Klopfer's scoring of typical detail responses to small areas of the blot). Thus this dimension could be characterized as one of relatively diffuse, positively toned affect that is accompanied by holistic and integrative cognitive operations. These processes are in contrast to the relatively affectless tendency to be cognitively constricted and narrowly focused. This factor appears to bear some similarity to the personality dimension of "openness to experience" (McCrae & Costa, 1980).

The broad form of this factor was found in eight studies. Table 6 displays the studies and the variables which loaded significantly on this factor. Since this factor was extracted subsequent to the response frequency factor in all analyses, the criteria for "significant

Table 6. The broad cognitive/emotional investment factor.

Study	Variables
Wishner, 1959	W%, C+CF%, Zf%, sY+C'+V+FD% vs. F+FM+m%, Dd%, D%
Williams and Lawrence, 1953	W, C, VIQ, PIQ, sY, (T+TF), (sV+FD) vs. F, D, FM, m, (Dd)
Wittenborn, 1950a	W, CF, sY, T+TF, (C) vs. F, Dd, (d)
Sultan, 1965	W, C+CF, FM, (M), (m), (H), (fire) vs. F, d, Dd, Ad, Hd
Mason, et al., 1985 (schizophrenic)	W, CF, Zf, DQ+, sC', M, sSP-SC, C-Sh-Bl, FC vs. F%
Lotsof, et al., 1958	W, sY+C'+V+FD, Pop vs. (Dd)
Williams and Lawrence, 1954	W, CF, C, sY, VIQ, MMPI-ES, sV+FD, FT, (T+TF), (MMPI-K) vs. MMPI-F, -Hs, -D, -Pt, -Sc, -A, and (-Pa)
Wittenborn, 1950b	W, CF, C, T+TF, (sC'), (sY)

Note. Parentheses indicate a variable with a loading greater than +/- .30, all other variables have a loading greater than +/- .40. sSP-SC = sum of all special scores; C-Sh-Bl = color-shading blends; MMPI = Minnesota Multiphasic Personality Inventory, ES = Ego Strength scale, K = defensive responding scale, F = General distress or unusual experiences scale, Hs = Hypochondriasis scale, D = Depression scale, Pt = Psychasthenia scale (generalized anxiety), Sc = Schizophrenia scale, A = Anxiety scale, Pa = Paranoia scale.

loading" was relaxed to +/- .40, with "near significant loadings" greater than +/- .30 indicated by parentheses.

A number of points are noteworthy about this factor. First, it can be seen that this factor emerged in a percentage study (#1) as well as in studies where R had not been controlled. Second, it can be seen that while there is not precise agreement across all factors on the exact variables that define the factor (e.g. FM and m appear on both poles of the factor in different studies) there is certainly a strong convergence of general factor composition across studies.

One could argue that this factor represents an artifact of Rorschach scoring because the location score of W is contrasted with the mutually exclusive location scores of Dd or d, and the determinants of color and shading are contrasted with the mutually exclusive "default" scoring category (F) which indicates the absence of determinant use. However, this argument would be refuted on two grounds. First, there is a notable lack of form-dominated determinant use on the high pole of this factor. Since form-dominated responses are by far the most frequently used determinants, these should appear in contrast to F if this dimension simply reflected an artifact of scoring procedures. Second, there is evidence that this factor, unlike the response frequency factor, is strongly related to external criteria. For example, in two studies the high pole of this factor is

strongly related to intelligence (verbal and performance IQ).

Perhaps the most surprising finding about this factor comes from study #7 in which the Rorschach was factor analyzed with the MMPI. In contrast to traditional Rorschach interpretation the measures of unmodulated affect (C and CF) and shading (sum of general shading, vista, texture, and form-dimensionality) all appear to be indices of relaxed and content states of high ego strength. If one refers back to Table 1 (p. 18) it can be seen that some of the best indicators of Negative Affectivity are the MMPI scales of anxiety (A), psychasthenia (Pt) and schizophrenia (Sc). In addition, though they were not listed in Table 1, it was found that the MMPI scales of subtle defensiveness (K) and ego strength (ES) were strong markers of low Negative Affectivity (Watson & Clark, 1984). Thus, the Rorschach determinants listed above, in conjunction with W, all appear to define the low pole of Negative Affectivity. This contradicts a number of the hypotheses set forth in Figure 3.

This broad factor of cognitive/emotional investment had a tendency to split into two or possibly three discrete factors in the other studies that were reviewed. In a relatively gross generalization, this factor could be seen as splitting into cognitive and emotional domains, as a factor of integrative intelligence became distinct from a

factor of general affective responsiveness that tended to be diffuse or vague (non-form dominated).

Table 7 displays the factors of cognitive investment or synthetic intelligence that emerged from the remaining eleven studies, while Table 8 displays the factor of general emotional investment or responsiveness that emerged in these studies (Coan, 1956, number 11 in the tables, did not include location or IQ scores in his analysis, so no clear synthetic integration factor emerged from his data).

The split of the two factors can best be seen through examination of Geertsma's factors (number 3 in Tables 7 and 8) since he conducted a reanalysis of Wishner's data (number 1 in Table 6). Geertsma extracted seven factors in contrast to Wishner's four, which he then rotated to an oblique structure. The correlation between Geertsma's synthetic intelligence and emotional responsiveness factors was very minimal, yet the breakdown of Wishner's large factor into relatively orthogonal subfactors is apparent.

From Table 7 it can be seen that the synthetic intelligence factor is consistently defined by M, W, Zf, and measures of intelligence. Thus, when the broad factor from Table 6 separates, whole responses become much more closely aligned with human movement responses, integrative perceptions, and intelligence. Occasionally, this factor also becomes defined by V or FD responses which are thought to be associated with introspective capacities.

Table 7. The cognitive investment/synthetic intelligence factor.

Study	Variables
1) Lotsof, 1953	OSPE-IQ, Verbal productivity, sV+FD, (W%), (M), (sY+C')
2) Shaffer, et al., 1981	W, Zf
3) Geertsma, 1962	W%, Zf% vs. D%
4) Shori & Thomas, 1972	W, Zf
5) Borgatta & Eschenbach, 1955	Zf, M, W, VIQ, Reasoning, Word Fluency, (Pop), (sC)
6) Consalvi & Canter, 1957	VIQ, Matrices, M+, FV+FT+FD, (W+) vs. F% (A%)
7) Cox, 1951	IQ, W, Architectural content, Geology and Mountain content, (CF-) vs. A, (F), (Dd), (R), (Ad), (F-)
8) Mason, et al., 1985 (depressed)	ZF, DQ+, M, W, m, H, sSpecial-scores vs. F%
9) Mason, et al., 1985 (normal)	DQ+, ZF, M, R, H, D
10) Lotsof, et al., 1958	W, sY+C'+V+FD, Pop, (Mazes, but no other IQ) vs. (Dd)
11) Coan, 1956	No location or intelligence measures included

Note. Parentheses indicate that the variable had a loading greater than +/- .30, all other variables have a loading greater than +/- .40.

Table 8. The general emotional investment/responsiveness factor.

Study	Variables
1) Lotsof, 1953	sC, sY+C', #Verbs, (W%)
2) Shaffer, et al., 1981	C, CF vs. Ad, F% or FY+FC', FC, FV+FD vs. F%, F-, Sex content
3) Geertsma, 1962	C+CF% vs. Dd%, F+FM+m% or sY+C'%, FC'% vs. F+FM+m%
4) Shori & Thomas, 1972	FC, CF, FY+FC', FV+FD
5) Borgatta & Eschenbach, 1955	sC, Nature content, S, W, sY+C'+T, sV+FD
6) Consalvi & Canter, 1957	C+CF+C'+C'F, Y+YF+T+TF+V+VF, (W+) vs. F%, A%
7) Cox, 1951	C, CF-, sY+C'+V+FD, Miscellaneous cont., Water cont. vs. School-not reform program, Hd, Ad, F+
8) Mason, et al., 1985 (depressed)	DQv, C+Cn, C-Sh-Bl, vs. Egocentricity index, X+%
9) Mason, et al., 1985 (normal)	FC, CF vs. M, H
10) Lotsof, et al., 1958	sC, (#Content) vs. (M)
11) Coan, 1956	CF, (C), (sV+FD), (T+TF) vs. M, (FC)

Note. Parentheses mark a variable with a loading greater than +/- .30, all others have a loading greater than +/- .40.

This factor tends to still be defined at the low pole by Rorschach variables that indicate a lack of investment in the environment (F, F% or Lambda, D, Dd, animal content). In light of the synthetic ideation that defines the high pole of this factor, the "lack of investment" indices may now be considered measures of cognitive simplicity or cognitive constriction.

Turning to Table 8, it can be seen that the general emotional investment/responsiveness factor is less "clean" than the other factors discussed. Generally, this factor is defined at the high pole by non-form-dominated color and shading responses and vague contents. At the low pole it is again marked by variables that indicate a lack of investment in the Rorschach procedure (F, F%, Dd, animal content). However, given the variables that define the high pole of this factor, the "lack of investment" variables now appear to indicate a lack of emotional complexity or a hesitancy to become emotionally invested.

At first glance it may seem that this emotional responsiveness factor is a neuroticism/negative affect dimension, or the dimension of strong emotional engagement that is hypothesized to define the choleric quadrant of the two dimensional mood and personality space. Primarily this hypothesis would be suggested because there are strong loadings on this factor from chromatic color determinants, achromatic color determinants, the shading determinants, and

color-shading blends. Referring back to Figure 3, it can be seen that shading determinants (Y, V, T), color determinants (C), and color-shading blends were all hypothesized to fall in the domain of the choleric quadrant. However, the hypothesis that this factor is an N/NA or Strong Engagement factor is seriously damaged by the Williams and Lawrence (1954) finding that all of these Rorschach variables load on the low pole of the neuroticism/negative affectivity dimension as defined by MMPI scales (see study 7 in Table 6).

In two studies the general emotional responsiveness factor appeared to be further divided into separate factors of chromatic color responsiveness and achromatic color responsiveness (studies 2 and 3 in Table 8). Additionally, in two studies the affectivity factor appeared to be more form-dominated than non-form-dominated (studies 2 and 4). Finally, in studies 9, 10 and 11 the affectivity factor (defined strongly by chromatic color responses) was contrasted with human movement responses, rather than "lack of investment responses". It may be inappropriate to consider these particular factors similar to the general emotional responsiveness factor. However, it may also be that these variations of the general factor are due to the effects of different samples, variables, numbers of factors extracted, factor selection, and factor rotation procedures.

In summary, a general cognitive/emotional investment

factor appeared across studies. In a number of studies this was a single large factor. However, this broad factor also tended to decompose into two distinct factors--one of cognitive investment or synthetic intelligence, and one of general emotional investment or responsiveness. Like the first factor of response frequency, this factor, in either its broad form or its decomposed form, was found across studies, irrespective of sample population, scoring system, and factor extraction/rotation methodology. In addition, this factor was found in studies that partialed R from the correlation matrix (Shaffer, et al., 1981), in studies that controlled for R by using percentages (Geertsma, 1962; Wishner, 1959), and in the other studies which made no attempt to control for R.

The only studies where some form of this factor were not found were Adcock (1951) and Singer, et al. (1956). Both of these studies used relatively few Rorschach variables, excluded some important variables, and/or utilized idiosyncratic combinations or ratios of variables.

The introversive versus extratensive factor

Given that the EB (introversive versus extratensive) factor began to emerge in the analysis of the general emotional investment factor, it was decided to conduct a systematic search for this dimension from the remaining pool of 33 factors.

Table 9 presents the introversive-extratensive factor, or the closest approximation found to it across studies. It can be seen that the EB factor emerged rather unambiguously in only four of the nineteen studies (1 through 4). Eight of the 19 studies provided some mixed evidence of the EB factor. In the Lotsof, et al. (1958) study (number 9) the second factor listed is a fairly straightforward example of the EB factor, though it has very small loadings from all of its defining variables. The data from Cox (1951; number 12 in the Table) suggest that the introversive-extratensive factor may have been found if the other human movement indices (M and H) been present in the analysis. In study 8 (Shori & Thomas, 1972) and in study 5 (Shaffer, et al., 1981) it is conceivable that a bi-polar EB factor would have been found. However, incomplete tables of factor loadings accompanied both of these articles and made this assessment impossible.

In a number of studies the human movement determinants were found to be the polar opposites of some content categories (5, 6, 7) or of shading determinants (9, 10, 11, or also 3) rather than of color determinants. In terms of traditional Rorschach theory this makes little interpretive sense.

Finally, in seven of the nineteen studies (Borgatta & Eschenbach, 1955; Mason, et al., 1985, schizophrenic and depressive samples; Williams & Lawrence, 1953, 1954;

Table 9. The introversive versus extratensive factor.

Study	Variables
Wishner, 1959	M%, H%, Popular% *vs.* C+CF%, (R)
Mason, et al., 1985 (normal) a	M, H *vs.* FC, CF
Coan, 1956 a	M, FC *vs.* CF, C, (sV+FD), (T+TF)
Sultan, 1965	M, H, (Hd) *vs.* (Geology Cont), (Fire Cont), (C+CF)
Shaffer, et al., 1981	M, H, Hd, Popular *vs.* Anatomy Cont
Geertsma, 1962	M%, H% *vs.* F+FM+m%, A%
Lotsof, 1953	M, sV+FD *vs.* A+Ad%
Shori & Thomas, 1972	H, M
Lotsof, et al., 1958	M, (H+Hd) *vs.* sT or [M] *vs.* sC, (number of contents)a
Consalvi & Canter, 1957	M+, W+, FM+m *vs.* (FC+FC'), [F%]
Singer, et al., 1956	M, M perception, Cooperation on ward *vs.* sY+C'
Cox, 1951 a,b	School-not reform program, Hd, Ad, F+ *vs.* C, CF-, sY+C'+V+FD, Misc. cont., Water cont.

Note. Sharp parentheses "[]" indicate that the variable had a

Table 9. (continued).

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loading greater than +/- .20, soft parentheses "()" indicate that the variable had a loading greater than +/- .30, all other variables have a loading greater than +/- .40.

a Factor used previously in Table 8.

b This study did not include M or H in its variables.

Wittenborn, 1950a, 1950b) there was not even partial evidence for an introversive-extratensive dimension in the data.

Mason, Cohen, and Exner (1985) have suggested that the EB dimension is characteristic of a normal population and therefore should not be expected to emerge in a psychiatric sample. A review of this postulate across studies provides some partial support for this notion. Ten of the twelve studies in Table 9 utilized normal subjects, while only two of the seven studies where no evidence for this factor was found utilized a normal sample. However, Table 9 clearly indicates that this factor does not emerge consistently even within a normal sample.

In summary, across studies there was only mild support for the existence of a clear bi-polar introversive-extratensive factor. In the bulk of studies this factor was either not present at all, or present in a form that would not be predicted by traditional Rorschach theory. The data does suggest, however, that this factor is more likely to be present in a normal population than in a psychiatric population.

Remaining factors

Of the remaining pool of 22 factors there was little coherent patterning across studies. A slight tendency was observed for m, FC, FM and perhaps S to occur together on

one pole and to be contrasted to pure F (see Table 10). However, a review of this table indicates that even though there does appear to be some consistent thread across these factors, they do not converge very clearly and any interpretation of this factor appears tenuous.

The remaining 14 factors are presented in Table 11. From this table it can be seen that these factors are highly idiosyncratic and most likely represent the combined influence of sample populations, scoring systems, variable inclusion, factor selection, factor extraction, and factor rotation.

Synopsis

This review of the previous Rorschach factor analyses has been cursory and numerous arguments could probably be made against the placement of some factors in particular tables. Ideally, a thorough review of this previous research would entail a complete reanalysis of the actual correlation matrices used in each study. If this task were undertaken it would allow control of the factor extraction method, the factor rotation method, and the number of factors extracted in each study. The data from this analysis would allow for a more rigorous comparison of factor convergence across studies. Ideally this analysis would proceed by selecting a large number of oblique factors that could then be subjected to second- or third-order

Table 10. The vague m, FC, FM, and S factor.

Study	Variables
Wittenborn, 1950b	S, Original, FC, R, (W), (m)
Wittenborn, 1950a	Original, P, (FC), (m) vs. CF, (F), (sV+FD)
Coan, 1956	(FC), (m) vs. (F)
Williams & Lawrence, 1954	FC, MMPI-Ma, m, (FM) vs. MMPI-L, -Hy, -Rep
Williams & Lawrence, 1953	m, (CF), (FM) vs. F, PIQ
Singer, et al., 1956	(FM), (FC) vs. Planfullness, Expectation of task success, Interest in ward events
Lotsof, et al., 1958	S, H+Hd, m or FM

Note. s = sum of; MMPI = Minnesota Multiphasic Personality Inventory, -Ma = mania scale, -L = lie scale; Hy = Hysteria scale, -Rep = repression scale; PIQ = performance IQ.

Table 11. Factors with no clear counterparts across solutions.

Study	Factors
Adcock, 1951	W/M vs. M/C, H% F% vs. Affective Ratio, sV+FD
Cox, 1951	Reject, Geo & Mount Cont, (X-), (C) vs. sY+C'+V+FD F-, (CF-) vs. (W), (F+)
Geertsma, 1962	sV+FD% vs. (FC%) Number of content% vs. A%, (FC%)
Mason, et al, 1985; (schizophrenic)	DQv vs. Egocentricity, X+%, Popular, H, DQ+
Shaffer, et al., 1981	A, Affective Ratio vs. S F+FM+m, Dd vs. D
Sultan, 1965	T+TF, sY+V+FD, Nature Content. vs. A, Popular FT, FC, sC' (S), [Ad], [FT] vs. [F]
Wishner, 1959	M%, ZF%, (H%) vs. sY+C'+V+FD, X+%, D%, F+FM+m%
Williams & Lawrence, 1953	S, (sV+FD), (FT) vs. (F) (d), (sV+FD), [FT], [T+TF] vs. sY, (m), (Dd)
Wittenborn, 1950a	W, (FC), (CF) vs. (Popular)

Note. Sharp parentheses "[]" indicate that the variable had a loading greater than +/- .20, soft parentheses "()" indicate that the variable had a loading greater than +/- .30, all other variables have a loading greater than +/- .40. s = sum of;

Table 11. (continued).

Reject = card rejection; Geo & Mount Cont = Geography and mountain content; DQ = Developmental Quality.

appear to indicate the absence of neuroticism-negative affect. 6) There is a slight tendency for an EB factor to emerge from the data of normals. However, this factor does not appear to be robust and replicable across studies.

From this review of the research it seems clear that the present investigation should not expect to find factors significantly different from those discussed above. Parker, Hansen, and Hunsley (1988) have determined that empirical Rorschach studies which are conducted on the basis of a strong theoretical rationale or on the basis of previous empirical research demonstrate the validity of this test. Unfortunately, the present investigation is now in the uncomfortable position of having one set of hypotheses generated on the basis of a strong theoretical rationale (basic mood and personality structure in conjunction with traditional Rorschach interpretation), that are in conflict with another set of hypotheses generated on the basis of previous research in this area. It seems likely that the initial set of hypotheses--based on traditional Rorschach theory--will not be supported by the factor analytic data of the present investigation. Instead, it appears more probable that the present investigation will replicate the factors found in previous research and discussed in this chapter.

METHOD

Subjects

The subjects were 268 undergraduate students (95 males and 173 females) who volunteered to participate in an extensive personality assessment sequence for course credit. The average age across all subjects was 19, though the ages ranged from 17 to 32. The great majority of subjects were white (167), though blacks (18), Hispanics (13), and orientals (27) were also represented (43 subjects did not indicate their race).

Measures

For each subject there was one source of self-reported personality data which yielded the dimensions of extroversion and neuroticism, two sources of self-reported mood data which yielded the dimensions of Positive and Negative Affect (one trait measure and one state measure), and completed Rorschach tests scored in the Exner system.

Personality self-report. The personality dimensions were obtained from the Minnesota Multiphasic Personality Inventory (MMPI). Several studies have found evidence for the dimensions of extraversion and neuroticism within this test. For example, two recent item-level factor analyses of this test identified dimensions of extraversion and neuroticism (Costa, Zonderman, McCrae, & Williams, 1985; Johnson, Butcher, Null, & Johnson, 1984). The Costa et al. study

provided the most complete scale data (evidence for reliability and validity, see also Costa, Busch, Zonderman, & McCrae, 1986) and results were derived from a normal medical patient population.

Their neuroticism scale was composed of 65 items (47 of which were also identified by Johnson, et al. as neuroticism items) and displayed a coefficient alpha of .92. Thus, this scale appeared sufficiently homogeneous for use with a normal population.

The extraversion scale contained 23 items (14 of which were also identified by Johnson, et al. as extroversion items) and displayed a coefficient alpha of .80. Thus, the internal consistency was slightly less than desireable. A review of the items from this scale revealed that a number of items had a questionable relationship to extraversion as it is traditionally defined (e.g., "I like to know some important people because it makes me feel important", "I would like to wear expensive clothes", "I like to flirt", and "I like to talk about sex"). Therefore, it was decided that a second extraversion scale would be constructed. This scale was composed of items that were believed to define extraversion in at least two of three studies (Costa, Zonderman, McCrae, & Williams, 1985; Johnson, et al., 1984; Wakefield, Bradley, Doughtie, & Kraft, 1975).

The final items for this scale (using the revised version of the MMPI) were: 57, 99, 181, 207, 229, 292

(reversed), 369 (reversed), 371, 382, 383, 384, 389, 390, 392, and 397. Estimates for the internal consistency for this scale were not investigated, but it displayed better convergent and discriminant validity than the original Costa et al. scale. Therefore, this scale was used in subsequent analyses.

Mood self-report. The mood measures utilized were the Profile of Mood States (POMS), and the Multiple Affect Adjective Checklist-Trait form (MAACL). Both of these measures have been factor analyzed previously and dominant dimensions of Positive Affect and Negative Affect have been found (Gotlib & Meyer, 1986; Watson & Tellegen, 1985). In an effort select a priori the mood terms that would most cleanly define each mood dimension (e.g., so PA would not blend into Pleasantness or Strong Engagement), several published and unpublished factor analyses were consulted to find terms that had high loadings on the target dimension and negligible discriminant loadings on the other dimension.

For the POMS, the terms most clearly indicative of Positive Affect were expected to be the following: full of pep, lively, alert, vigorous, energetic, cheerful, active, and good-natured. A number of POMS terms indicating states of fatigue have been hypothesized to be measures of low PA. However, this hypothesis has been called into question (Meyer, 1987; Meyer & Shack, in press), especially as markers of trait affect. Therefore, these terms were not

considered here. The POMS terms that were expected to most clearly indicate Negative Affect were as follows: nervous, tense, on edge, uneasy, shaky, annoyed, angry, and anxious.

For the MAACL, Positive Affect terms were expected to be the following: active, enthusiastic, energetic, cheerful, good-natured, inspired, interested, and strong. Negative Affect terms for the MAACL were expected to be as follows: fearful, nervous, worrying, tense, annoyed, shaky, frightened, and upset.

The terms listed above appeared to be the best marker scales of PA and NA for each of the mood measures. However, later factor analyses sought to confirm the utility of these scales.

There was mood data available on only a portion of the full sample (168 subjects). When conducting a factor analysis it is best to have at least five subjects for every variable included in the matrix. However, since the MAACL has 132 terms and the POMS has 65 terms, this optimal situation was not possible. In an effort to increase the ratio of subjects to variables, terms from the MAACL and POMS were excluded from further analysis on the basis of several criteria. First, terms that showed little variance were excluded (on the MAACL, a forced choice test, this translated into less than 15% of the subjects either agreeing or disagreeing with an item; on the POMS, a five point Likert rating scale, this translated into less than

10% of the subjects responding to the categories "not at all" or "a little", or less than 10% of the subjects responding to the categories "quite a bit" or "extremely"). This criterion resulted in the deletion of 37 MAACL terms and 21 POMS terms. Additionally, terms that did not clearly indicate mood terms were deleted (e.g., clean, devoted, frank, tame, willful, muddled, etc.). This resulted in the deletion of 20 MAACL terms and 3 POMS terms. Finally, four additional MAACL terms were deleted. Half of the MAACL's had subjects rating the term "gay", while half of the MAACL's were revised versions of the scale and had subjects rating the term "lively" instead of "gay". Apparently this switch was made to counter unintended connotations to the word "gay". Given the lack of correspondence across forms, neither term was evaluated. Additionally, a substantial portion of MAACL scoring sheets were xeroxed in such a way that the terms "young", "patient", and "fine" were not copied. As such, these terms could not be evaluated across the full sample and were deleted.

The Rorschach. All Rorschach protocols (along with the other data) were collected over a four year period by beginning graduate students taking a required course in personality assessment. Each graduate student conducted eight assessment batteries over the course of the academic year. Prior to being placed in the data base, the Exner system scoring of each Rorschach protocol was double checked

by an advanced graduate student who had extensive test administration and scoring experience. Additionally, the course instructor regularly reviewed Rorschach scoring after it had been double checked by the advanced graduate student. To further insure that all Rorschach protocols in the data pool were valid and reliably scored, the first two protocols obtained by each graduate student were considered "practice" protocols and discarded (in the first year of data collection the first four protocols collected by each graduate student were discarded).

Despite these efforts to obtain reliable and valid Rorschach protocols, it was decided that the scorer reliability of the Rorschach protocols should be assessed prior to data analysis. To assess reliability, I first practiced blind scoring against 200 "expert scored" responses given in A Rorschach workbook for the Comprehensive System, 2nd Ed. (Exner, 1985). The 200 workbook responses were given a total of 969 actual scores (either my scores or workbook scores). Of the scores given, it was found that there was exact agreement between my scores and the expert scores in 88.4% of the cases. This is a substantially high reliability index. However, it should be noted that this reliability estimate did not take into account the "agreements" made to exclude particular scores in a given response. When the percentage of exact agreement was computed for scores given and for scores not given, a reliability of .965 was obtain-

ed. This value is in line with the interscorer agreements found by Exner (1986) and noted previously.

Following this practice I blindly scored 30 randomly chosen protocols from the data pool. In each case, only the 16 scoring categories relevant to the present study were blindly re-scored (location, space, developmental quality [necessary for z-scores], human movement, animal movement, inanimate movement, active or passive movement, color, achromatic color, shading, vista, form dimensionality, pairs, reflections, z-scores, and morbid).

Across these thirty protocols there were a total of 588 responses. Across these responses a total of 2909 scores were given (either my coding or the original scoring). Exact agreement was found for 87.5% of the scores given. However, as before, this reliability ratio did not take into account the implicit agreements made to exclude particular scores. Since each Rorschach response had 16 potential scores, there was a total of 9408 potential agreements. The scoring reliability increased to 96.1% exact agreement when agreements were determined by score inclusion and score exclusion. This was in line with the interscorer agreements reported by Exner (1986) and compared favorably with the estimates of reliability found by other investigators using the Exner system (e.g., Zillmer, Archer, & Castino, 1989).

Across subjects and cards a degree of variance in the

reliability estimates was found. Across cards, the reliability of actual scores given (with agreements to exclude particular scores not taken into account) ranged from a low of 83.6% for card IX to a high of 91.6% for card V. This was not surprising as card IX is one of the most complex cards, while card V is the simplest card. Greater variability was found across the 30 examiners. Here reliability estimates of included scores ranged from a low of 77.3% exact agreement to a high of 96.7% exact agreement. Despite these fluctuations, the overall reliability estimates--especially when excluded scores were taken into account--were quite high, and indicated that the Rorschach was originally scored with a sufficient degree of consistency to warrant the analyses proceeding without further re-scoring.

The final list of Rorschach variables evaluated in this study were: Response Productivity (R), Wholes (W), Usual Details (D), Unusual Details (Dd), White Space (S), Human Movement (M), Animal Movement (FM), Inanimate Movement (m), Proportion of Active Movement (a/(a+p)), Organizational Efficiency (Zd), proportion of responses to the last three cards--or the Affective Ratio (Afr), proportion of weighted reflections and pair responses--or the Egocentricity Index (Ego), Proportion of Pure Form (Lambda), Form Dimensionality (FD), Form-dominated Chromatic Color (FC), weighted Non-form-dominated Chromatic Color (CF+2C), Form-dominated Achromatic Color (FC'), weighted Non-form-dominated Achro-

matic Color (C'F+2C'), Form-dominated Diffuse Shading (FY), weighted Non-form-dominated Diffuse Shading (YF+2Y), Form-dominated Texture (FT), weighted Non-form-dominated Texture (TF+2T), Form-dominated Vista (FV), weighted Non-form-dominated Vista (VF+2V), Color-Shading Blends (C-Sh-Bl), Shading Blends (Sh-Bl), and Morbid responses (Mor).

Other measures. In addition to the measures discussed above, which were directly relevant to the initial hypotheses, several other pieces of information were available for most subjects. This additional information consisted of the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961); the Weschler Adult Intelligence Scale's revised version of the performance IQ scale, verbal IQ scale, and full scale IQ; and the following clinical and validity scales from the MMPI: L or lie scale, F or infrequency scale, K or subtle defensiveness scale, Hs or Hypochondriasis scale, D or depression scale, Hy or hysteria scale, Pd or psychopathic deviate scale, Mf or masculinity-femininity scale, Pa or paranoia scale, Pt or psychasthenia scale, Sc or schizophrenia scale, Ma or hypomanic scale, and Si or social introversion scale.

Procedures

It was decided that all factor analyses should be conducted with a principal axis factor extraction. This procedure begins with initial communality estimates on the

diagonal of the correlation matrix and can be contrasted with a principal components analysis which begins with unities (1.0's) on the diagonal of the correlation matrix. The principal axis procedure assumes that variation within a variable can be broken up into two components. One component is "unique" to a variable and is determined by error and influences other than the remaining variables in the correlation matrix. The other component is the "common" component. This is variation within a variable that can potentially be explained by the other variables in the correlation matrix. The principal axis procedure seeks factors which explain the variation a variable has in common with the other variables in a matrix.

Principal components, on the other hand, makes no distinction about the variation within a variable and assumes that all potential variation in a variable can be explained by other variables in the correlation matrix. It is for this reason that principal components analysis begins with unities on the diagonal of the correlation matrix (indicating that all variation can be explained) rather than communality estimates.

The principal components extraction procedure is typically accompanied by the retention of all factors having eigenvalues greater than one (the Kaiser criteria) and by the rotation of factors to orthogonal structure. These procedures have been criticized by several authors (see Lee

and Comrey, 1979; Loo, 1979) because they tend to retain too many factors, overestimate factor loadings, overestimate the proportion of variance accounted for by factors, and impose orthogonality on data that is more accurately seen as correlated. As mentioned above, it was decided that principal axis factoring should be the factor selection procedure rather than principal components. However, this still left open the question of how many factors to extract, and which the type of rotation to apply to the factors.

The hypotheses formed from previous mood and personality research and from traditional Rorschach interpretation indicated that only two or possibly three factors (one to account for response frequency) should be extracted and rotated to an orthogonal solution. However, the previous Rorschach factor analyses suggested that a relatively large number of factors should be extracted and rotated to an oblique solution. Given these discrepancies, it was decided that both orthogonal and oblique rotations should be sought for the data.

With regards to the question of how many factors should be retained, it was decided that two approaches should be utilized. First, the "dominant factor" approach advocated by Watson and Tellegen (1985) needed to be used because this was the approach that consistently found evidence for dimensions of PA and NA in mood research and evidence of E and N in personality research. However, using

this approach with the Rorschach is questionable because it had been shown that one dominant dimension was a response frequency factor while another was often a factor of intelligence. Both of these dimensions should not correspond to the mood and personality dimensions of interest. Therefore, it was decided that a multi-factor solution should also be sought within the Rorschach data.

It was decided that the best technique for determining the number of factors to retain in this instance would be a combination of Kaiser's criteria and Cattell's scree test (e.g., Cattell & Vogelmann, 1977). Kaiser's criteria is to retain all factors that have an eigenvalue greater than one, as this indicates that the factor accounts for more than one variable. Cattell's scree procedure begins by plotting the eigenvalues for every potential factor. Once this is done the investigator needs to draw a straight line through the eigenvalues, beginning with the eigenvalue that corresponds to the last factor. After the line is drawn, the investigator simply retains all factors which have eigenvalues that do not fall on the slope of the line.

RESULTS

The sample: Descriptive data and discussion of findings

Descriptive data for this sample are presented in Tables 12, 13, 14 and 15. From Table 12 it can be seen that on average the subjects in this study were slightly higher than the norm in intelligence. This was not unusual given that it was a college student sample. The Beck Depression Inventory scores indicated that on average the sample fell in the "not depressed" range, and the mean for this sample was similar to means reported elsewhere for college students (Bumberry, Oliver, & McClure, 1978; Hammen & Padesky, 1977; Hasher, Rose, Zacks, Sanft, & Doren, 1985; Hatzenbuehler, Parpal, & Mathews, 1983; King & Buchwald, 1982).

From Table 13 it can be seen that this sample was very similar to the normative sample available for the Profile of Mood States (POMS). The present sample, however, was significantly lower on the scales of Depression and Confusion than the normative sample. Unfortunately, norms for the trait form of the MAACL scales were not available for comparison purposes.

Turning to Table 14, it can be seen that this sample was higher than the Minnesota standardization sample on scales F, Pd, Pt, Sc, and Ma of the MMPI (t scores greater than 57). However, it can also be seen that the means for this sample corresponded extremely well with the means found in other college student samples. Thus, the objective

Table 12. Means and standard deviations for the current sample on the WAIS-R and BDI.

Scale	Mean	S.D.	n
VIQ	108.641	11.406	259
PIQ	106.695	12.880	259
FSIQ	108.655	11.581	258
BDI	6.883	6.055	162

Note. All IQ scores are from the Weschler Adult Intelligence Scale-Revised. VIQ = verbal intelligence score; PIQ = performance intelligence score; FSIQ = full scale intelligence score; BDI = Beck Depression Inventory.

Table 13. POMS scale means for the current sample and for a comparable normative sample of college students (McNair, Lorr, & Droppleman, 1971, Table 23, p. 20).

	Current (n=226)		Norm (n=856)		
Scale	Mean	S.D.	Mean	S.D.	t-value
Tension	12.55	7.02	13.50	7.16	-1.78
Depression	11.21	10.41	14.12	11.04	-3.57**
Anger	10.01	8.79	9.62	7.56	0.66
Vigor	16.24	6.59	15.60	6.36	1.34
Fatigue	10.53	6.22	10.58	6.56	-0.10
Confusion	9.06	4.96	11.10	5.50	-5.46**

** $p < .05$, two tailed.

Table 14. MMPI scale means for the current sample and two comparable samples of college students.

	Full-a	M-a	M-b	M-c	F-a	F-b	F-c
	n=236	n=83	n=96	n=340	n=153	n=113	n=425
L	47.9	47.6	44.0	45.0	48.1	45.0	45.0
F	57.4	60.3	61.0	55.0	55.9	56.0	53.0
K	51.9	51.6	50.0	56.0	52.0	50.0	56.0
Hs	53.2	55.2	55.0	51.0	52.1	50.0	49.0
D	54.5	56.8	57.0	54.0	53.3	50.0	50.0
Hy	55.9	57.5	53.0	58.0	55.0	55.0	55.0
Pd	60.7	62.7	62.0	60.0	59.6	57.0	57.0
Mf	54.6	63.8	63.0	65.0	49.6	49.0	46.0
Pa	56.7	57.6	59.0	56.0	56.2	58.0	57.0
Pt	58.5	62.2	62.0	59.0	56.5	57.0	56.0
Sc	60.9	65.3	64.0	60.0	58.5	58.0	58.0
Ma	64.0	66.4	67.0	62.0	62.7	64.0	61.0
Si	50.6	49.9	52.0	50.0	51.0	52.0	49.0

Note. All Minnesota Multiphasic Personality Inventory (MMPI) scales are reported in K-corrected t-scores rather than raw scores. M = male; F = female; a = current sample; b = Greene (1980, Table 2-3, p. 24); c = Dahlstrom, Welsh, & Dahlstrom (1975, Table 2, p. 264). The Greene and Dahlstrom, et al. means are converted from raw scores into K-corrected t-scores.

personality and intelligence data did not suggest anything unusual about the current sample.

However, comparing the current sample's Rorschach data with Exner's (1985) normative sample was not as reassuring (see Table 15). It can be seen that for virtually every variable the variances and/or the means were significantly different across the two samples. In part, this was not surprising given the great number of statistical tests conducted and the very large n in each of the samples--which served to make even relatively minor differences statistically significant. Nonetheless, there appeared to be meaningful (t-values greater than +/- 5.0) mean differences for location variables, color responses--particularly FC, texture (T) and diffuse shading (Y) responses, frequency of organizational activity (Zf), reflection and pair responses, the affective ratio, popular responses, morbid responses, the schizophrenic index (Sczi), and the suicide constellation (S-con). All of these differences did not appear to be a result of differences in response frequency (R), as the samples were comparable on this variable. In general, and in contrast to the objective data discussed above, the Rorschach data indicated that the current sample was more "pathological" than the standardization sample.

The question then raised is how do we understand and interpret these differences? Is Exner's normative sample significantly different from the present sample in other

Table 15. Means and standard deviations for the Rorschach from the current sample and Exner's (1985) normative sample.

	Current	n=265	Exner	n=600		
Var	Mean	S.D.	Mean	S.D.	F-value	t-value
R	22.14	8.69	22.57	5.54	2.46**	-0.74
W	10.35	4.68	8.58	2.66	3.09**	5.77**
D	8.28	6.67	12.59	4.74	1.98**	-9.50**
Dd	3.49	3.56	1.73	2.74	1.68**	7.18**
S	3.33	2.32	1.84	1.66	1.95**	9.45**
M	4.37	2.76	4.19	2.04	1.84**	0.93
FM	3.72	2.37	3.51	1.51	2.47**	1.31
m	1.73	1.67	1.25	1.06	2.47**	4.33**
a	6.32	3.48	6.25	2.30	2.29**	0.29
p	3.50	2.65	2.70	1.69	2.45**	4.53**
Sum C	2.80	2.00	4.23	1.82	1.20	-10.35**
FC	1.82	1.76	3.87	2.06	1.37*	-14.11**
CF	1.60	1.50	2.07	1.21	1.53**	-4.72**
C+Cn	0.20	0.49	0.12	0.43	1.27	2.30**
Sum C'	1.63	1.56	1.31	1.28	1.48**	2.89**
Sum T	0.65	0.91	1.16	0.80	1.29	-8.36**
Sum Y	1.99	2.20	0.98	1.60	1.89**	7.27**
Sum V	0.57	0.90	0.48	0.93	1.06	1.32
FD	1.21	1.26	1.15	1.09	1.33	0.69

(table continues)

Table 15. (continued).

Var	Mean	S.D.	Mean	S.D.	F-value	t-value
F	8.13	5.47	8.17	3.27	2.80**	-0.14
Lambda	0.58	0.16	0.59	0.28	3.09**	-0.54
Zf	14.01	5.18	11.22	2.96	3.06**	8.20**
Zd	0.02	4.92	0.84	3.11	2.51**	-2.51**
Ego	0.43	0.17	0.39	0.11	2.49**	3.79**
Fr+rF	0.79	1.19	0.12	0.46	6.65**	8.88**
(2)	7.04	4.06	8.44	2.65	2.35**	-5.16**
Afr	0.47	0.18	0.66	0.19	1.11	-13.53**
Blends	4.83	3.34	5.02	2.21	2.28**	-0.83
C-Sh-Bl	0.88	1.17	0.51	0.69	2.89**	4.77**
Mor	1.43	1.51	0.70	0.94	2.58**	7.27**
Agr-Mov	0.70	1.01	0.72	0.84	1.45**	-0.24
Per	1.09	1.60	1.06	1.01	2.52**	0.29
Pop	5.38	1.76	6.66	1.66	1.12	-10.29**
Depi	1.39	1.14	0.95	1.08	1.11	5.42**
Sczi	2.28	1.29	0.40	0.78	2.73**	21.96**
S-con	4.76	1.67	0.40	0.78	4.58**	40.64**

* $p < .05$; ** $p < .01$; two tailed.

Note. Agr-Mov = aggressive movement responses; Per = personals; Depi = depression index; Sczi = schizophrenic index; S-con = suicide constellation.

important ways? Are the mean differences a statistical artifact that comes from comparing distributions which are decidedly non-normal? Are the scores in the current sample different from the normative data because of problems in scoring, or problems in the way the sample data was collected? And finally, do the observed differences invalidate the sample from further study?

Exner's normative sample of 600 subjects was culled from a broader sample of 1225 protocols. These 600 protocols were selected in an effort to balance five national geographical locations, nine socio-economic groupings (SES), and sex of subject. All protocols were collected by "competent examiners" from volunteers who were told they would be given no feedback on the results of their testing. The majority of subjects volunteered through their places of work (white and blue collar), while an additional portion were recruited through social or interest organizations (Audobon chapters, PTA groups, bowling leagues, etc.). Therefore, Exner's sample was much more stratified in terms of SES, education, age (mean = 29.18), and geographic locale than the current sample.

Given that the current sample, theoretically, is an "achieving" college sample, it could be argued that the location and organizational activity means are explainable on this basis. If we assume that college student are motivated to achieve and perform more highly than Exner's

normative sample, it could be argued that the students will adopt one of two strategies to reach their performance goal. They may be prone to either more dramatically synthesize and integrate objects in their perceptual field (increased W and Zf), or they may "obsessively" account for objects in their perceptual field (increased Dd and S). If these strategies are adopted, then more economical or conservative responding to the blots (D and Pop) would obviously decrease.

An additional factor that may account for some of the observed mean differences is the fact that means are rather poor descriptive statistics when the underlying distributions are highly skewed and leptokurtic. The distributions for most Rorschach variables are both skewed and leptokurtic and, therefore, tend to violate the assumptions for conducting t-tests in the first place. Comparing median values would be much more appropriate with these types of distributions, however, this information was not available in Exner's table.

It was interesting to find that the variable distributions for the current sample were generally much less skewed and leptokurtic than Exner's normative sample--indicating they were more statistically "normal" distributions. Additionally, in general, the variance estimates in the current sample were significantly larger than the estimates from the normative sample. This suggested that the present sample was composed of subjects with more diverse personal-

ity characteristics. However, these latter two points run counter to the fact that the present sample of college students was more narrowly defined and homogeneous than the normative sample.

As an alternative, it could be argued that the reason the variances were larger in the present study was because of sloppy or unrefined scoring. Despite the fact that all Rorschach variables appeared to be scored reliably, it was decided that this alternative hypothesis needed to be pursued further.

Two sets of analyses could be conducted. First, it was known which protocols were collected and scored in the first semester of graduate study and which protocols were collected and scored in the second semester. If sloppy or unrefined scoring was a problem, then it could be argued that after additional practice and training in the second semester the variable means should be closer to the normative values and the variable variances should be smaller. Second, the year in which the protocols were collected was also known. If the course instructor became more proficient in training over time, or if there was a significant effect of the advanced graduate students who had primary responsibility for checking the scoring of the protocols each year, then mean differences could be expected to emerge across years.

In assessing these possibilities t-tests (by experi-

ence) and oneway ANOVAs (by year) were run.[4] Given the large number of tests, a more stringent alpha level of .01 was set for significance. Only two significant differences were found for the effects of experience. First, the variance in the Rorschach "C + Cn" variable decreased during the second semester of testing ($F = 1.70$, $p = .002$). Second, the mean of the Rorschach variable "F" decreased in the second semester as well ($t = 2.62$, $p = .009$), making the mean for the second semester (7.42) lower than the normative mean (8.17). Thus there was some slight evidence that scoring was refined over time. However, the fact that these were very isolated findings of low magnitude did not suggest that there was any sort of systematic skill-level scoring bias in the data.

Examining the effects of year revealed that six variables were significantly different over time. Four of these variables were from the Rorschach: form-dimensional responses occurred more frequently in the fourth year of data collection than in the third year ($F = 5.3$, $p = .002$); the schizophrenic index scores were lower in years one and four than in years two and three ($F = 6.4$, $p < .001$); passive movement scores occurred more frequently in the second and third years than in the first and fourth years;

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[4] The SPSSx t-test procedure also computes F tests of the dependent variable and therefore was used to assess changes in variable variances over semesters.

and organizational efficiency scores were lower in the first year than in the other three years ($F = 4.57$, $p = .004$). Thus there were some indications of potential year-by-year bias for the Rorschach data.

However, these findings were clouded by the fact that two MMPI scales showed similar significant differences over years. Scale six (paranoia) had a higher mean in year four than in years one and three ($F = 4.29$, $p = .006$), and scale nine (hypomania) was significantly lower in year one than in year four ($F = 4.03$, $p = .008$). Importantly, scale nine of the MMPI also correlated significantly with Rorschach scores of organizational activity ($r = .21$, $p = .001$), suggesting that the Rorschach differences for this variable, and perhaps the others, may have been due to general personality changes within the sample. Additionally, even though mean scores for the Rorschach variable FD changed over the four years of data collection, it was one of the few variables that had a mean and variance not significantly different from the normative sample. Again, these findings suggest that systematic scoring errors were not a problem for the present sample.

Two additional points are worth making with regards to Exner's normative sample. First, at least with children, Exner's norms for the Affective ratio have not been replicated and they have been criticized for being too high (see Loucks, Burstein, Boros, & Kregor, 1980). It is possible

that this is also the case with adults or adolescents, as the present data would suggest. Second, all scoring systems utilize the same procedures for scoring chromatic color. However, Exner's norms for this variable are unusually high when compared to data from the Beck (see Beck, Beck, Levitt, & Molish, 1961; Harrower & Bowers, 1987) and Klopfer (see Dana & Bolton, 1982) systems. For example, Harrower (see Harrower & Bowers, 1987) has conducted some large scale investigations of medical students using the Rorschach. She has consistently found that extratensives (subjects with more weighted color than movement) are rare individuals. In addition, with college students she has found means for the chromatic color variables that are much more similar to the means reported in this study than the means reported by Exner.

In summary, there were no clear problems with the present sample in terms of Rorschach scoring or in terms of its comparability to a typical college student population. Some of the significant differences between this sample and the normative sample were explained on the basis of this sample being composed of college students, while other discrepancies seemed to reflect potential problems with the normative sample itself.

Factoring of the Rorschach

Principal Axis Factoring. After plotting and review-

ing the eigenvalues, a series of principal axes extractions were performed on the Rorschach data. The SPSSx program attempted to extract from two to eight factors. However, the program could not extract any dimensions because the final communalities for some variables exceeded unity. A final communality, in the general sense, refers to the proportion of variance explained in a variable by the extracted factors (an initial communality, on the other hand, refers to the proportion of variance explained in a variable by all the other variables in the correlation matrix). Since it is obviously impossible to explain more variance in a variable than is in fact present, the extraction was terminated.

In a general sense, communalities that are greater than one indicate that colinearity is present in the correlation matrix. This means that one or more variables are a simple linear function of one or more other variables. In the present data it was found that the variables R, D, Dd, and Lambda all had very high initial communality estimates, suggesting that colinearity was present for these variables. Since response frequency (R) is a linear combination of D, Dd, and W (or alternatively a combination of Lambda and determinant use), and since R and D had the same high values for their initial communality estimates (.774), it was decided to remove D from the correlation matrix and re-factor the data (R was not removed so it could

be used to define a response frequency factor).

With usual detail responses (D) removed from the matrix a two factor extraction could be completed by the principal axis method. However, additional factors could not be extracted because final communality estimates again exceeded unity. Review of the two factor solution revealed that after extraction the final communality estimate for R was .992. Thus, this variable could be predicted almost perfectly from a two factor solution, and it is likely that a three factor solution pushed the communality estimate for this variable over 1.0. No other single variable displayed a final communality estimate in excess of .54, suggesting that the ability to explain the variance in R lay in the combination of several variables.

At this point it was decided to try the maximum likelihood method of factor extraction. This procedure is similar to principal axes analysis in that it partitions variance for a variable into two components--a component which is common to the other variables in the matrix, and a component which is unique to the variable and not explainable by other variables in the matrix. However, the maximum likelihood procedure estimates factors and communalities in a slightly different fashion and is somewhat less sensitive to colinearity than the principal axis method. Therefore, the maximum likelihood procedure could be expected to extract factors even when there was some colinearity problem

present.

Without replacing D in the correlation matrix, it was found that the maximum likelihood procedure could extract up to four factors from the Rorschach data. Extractions beyond four factors again encountered communality estimates that exceeded unity. Review of the final communality estimates for the four factor solution revealed that both R and Lambda had estimates of .9990. It did not appear that these variables were directly accounted for by each other, as they both defined separate factors. However, it did appear that the combination of other variables in the matrix accounted for nearly all of the variance in these two variables.

As a final resort principal component extractions were conducted. Since the variance for a variable is not partitioned into a common and unique component with this method, it was found that as many factors as necessary could be extracted from the correlation matrix--even with usual detail responses (D) in the matrix. The SPSSx principal components procedure gave warning messages that the correlation matrix was "ill conditioned"--signifying the problem of colinearity--but it allowed factor extraction and rotation to proceed.

Given the different factor extraction methods, and the necessity of proceeding with the principal components rather than the principal axis method, it was necessary to be determine if the factor extraction procedures were yielding

roughly equivalent factor structures. Since factor scores for each of the rotated extraction methods could be obtained, a decision was made to correlate the factor scores from the varimax rotated solutions of the three extraction methods. Large convergent and small discriminant correlations would indicate that the three methods were extracting very similar factors.

Table 16 presents the convergent and discriminant correlations for the two factor solution across the three extraction methods. The convergent correlations were all very high (above .88) while the discriminant correlations were uniformly low (less than +/- .14). These results indicated that at the level of the two primary factors the method of extraction did not play a very important role. Similar findings were observed when three factors were extracted from the Rorschach data (see Table 17). In this case the convergent correlations all exceeded .90, while the discriminant correlations never exceeded +/- .15.

However, when the four factors extracted by the maximum likelihood method were compared to the four factors extracted by the principal components method, a more significant breakdown of factor comparability was observed (see Table 18). There were still fairly clear convergent correlations for two of the factors extracted (above .85), but there were now more moderate convergent correlations for the remaining two factors (correlations above .69). In

Table 16. The correlation of varimax rotated factor scores across factor extraction methods: Two factor solution.

Meth/fac	PAF1	PAF2	ML1	ML2	PC1	PC2
PAF1	1.00					
PAF2	-.05	1.00				
ML1	.94	.08	1.00			
ML2	-.14	.98	-.05	1.00		
PC1	.88	.02	.93	-.08	1.00	
PC2	.02	.97	.13	.94	.00	1.00

Note. 1 = first factor; 2 = second factor; PAF = principal axis extraction; ML = maximum likelihood extraction; PC = principal components extraction.

Table 17. The correlation of varimax rotated factor scores across factor extraction methods: Three factor solution.

Meth/fac	ML1	ML2	ML3	PC1	PC2	PC3
ML1	1.00					
ML2	.15	1.00				
ML3	-.10	.06	1.00			
PC1	.95	.11	-.06	1.00		
PC2	.02	.95	.01	.00	1.00	
PC3	.00	.15	.91	.00	.00	1.00

Note. 1 = first factor; 2 = second factor; 3 = third factor; ML = maximum likelihood extraction; PC = principal components extraction.

Table 18. The correlation of varimax rotated factor scores across factor extraction methods: Four factor solution.

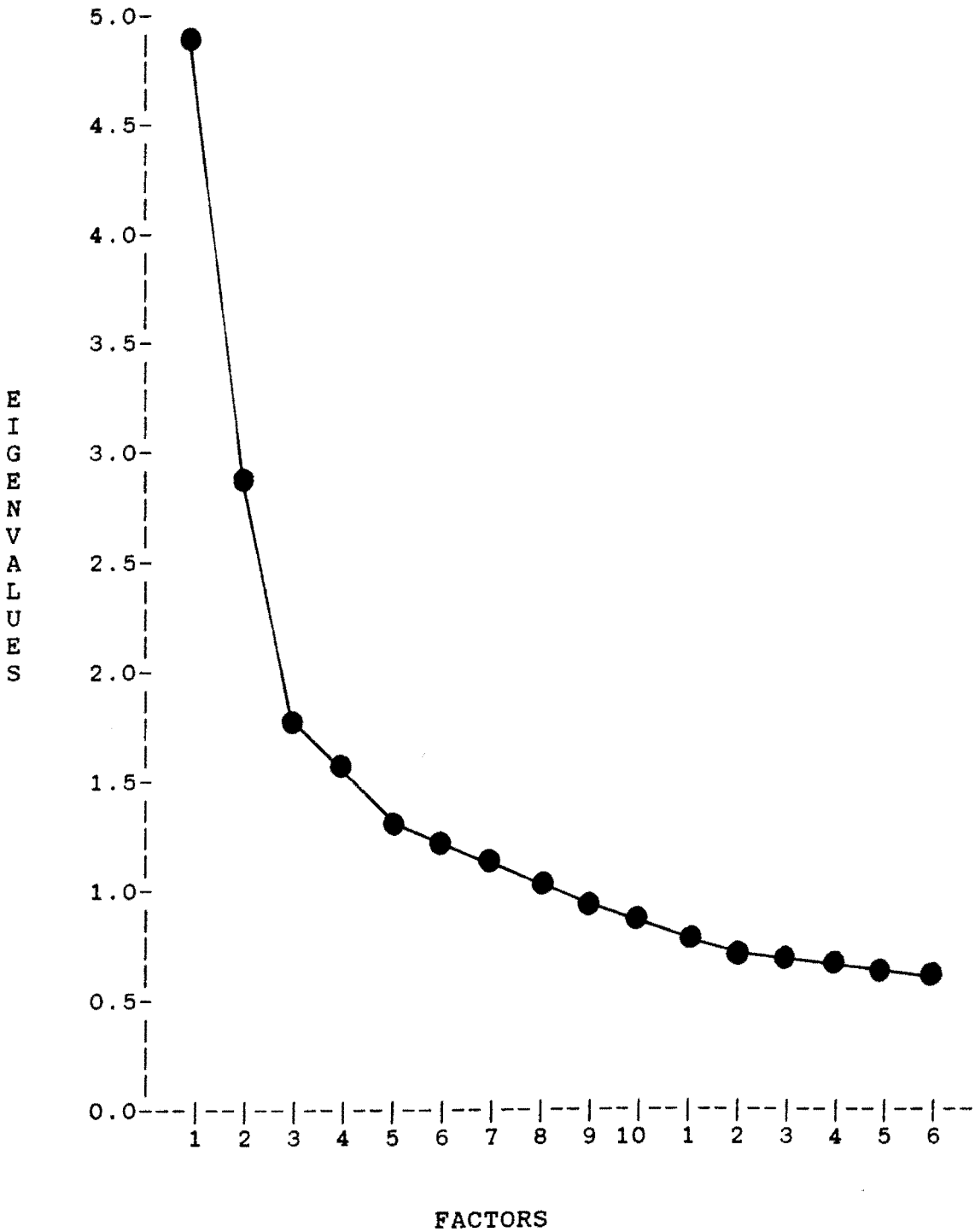
Meth/fac	PC1	PC2	PC3	PC4	ML1	ML2	ML3
PC2	.00						
PC3	.00	.00					
PC4	.00	.00	.00				
ML1	.85	-.06	-.19	.10			
ML2	.25	.19	.16	.78	.04		
ML3	.18	.90	.25	-.09	.13	.11	
ML4	-.13	-.08	.69	.21	-.04	.03	.07

Note. 1 = first factor; 2 = second factor; 3 = third factor; 4 = fourth factor; ML = maximum likelihood extraction; PC = principal components extraction.

addition, there were now slightly larger discriminant correlations (up to +/- .25) and there were factors that shifted their positioning in the factor space. For example, factor 2 from the maximum likelihood method corresponded to factor 4 from the principal components method. Thus, the data suggested that there was an impact of the factor extraction method on the resulting factor structure when a relatively large number of factors were extracted. However, since the maximum likelihood and principal axis procedures could not be used beyond the first few factors, all correlations could not be obtained and a full assessment of this effect could not be completed.

Principal Components Extraction. A plot of the eigenvalues for the principal components (PC) extraction is given in Figure 4. The Watson and Tellegen (1985) criteria for factor extraction indicated that a two-factor solution was appropriate. That is, the discontinuity of the eigenvalues after the second factor indicated that two broad factors accounted for the great bulk of the explainable variance in the Rorschach. These two factors accounted for 29.4% of the total variance in the matrix (note, the percentage of common variance accounted for by these factors could not be determined because the PC extraction begins with initial communalities of 1.0). The Kaiser criteria (eigenvalues greater than 1.0) indicated that nine factors should be extracted from the matrix, and the scree test

Figure 4. Plot of the factors and eigenvalues from a principal components extraction of the Rorschach data.



indicated that five or six factors should be extracted.

Given these differing criteria, I decided to extract from two to nine factors and rotate them with both oblique (oblimin) and orthogonal (varimax) rotation methods. However, beyond the four factor solution several problems were encountered. First, the five, six, seven, eight, and nine factor extractions could not be rotated to an oblique solution within the 25 iteration default parameters of SPSSx. Additionally, the factors from these solutions were small and increasingly defined by only one or two determinants. Given that the focus of this study was the broadest dimensions of the Rorschach (excluding response productivity), and given the results of the scree test, I decided to present the findings from the two, three, four, five, and six factor solutions. The five and six factor solutions should be considered tentative, however, since SPSSx could not find oblique rotations for these factors within the default parameters.

In deciding whether to present the oblique or orthogonal rotations, several factors were considered. First, the fact that oblique rotations could not be found for the five and six factor solutions argued for the presentation of orthogonal factors. Second, it was found that the three and four factor solutions had only one pair of oblique factors with a correlation that exceeded +/- .20 (.22 in the three factor solution and .24 in the four factor solution). All

other correlations between oblique factors in the two, three, and four factor solutions were virtually zero. Given all of this, I decided to present only the varimax rotated factor solutions.

Table 19 displays the final communalities and factor loadings for the two factor solution. From the final communalities it can be seen that, in general, the two factor solution did not account for the non-form-dominated color and shading variables, the egocentricity index, or the proportion of active movement index. However, the two factor solution very adequately accounted for the variance in R and D, explaining 88 and 75 percent of the respective variance in these variables.

Not unexpectedly, both factors were in part response productivity factors. The first factor appeared to be one of general determinant use, as virtually all determinants loaded highly on this factor, while Lambda, the proportion of pure form responses, was the only variable to have a strong negative loading on this dimension. The second factor again appeared to be a response productivity factor (R's highest loading). This factor differed from the first, however, by the fact that it was defined on the high end by scores of location rather than by scores of determinant use. For the second factor high frequency responding was strongly associated with non-elaborated (Lambda) usual and unusual detail locations (D and Dd) and a large proportion of

Table 19. The varimax rotated two factor solution from a principal components analysis of the Rorschach variables.

Var	Final Communality	Factor 1	Factor 2
C-Sh-Bl	47	66*	-19
FY	42	61*	22
FC'	33	57*	-11
FC	31	55*	05
CF+C	33	55*	-16
Sh-Bl	29	54*	-04
m	29	54*	00
S	33	52*	26
FM	28	49*	20
FV	22	47*	01
W	28	46*	-28
Mor	23	44*	-19
M	26	42*	29
FD	13	34*	-09
YF+Y	10	30*	09
TF+T	08	28	01
FT	06	24	02
C'F+C'	08	24	-16
VF+V	03	18	01
D	75	21	83*
R	88	54*	76*
Dd	55	34*	66*
Lambda	58	-49*	58*
Zd	29	25	-48*
Afr	20	05	45*
Ego	10	14	-27
a/(a+p)	07	03	-26

Note. n = 265, decimal places have been omitted. * indicates a loading above .30.

responses to the last three cards (Afr). This type of responding was contrasted with more active, global, and integrative responding (Zd, W, Ego, and a:a+p).

It was clear that this two-dimensional structure bore no resemblance to the two-dimensions of the Rorschach hypothesized to be present on the basis of traditional variable interpretation. Instead, this analysis indicated that the two greatest sources of variance in the Rorschach were tied to how frequently the subject chose to respond to the task. A large number of responses generated an increase in the use of all determinants (factor 1) and it generated an increase in the use of discrete blot areas in contrast to more integrative perceptions (factor 2).

An effort was made to find the effects of R localized onto a single factor. However, inspection of the unrotated dimensions revealed that R still had a complex, or strong dual loading on both factors. Despite this, if the varimax rotated axes were "hand rotated" forty five degrees, a structure virtually synonymous to the Rorschach factors found in previous research was revealed (refer back to Tables 5 and 6, p. 124 and p. 132). That is, a unipolar factor of response productivity and a bipolar factor of "cognitive/emotional" investment were found. Table 20 presents the factor loadings for these rotated factors.

It can be seen that the more "pure" response productivity factor had high loadings from D, Dd, FY, M, FM, FC,

Table 20. The forty five degree "hand rotated" varimax solution for the two dimensional Rorschach structure.

Variable	Factor 1	Factor 2
R	91*	-13
D	73*	-46*
Dd	70*	-21
FY	57*	30*
S	54*	18
M	50*	11
FM	48*	21
FC	42*	36*
m	38*	38*
Afr	35*	27
FV	34*	33*
YF+Y	27	16
FT	18	17
VF+V	13	11
Lambda	06	-76*
C-Sh-Bl	33*	60*
W	12	53*
Zd	-17	52*
C+CF	26	51*
FC'	32*	49*
Mor	17	44*
Sh-Bl	34*	42*
FD	17	30*
Ego	-10	30*
C'F+C'	05	29
a/(a+p)	-17	22
TF+T	19	20

Note. * indicates a loading above .30.

and m, just as would have been expected from Table 5. The variables which did not appear on this factor but that were present in Table 5 were the variables F and Zf. Both of these variables were transformed prior to being used in this analysis. Apparently the process of transforming these variables rid them of their strong response frequency component.

The second factor was defined on the positive end by the blend variables (C-Sh and Sh), W, Zd, non-form dominated color, and form dominated achromatic color. On the negative pole this factor was defined by Lambda (or F%) and D. This factor corresponded fairly closely with the broad cognitive-emotional investment factor found in previous research (see Table 6), which contrasted integrative determinant use with non-elaborated responses to detail locations.

It was interesting to find that the effects of R could also be localized onto a single factor, as displayed in Table 20, by eliminating the Affective Ratio from the correlation matrix. The Affective Ratio is the proportion of total responses given to the last three cards, and in the two-factor space this variable fell midway between R and Lambda. This indicated it had a strong association with both variables. The inclusion of this single variable in the matrix forced a two factor solution to place one factor directly through the Afr (see Table 19), rather than allowing R and Lambda to define separate factors, as was the

case in Table 20. In this context, it is worth noting that the only previous factor analytic study of the Rorschach which did not control for R and which included the Afr in the correlation matrix was the Mason et al. (1985) study. It may be recalled (refer to Table 4) that R was split onto two separate factors in this solution as well.

Returning to the varimax rotated factors, Table 21 displays the three factor solution. First it should be noted that the final communalities for the non-form dominated color and shading variables were generally much improved. This was due to the fact that factor 1 from the previous solution decomposed into two separate factors (1 and 3) in the three factor solution. What was initially a general determinant use and response frequency factor was now (a) a response productivity factor of form-dominated color, shading, and movement to generally rare parts of the blot (factor 1); and (b) a factor of holistic, non-form-dominated, blends of color and shading determinants (factor 3). The latter factor was likely to be one of vague perceptions since it had no significant loading from Zd and had a negative loading from the egocentricity index.

From the perspective of traditional Rorschach interpretation, this factor of non-form-dominated gestalts could be seen as a neuroticism/negative affect factor, since it is defined on the high end by m and on the low end by the egocentricity index. Adding to this interpretation is the

Table 21. The varimax rotated three factor solution from a principal components analysis of the Rorschach variables.

Variable	Final Comm.	Factor 1	Factor 2	Factor 3
FY	43	58*	25	19
FC'	36	56*	-08	18
FM	36	56*	22	-01
M	39	54*	30*	-12
S	37	53*	28	09
FC	31	51*	08	21
C-Sh-Bl	50	50*	-14	48*
MOR	25	46*	-17	13
Sh-Bl	30	44*	00	32*
FV	22	43*	04	20
FD	17	40*	-08	01
Ego	31	37*	-29	-30*
FT	06	24	03	06
D	75	10	85*	12
R	88	41*	80*	28
Dd	60	38*	67*	-07
Lambda	62	-54*	56*	12
Zd	36	36*	-47*	-05
Afr	20	02	45*	00
a/(a+p)	07	-00	-25	09
CF+C	54	23	-11	69*
YF+Y	45	-05	14	65*
m	38	30*	05	54*
C'F+C'	24	-00	-12	48*
TF+T	19	07	05	42*
W	32	31*	-24	40*
VF+V	06	06	03	24

Note. n = 265, decimal places have been omitted. * indicates a loading above .30.

fact that non-form-dominated responses are traditionally considered indices of emotional lability. However, from a different perspective it could be argued that this is a cognitive style factor. If this is correct then m would best be seen as a non-form-dominated movement response.

Factor 2 from the three factor solution was virtually identical to the second factor extracted in the two factor solution. This factor was again one of frequent and non-integrated location use that was contrasted with synthesized or integrated perceptions.

The four factor varimax rotation is presented in Table 22. This solution was similar to the three factor solution, in that factors 2 and 4 in the four factor solution correspond to factors 2 and 3 from the previous solution (non-elaborated, frequent responding to details of the blot; and non-form-dominated color and shading gestalts; respectively).

What had changed, however, was factor 1 from the three factor solution (form-dominated response productivity to generally rare parts of the blot). This factor split into two smaller subcomponents. One subcomponent (factor 3) was now a fairly easily interpretable bipolar factor of form-dominated shading determinant use versus non-elaborated responding. Like the factor of non-form-dominated color and shading gestalts (factor 4), this factor was free of response frequency effects. The factor of form-dominated

Table 22. The varimax rotated four factor solution from a principal components analysis of the Rorschach variables.

Var.	Final Comm.	Fact 1	Fact 2	Fact 3	Fact 4
S	49	66*	21	-03	09
FC	37	57*	02	13	-14
M	41	56*	24	13	-14
W	69	55*	-32*	-29	44*
FM	36	53*	17	22	-05
FC'	36	51*	-13	25	15
Mor	28	45*	-21	12	11
FD	17	35*	-11	19	-03
D	78	10	85*	18	10
R	93	55*	74*	02	28
Dd	61	43*	63*	10	-08
Lambda	64	-32*	58*	-44*	-05
Zd	37	31*	-51*	11	-08
Afr	23	-02	46*	13	-01
a/(a+p)	07	-02	-25	01	09
FV	48	11	05	68*	11
Sh-Bl	48	17	01	63*	23
FY	53	37*	23	57*	11
C-Sh-Bl	54	30*	-16	51*	41*
VF+V	17	-10	06	34*	20
FT	12	09	03	33*	02
CF+C	54	23	-13	15	67*
YF+Y	45	-06	15	13	64*
m	41	35*	01	08	53*
C'F+C'	24	-03	-12	09	47*
TF+T	19	05	04	12	41*
Ego	35	17	-29	34*	-35*

Note. n = 265, decimal places have been omitted. * indicates a loading above .30.

shading was also similar to the factor of non-form-dominated color and shading determinants in that traditional interpretation would suggest that this is a factor of neuroticism-negative affect. This became more clear in the subsequent factor extractions, as the positive loading for form-dominated achromatic color increased on this factor, while the loadings for the Egocentricity index and Lambda decreased.

The other subcomponent (factor 1) of the former response productivity factor was now slightly more difficult to conceptualize. It was a mixture of movement, space, form-dominated achromatic and chromatic color, whole, Morbid, unusual detail, and form dimensionality responses. On the surface of it, this factor would be hard to conceptualize along a continuum. However, the high loading on this factor from response productivity (R) suggested that this factor is simply what remained of response productivity after the effects of response productivity to more typical detail locations of the blot had been held constant (that is, by being localized on factor 2). Additionally, reference back to Table 20, where the effects of response frequency were localized on a single factor, indicated that factor 1 in this solution was now approaching the single "hand rotated" response frequency factor. This interpretation of factor 1 was supported when the five and six factor solutions were examined. In the five and six factor

solutions, factors 1 and 2 from the four factor solution merged into a single response frequency factor (factor 1 in both solutions) analogous to the "hand rotated" response frequency factor reported earlier.

The five factor varimax rotated solution is presented in Table 23. As mentioned above, the five factor solution was the first where the effects of response productivity were localized on a single factor (factor 1). Having R load on a single factor was advantageous because it left all the other factors essentially free of response frequency effects. However, while this was being gained in the five factor solution, two of the factors (3 and 4) became less easily interpretable. Before discussing these, however, it will be noted that factor 2 was still the form-dominated shading factor. This factor differed from the previous solution in that it now appeared without a significant negative loading from non-elaborated responding (Lambda) and had a stronger loading from form-dominated achromatic color. Factor 5 in this solution also remained essentially the same as factor 4 in the previous solution, and was the factor of non-form dominated color and shading gestalts.

Turning to the more difficult factors to interpret, factor 3 was a bipolar factor of integrative (Zd and Ego), form-dominated movement (M and FM), and form dimensional responses versus the proportion of non-elaborated responses (Lambda). This factor had not been apparent prior to the

Table 23. The varimax rotated five factor solution from a principal components analysis of the Rorschach variables.

Var.	Final Comm.	F1	F2	F3	F4	F5
R	93	87*	08	-05	33*	25
D	81	85*	13	-15	19	14
Dd	63	72*	17	-04	25	-14
Afr	47	51*	-07	14	-39*	16
M	47	49*	00	43*	18	-04
a/(a+p)	09	-21	-05	15	-04	15
FV	50	10	68*	16	-01	07
Sh-Bl	50	07	65*	17	06	19
FY	56	34*	61*	17	20	05
C-Sh-Bl	59	-06	60*	16	31*	33*
VF+V	29	-05	48*	-23	06	05
FT	13	10	26	21	-08	07
Lambda	70	33*	-27	-69*	-09	-19
Ego	44	-10	12	59*	-16	-19
Mor	35	03	-00	50*	21	23
Zd	37	-32*	04	46*	23	-02
FM	41	41*	10	45*	17	06
FD	21	08	08	42*	11	07
S	63	36*	15	03	69*	-06
W	70	-14	-18	16	68*	39*
FC'	50	02	39*	17	56*	02
FC	37	22	13	25	47*	18
CF+C	56	03	17	12	22	68*
YF+Y	47	11	16	-16	-03	63*
m	44	16	07	17	25	57*
TF+T	28	10	04	11	-08	50*
C'F+C'	25	-12	11	-02	03	47*

Note. n = 265, decimal places have been omitted. * indicates a loading above .30.

five factor solution, though it emerged out of the two response frequency factors discussed in the four factor solution. This factor suggested that the capacity to synthetically integrate perceptions is in opposition to the tendency to report non-elaborated perceptions. Further, this capacity, according to traditional interpretation, is associated with the capacity for ideation (M) and the capacity to take a distancing objective view (FD). It is worth noting that, as in all previous solutions, M and FM displayed the same pattern of convergent and discriminant loadings. This pattern was different than that displayed by m and suggests that it may be best to differentiate movement on the basis of form-dominance, rather than on the basis of content, as is currently done.

The fourth factor was also bipolar and was comprised of form-dominated chromatic and achromatic color, space, and whole responses versus a high proportion of responses to the last three cards. Since space responses are scored as achromatic color responses when white space is identified and integrated in a perception, this factor appeared to partially be a result of this scoring criterion. Additionally, since a high proportion of responses to the last three cards (Afr) virtually necessitates the use of usual and unusual detail locations (D and Dd) rather than wholes, this factor also appeared to contrast the location scoring for the last three cards. Combining this information, it

appeared that factor 4 was one that pitted integrated white space and chromatic color whole responses to the last three cards against frequent responses to the last three cards.

The six factor solution is presented in Table 24. In this solution it was found that the first five factors were essentially equivalent to the five factors found in the previous solution. The sixth factor, however, was rather unusual. It was a bipolar factor that contrasted blends of form-dominated color, non-form-dominated texture, and non-form-dominated diffuse shading with form dimensionality responses. The interpretation of this factor is unclear.

Summary

A summary of the nested relationships among the factor solutions for the Rorschach is presented in Figure 5. At the level of two broad factors, two response productivity factors were found. One factor was of frequent responding to discrete blot areas in contrast to more integrative perceptual gestalts. The second factor was of frequent responding and frequent determinant use of all kinds in contrast to unarticulated or non-elaborated perceptions. When these two factors were manually rotated so the effects of R were localized onto one factor, the findings from previous factor analyses of the Rorschach were replicated.

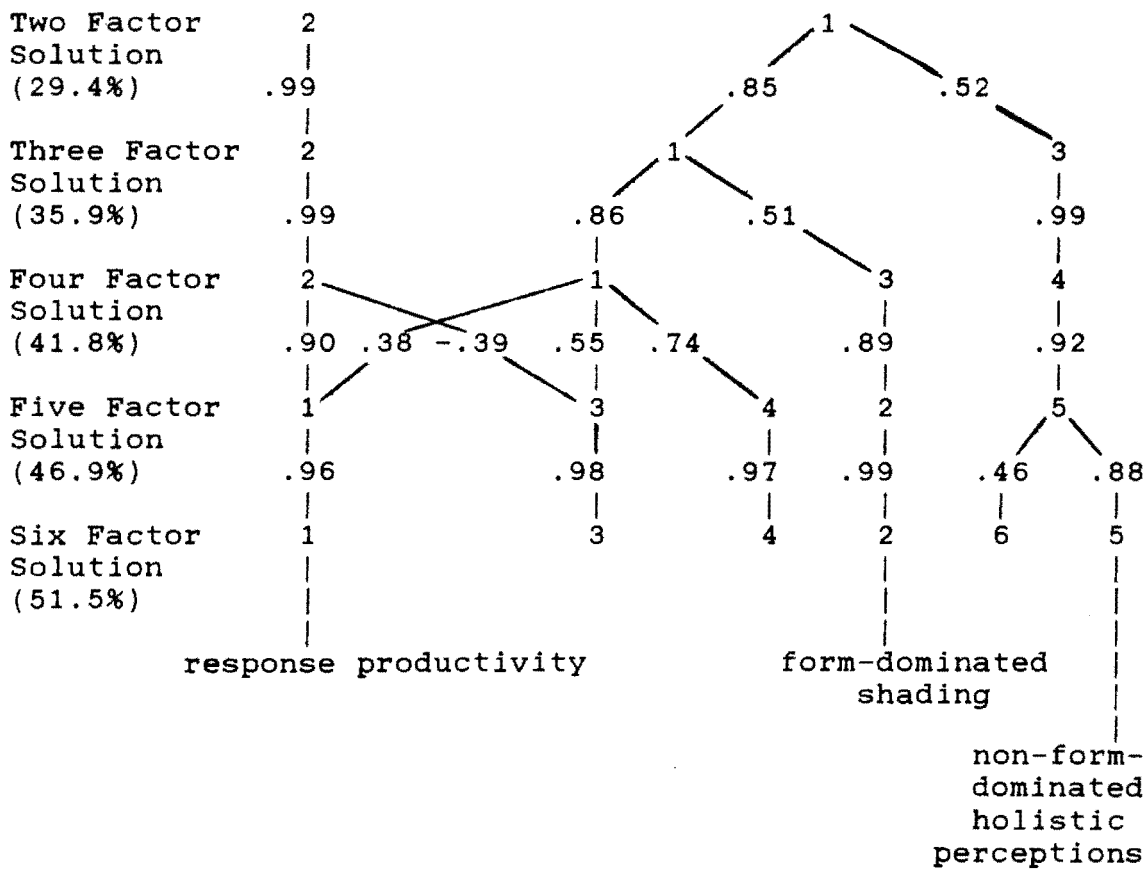
The effects of response productivity were clearly evident in all of the factor solutions, although when five

Table 24. The varimax rotated six factor solution from a principal components analysis of the Rorschach variables.

Var.	Final Comm.	F1	F2	F3	F4	F5	F6
R	93	87*	09	-23	21	18	18
D	81	76*	16	-31*	-26	00	21
Dd	63	72*	19	-18	18	-15	-08
M	48	60*	02	33*	10	02	-07
FM	42	52*	11	35*	11	09	00
Afr	47	46*	-05	04	-43*	02	27
FV	52	12	69*	13	-01	09	-02
Sh-Bl	51	10	66*	14	06	20	05
FY	58	35*	60*	10	21	-04	22
C-Sh-Bl	71	-05	55*	15	39*	17	45*
VF+V	40	-05	50*	-22	03	18	-26
FT	15	10	25	18	-05	-02	21
Lambda	71	17	-27	-72*	-11	-27	01
Ego	45	-03	12	62*	-11	-20	05
Zd	41	-22	01	51*	30*	-03	11
Mor	35	16	-00	47*	19	25	08
FD	41	24	11	39*	02	28	-33*
W	70	-00	-21	14	65*	45*	06
S	64	45*	14	-05	63*	03	-13
FC'	50	11	36*	15	58*	06	01
FC	58	25	08	18	51*	-00	47*
CF+C	59	05	17	08	16	71*	15
m	48	26	09	10	16	64*	03
C'F+C'	28	-09	12	-02	-01	51*	04
YF+Y	48	05	16	-21	-05	49*	41*
a/(a+p)	16	-14	-03	17	-07	27	-18
TF+T	48	05	01	07	-03	23	65*

Note. n = 265, decimal places have been omitted. * indicates a loading above .30.

Figure 5. The hierarchy of Rorschach factor structure based on correlations of factor scores across factor solutions (all correlations above +/- .35 shown). The percent of <u>total</u> Rorschach variance accounted by the factor solution is noted in parentheses.



and six factors were extracted only a single factor of response productivity was present. The single response productivity factor that was present in these solutions was remarkably similar to the single response productivity factor found when the two factor solution was manually rotated. For example, the response productivity factor from the hand rotated two factor solution correlated .88 and .89, respectively, with the variable factor loadings from the response productivity factor in the five and six factor solutions.

As additional factors beyond the first two were extracted, a clearly defined factor of non-form dominated holistic perceptions was apparent. This factor remained quite consistent across subsequent extractions and generally appeared as the last factor in the rotated matrix. Additionally, a clearly defined factor of form-dominated shading was apparent. This factor also remained consistent across solutions which extracted additional factors.

Finally, the new factors that emerged in the five and six factor solutions were more difficult to interpret than the factors from the two, three, and four factor solutions. This is consistent with the inability of SPSSx to find oblique solutions for these extractions, and it suggests that these factors may be an artifact of scoring procedures or of the sample.

Factoring of the mood data

POMS Analyses. The remaining forty-three state mood terms from the POMS were subjected to a principal axes factor analysis. As expected, a plot of the eigenvalues (see Figure 6) revealed a sharp "elbow" at the third factor. This indicated the presence of two dominant factors. The first factor accounted for 56.34% of the common variance among the mood terms, while the second factor accounted for an additional 17.15% of the common variance. Thus, together, the first two factors accounted for approximately three quarters of the common variance. These two factors accounted for approximately 44% of the total variance among mood terms.

A full matrix of terms and factor loadings for the varimax rotated two factor solution is presented in Table 25. From these data it is readily apparent that factor 1 is a factor of Negative Affect, while factor 2 is a factor of Positive Affect.

Six of the eight terms predicted to have a strong convergent loading on the Negative Affect factor and a negligible discriminant loading on the Positive Affect factor (no greater than +/- .20) displayed this pattern. The six terms were the following: on edge, angry, shaky, annoyed, anxious, and nervous. The other predicted terms--uneasy and tense--had discriminant loadings on the PA factor that were much higher than expected and so could not be

Figure 6. Plot of the factors and corresponding eigenvalues from a principal axes factor extraction of the POMS terms.

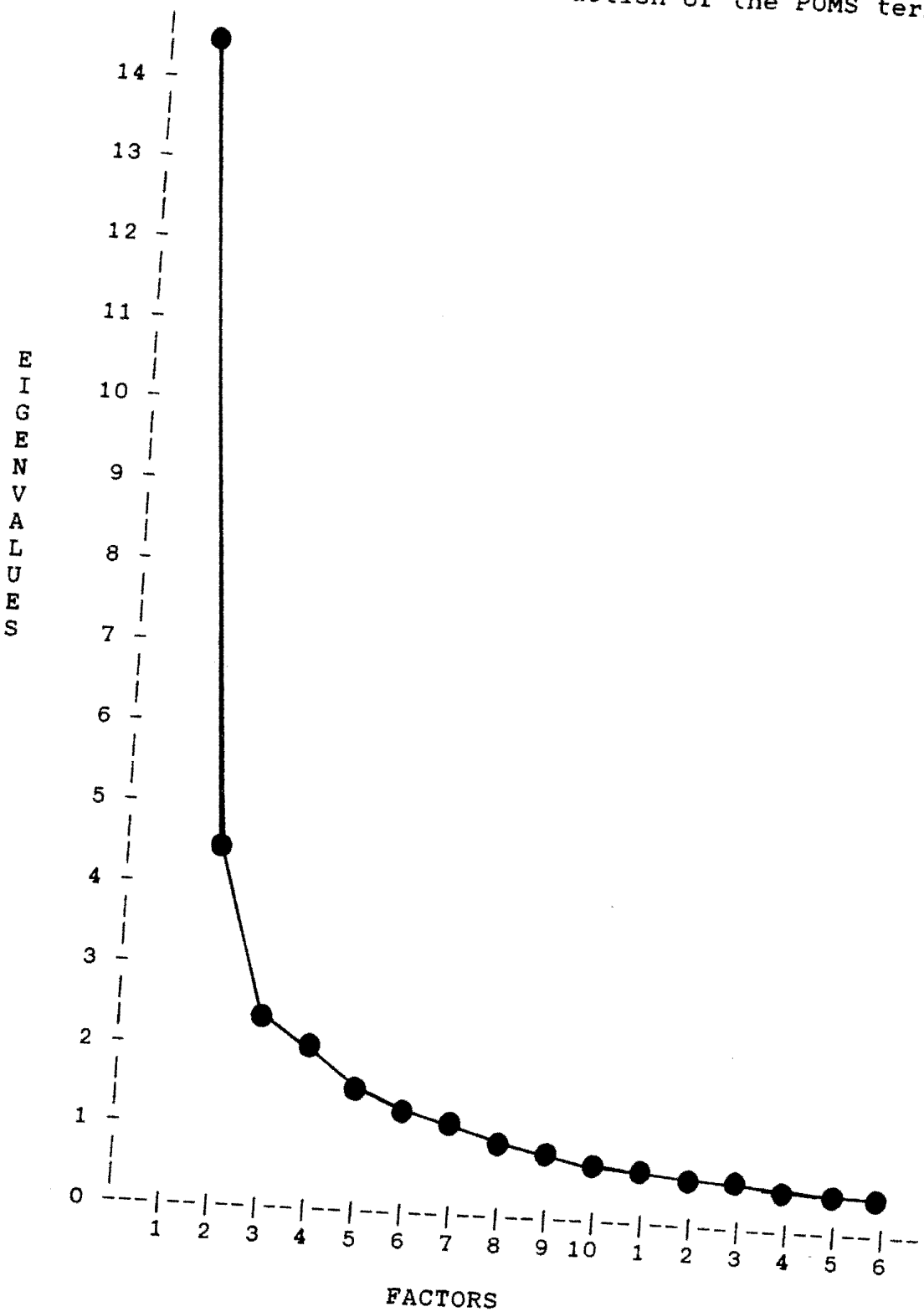


Table 25. The two POMS varimax rotated factors.

Term	Factor 1	Factor 2
uneasy	70	-24
confused	69	-07
on edge	67	-16
grouchy	66	-24
unhappy	65	-33
gloomy	65	-30
angry	64	-15
discouraged	64	-29
shaky	63	-09
sad	63	-31
fatigued	62	-32
uncertain about things	61	-20
annoyed	60	-08
tense	59	-35
resentful	59	-17
blue	59	-33
restless	59	02
exhausted	58	-25
anxious	57	18
worn out	56	-34
bushed	55	-37
nervous	54	-13
lonely	51	-17
weary	51	-36
sorry for things done	50	-06
ready to fight	49	03
sluggish	48	-40
rebellious	45	09
forgetful	30	-07
full of pep	-19	84
energetic	-17	81
lively	-25	76
cheerful	-18	73
active	-13	71
good natured	-22	70
vigorous	-05	69
carefree	-11	55
alert	-24	55
helpful	-10	54
efficient	-28	54
relaxed	-45	48
trusting	-02	43
sympathetic	04	29

Note. n = 229; Decimals omitted.

considered "pure" markers of NA. However, three other terms were found that appeared to be relatively pure markers of NA. These terms were confused, uncertain about things, and resentful. Taken together these nine terms formed a scale of Negative Affect that displayed a coefficient alpha of .85. This reliability estimate is sufficiently high to warrant use of this scale in further analyses.

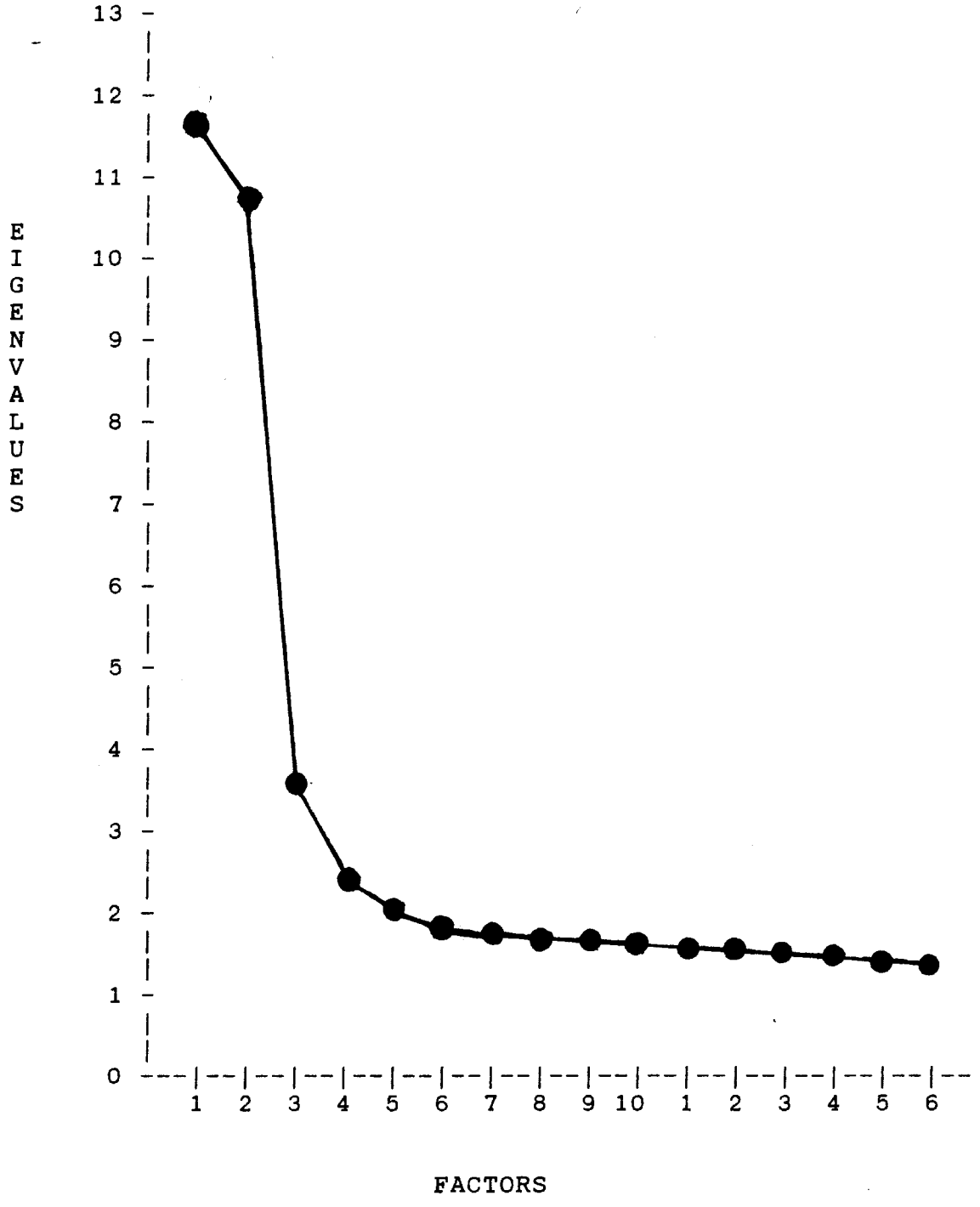
Five of the eight terms predicted to have a strong convergent loading on the PA factor and a negligible discriminant loading on the NA factor (no greater than +/- .20) displayed this pattern. These terms were full of pep, energetic, cheerful, active, and vigorous. The other three predicted terms (lively, good-natured, and alert) demonstrated high convergent loadings on the PA factor, but had higher than expected discriminant loadings on the NA factor (between .22 and .25). Since the magnitudes of the discriminant loadings were not great it was decided to keep the latter three terms for the formation of a PA scale. These eight terms, in conjunction with the term carefree--which also proved to be a relatively pure marker of PA--demonstrated a scale reliability (coefficient alpha) of .91. Again, this reliability estimate is sufficiently high to warrant use of this scale in further analyses.

MAACL analyses. The remaining seventy-two trait mood terms from the MAACL were subjected to a principal axes factor analysis. As hypothesized, a plot of the eigenvalues

revealed a sharp "elbow" at the third factor (see Figure 7). As before, this indicated the presence of two dominant factors. The first factor accounted for 24.34% of the common variance among the mood terms, while the second factor accounted for an additional 22.48% of the common variance. Thus, together, the first two factors accounted for slightly less than half of the common variance among terms. In terms of total variance in the matrix, these two factors accounted for roughly 30.6%.

It may be noted that the two factors from the MAACL accounted for a substantially smaller proportion of variance (whether total or common) than the two factors extracted from the POMS. In part, this was due to the fact that almost twice as many variables were analyzed in the MAACL matrix than the POMS matrix. However, the smaller proportion of variance accounted for by the two factors also signified the fact that the MAACL terms are more diverse than the POMS terms. It was noted earlier that twenty MAACL terms were deleted because they were terms that are not clearly indicative of moods. Even more terms could have been deleted on these grounds, or on the grounds that they are more inter-personal than intra-personal (e.g., warm, kindly, safe, loving, cooperative, understanding, steady, agreeable, adventurous, sympathetic, stubborn, alone, offended, complaining, timid, unsociable, bashful, cautious). However, these terms were not deleted for fear of

Figure 7. Plot of the factors and corresponding eigenvalues from a principal axes factor extraction of the MAACL terms.



biasing the results too much.

The MAACL terms and their varimax rotated factor loadings for the two factor solution are presented in Table 26. In contrast to hypotheses, "pure" PA and NA factors did not emerge in this solution. Factor 1 is a mix of Pleasantness and High Positive Affect terms, while factor 2 is a mix of Unpleasantness and High Negative Affect terms. In a gross way these factors can be considered positive and negative affect dimensions, respectively. However, the factors lacked the fidelity and circumplex structure that had been found elsewhere. It can be seen that virtually all terms lacked significant discriminant loadings. In fact, only four terms (contented, blue, offended, and discontented) had a salient convergent loading on one factor (greater than .35) and a salient discriminant loading on the other factor (greater than or equal to +/- .20).

Given the ambiguous two factor structure, scale construction became more tentative. All of the eight terms hypothesized to load cleanly on the PA dimension did so. However, the term strong had a relatively small convergent loading on this dimension. Given this, the term strong was dropped. Next, it was decided to add terms that had high convergent loadings on the PA/Pleasantness dimension. However, terms that had been found in previous research to clearly represent the Pleasantness dimension were excluded. With this criterion in mind, the terms joyful and merry were

Table 26. The varimax rotated factor solution from a two factor principal axes analysis of the MAACL terms.

Term	Factor 1	Factor 2	Term	Factor 1	Factor 2
satisfied	71	-06	irritated	08	67
happy	70	-05	upset	03	65
joyful	69	08	sad	-02	64
alive	66	-10	unhappy	-08	63
energetic	65	-07	alone	-08	62
pleasant	64	-04	mad	09	62
merry	63	-04	worrying	-05	62
warm	63	02	blue	-20	59
secure	63	-03	lonely	-10	58
cheerful	62	-05	discouraged	-18	57
pleased	62	-06	agitated	-02	56
enthusiastic	62	-07	annoyed	07	56
good	62	-00	suffering	-08	56
kindly	60	09	fearful	00	56
safe	59	01	frightened	-01	55
glad	59	-05	disgusted	-03	54
interested	57	-01	gloomy	-13	54
loving	54	09	offended	26	53
peaceful	54	-04	displeased	-17	53
contented	51	-20	nervous	07	53
active	51	-11	complaining	01	51
cooperative	49	08	afraid	03	51
good-natured	49	-06	disagreeable	15	47
amused	47	-15	tense	07	47
inspired	44	19	timid	13	47
lively	43	10	shaky	-11	45
understanding	42	08	discontented	-25	45
steady	41	-05	unsociable	-19	45
agreeable	40	00	hostile	09	44
strong	39	07	bored	-10	43
adventurous	38	-14	critical	-03	42
sympathetic	37	17	shy	16	40
powerful	26	03	impatient	-07	32
stubborn	23	20	quiet	13	32
aggressive	22	04	bashful	15	31
calm	22	02	cautious	23	30

Note. n = 168. MAACL = Multiple Adjective Affect Checklist. Decimal places have been omitted.

added to the other seven hypothesized PA terms (energetic, cheerful, enthusiastic, interested, active, good-natured, and inspired) to form a nine item PA scale. This scale displayed a coefficient alpha reliability estimate of .83. This reliability estimate, even though lower than the POMS PA scale, is sufficiently high to warrant use of this scale in further analyses.

A similar process was used for determining the MAACL scale of NA. All of the hypothesized terms (upset, worrying, annoyed, fearful, frightened, nervous, tense, and shaky) had strong convergent loadings on the NA/Unpleasantness factor. However, it will be recalled that the term tense displayed a significant discriminant loading on the PA dimension in the POMS analysis, and thus was excluded from the POMS NA scale. Given this, it was decided to exclude this term from the MAACL NA scale as well. Next, the two terms which loaded most strongly on the NA/Unpleasantness dimension but which were clearly not Unpleasantness terms were added to the scale (irritated and mad). The resulting nine item trait NA scale displayed an internal consistency estimate (coefficient alpha) of .81. Again, the reliability estimate for this scale is sufficiently high to warrant its use in further analyses.

Factoring of the mood and personality scales

The next analysis examined the personality, trait

mood, and state mood scales together, in order to evaluate the presence of the broad E/PA and N/NA structure hypothesized to underlie these domains. A plot of the eigenvalues from a principal components analysis of the six mood and personality scales is given in Figure 8. All of the criteria for the number of factors to extract indicated that two factors should be extracted. These two factors were extracted and rotated to an orthogonal varimax solution.

The scales and their factor loadings for the two factor solution are presented in Table 27. From this table the E/PA and N/NA structure of personality and mood can readily be seen. Factor 1 was the extraversion/Positive Affect dimension, while factor 2 was the neuroticism/Negative Affect dimension. The only measure which yielded salient discriminant loadings across factors was the state mood scales from the POMS. The POMS PA scale loaded negatively on the N/NA dimension, while the POMS NA scale loaded negatively on the E/PA dimension. This finding was surprising given the effort made to exclude POMS terms with large discriminant loadings. However, it does not mitigate the otherwise clear evidence for the robust E/PA and N/NA structure of mood and personality.

Factoring of the mood, personality, and Rorschach data

The six mood and personality scales were factored in conjunction with the Rorschach variables to determine if the

Figure 8. Plot of the factors and corresponding eigenvalues from a principal components factor extraction of the combined mood and personality scales.

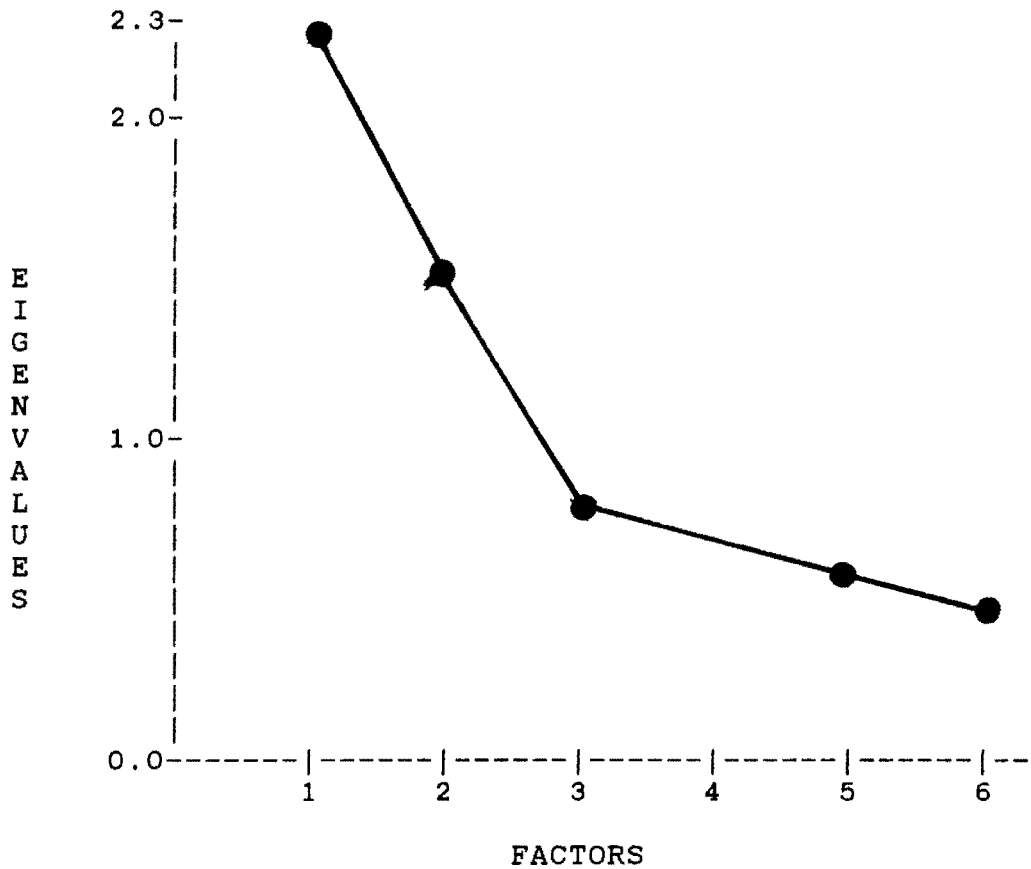


Table 27. The varimax rotated factor solution from a two factor principal components analysis of the MAACL PA and NA scales, the POMS PA and NA scales, and the E and N scales from the MMPI.

Scale	Final Comm.	Factor 1	Factor 2
POMS PA	72	83	-20
MAACL PA	57	79	04
MMPI E	49	70	-07
MAACL NA	67	09	82
POMS NA	63	-30	73
MMPI N	53	-07	73

Note. Decimal places have been omitted.

Rorschach measured the fundamental E/PA and N/NA structure of personality and mood. A plot of the eigenvalues from the principal components analysis of this data is presented in Figure 9. From this figure it was seen that the Watson and Tellegen criteria for the number of factors to extract was difficult to employ since there was no clear demarcation of factor structure. Similarly, Kaiser's criteria indicated that ten factors should be extracted, but there was little indication why ten factors should be more appropriate than nine or eleven. The scree test, however, indicated unambiguously that six factors should be extracted.

Despite this clear criterion, the varimax rotated solutions for the two through ten factor solutions were investigated. The five and six factor solutions were the first solutions to have clear E/PA and N/NA factors. Prior to these solutions only a small proportion of variance was explained in these scales by the factors extracted. Additionally, in the three and four factor solutions, the under-extraction of factors was apparent because the mood and personality scales formed a single bipolar factor, rather than two independent factors.

The five factor solution accounted for 42.4% of the total variance in the matrix, while the six factor solution accounted for 47.2% of the total variance. The variables and factor loadings for each of these solutions are presented in Tables 28 and 29.

Figure 9. Plot of the factors and corresponding eigenvalues from a principal components factor extraction of the Rorschach, mood and personality data.

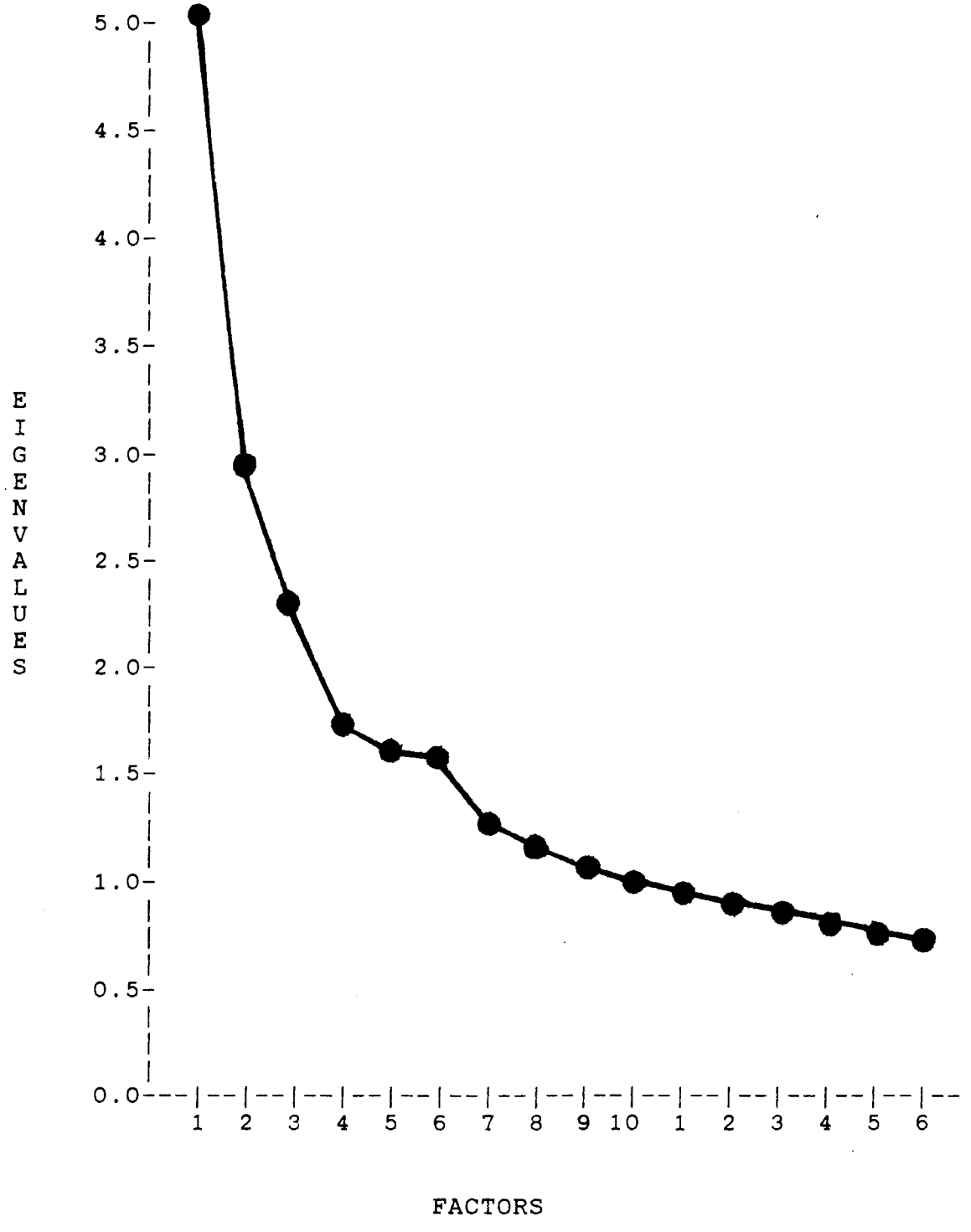


Table 28. The varimax rotated five factor solution from a principal components analysis of the Rorschach, mood, and personality data.

Var.	Final Comm.	F1	F2	F3	F4	F5
Lambda	69	-59*	49*	-20	20	14
FY	50	56*	30*	26	-04	-17
FC'	44	56*	-06	12	29	16
FM	35	54*	26	02	-00	-01
M	41	52*	35*	-09	-08	-09
S	53	49*	28	-04	39*	26
FC	36	49*	09	18	24	17
MOR	25	46*	-14	10	07	10
Sh-Bl	32	43*	05	36*	-03	02
FV	29	42*	10	28	-17	-03
FD	18	38*	-04	03	-05	16
FT	12	25	05	10	05	-21
D	79	04	87*	16	-02	-08
R	88	33*	81*	23	24	10
Dd	63	32*	68*	-08	15	18
Afr	30	-03	47*	08	-23	09
Zd	37	39*	-45*	-06	-02	12
a/(a+p)	08	01	-26	08	04	09
CF+C	53	22	-10	67*	13	08
YF+Y	48	-06	14	66*	03	-12
C-Sh-Bl	53	49*	-10	52*	04	-02
m	35	29	07	49*	13	03
TF+T	27	06	06	49*	-13	-09
C'F+C'	27	-02	-13	48*	05	17
VF+V	08	04	04	25	04	12
MAACL-PA	55	-04	-05	05	73*	-08
POMS-PA	60	-01	-11	-02	69*	-34*
E	40	25	13	08	44*	-35*
Ego	46	42*	-20	-18	-43*	-14
W	39	32*	-26	26	36*	15
N	54	11	06	-08	-04	72*
MAACL-NA	46	04	-01	19	-01	65*
POMS-NA	57	18	-06	18	-31*	63*

Note. Decimals have been omitted. * = loading above |.30|.

Table 29. The varimax rotated six factor solution from a principal components analysis of the Rorschach, mood, and personality data.

Var.	Final Comm.	F1	F2	F3	F4	F5	F6
S	56	62*	25	04	-03	26	19
W	65	57*	-27	-24	41*	19	-01
M	49	55*	32*	10	-04	-19	-20
FC	38	53*	07	14	17	14	13
FM	38	53*	23	18	02	-10	-07
FC'	46	49*	-10	34*	04	23	20
Mor	29	49*	-16	09	13	-04	02
FD	19	38*	-07	10	03	-13	11
D	79	02	87*	17	11	00	-04
R	93	46*	79*	06	25	14	04
Dd	63	36*	66*	13	-12	10	16
Lambda	69	-39*	52*	-39*	-16	25	14
Afr	30	-03	48*	01	07	-23	08
Zd	38	36*	-47*	08	-06	-09	07
a/(a+p)	08	01	-26	-01	08	03	09
Sh-Bl	50	14	01	64*	17	02	19
FV	46	10	07	64*	09	-11	12
FY	54	33*	26	58*	13	-03	-09
C-Sh-Bl	56	28	-13	55*	40*	04	09
FT	17	07	03	38*	01	09	-12
VF+V	27	-14	03	38*	09	13	28
CF+C	56	23	-10	13	68*	07	09
YF+Y	49	-08	16	14	66*	04	-06
m	41	35*	06	08	53*	04	-00
TF+T	32	05	07	06	52*	-15	-10
C'F+C'	28	-03	-12	09	45*	04	22
MAACL-PA	58	03	-05	05	02	76*	01
POMS-PA	62	02	-12	07	-02	73*	-26
E	50	10	10	43*	-03	50*	-22
Ego	46	22	-23	30*	-22	-44*	-15
N	60	13	05	02	-17	-08	74*
MAACL-NA	50	05	-01	05	10	-03	70*
POMS-NA	57	17	-07	05	12	-37*	62*

Note. * indicates a loading above |.30|. Decimals omitted.

The striking feature about both of these tables is the lack of overlap between the mood and personality factors and the Rorschach factors. In both the five and six factor solutions the last factor was the N/NA factor, while the E/PA factor directly preceded this. The first three or four factors in each solution were clear Rorschach factors.

In the six factor solution, which was the most appropriate solution to examine according to the scree test, only one Rorschach variable had a significant association with the mood and personality factors. This was the negative loading on the E/PA dimension from the Egocentricity index. In conjunction with the negative loading from the POMS state NA scale on this factor, it suggests that the Egocentricity index may measure introversive experiences of transient negative affect. This interpretation is not consistent with the traditional interpretation of this Rorschach variable, as it should reflect an over-estimate of personal worth.

From Table 29 it can also be seen that the mood and personality scales had only one significant association (out of 24 potential associations) with the Rorschach factors. The extraversion scale displayed a significant positive loading on the Rorschach's form-dominated shading factor. This, obviously, is also counter to the prediction based on traditional Rorschach interpretation.

Additionally, it is apparent that the Rorschach factors observed when the Rorschach was factored with the

mood and personality data correspond to the factors found when the Rorschach was factored alone. That is, in the five factor "combined" solution (Table 28), the first three factors were essentially the same as the three factor factors found when the Rorschach was factored alone (refer to Table 21). Similarly, in the six factor "combined" solution (Table 29), the first four factors were essentially the same as the four factor factors found when the Rorschach was analyzed in isolation (refer to Table 22). In fact, the three Rorschach factors from Table 28 all had convergent correlations with the three Rorschach factors from Table 21 in excess of .96. In a similar fashion, the four Rorschach factors from Table 29 all had convergent correlations with the four Rorschach factors from Table 21 in excess of .96.

This demonstrated three things. First, it demonstrated that the Rorschach solutions found earlier are stable. Second, it demonstrated that Rorschach variables are minimally impacted by the inclusion of other mood and personality data. Finally, as already alluded to, it demonstrated that the Rorschach contains virtually no overlap with the predominant model of self-rated mood and personality, because the mood and personality scales defined their own distinct factors within this combined factor analytic space.

A final point worth noting is in regards to the optimal number of factors to extract from the Rorschach. It

was noted earlier that problems became apparent when more than four factors were extracted from the Rorschach data. Factors began to shift and recombine in the five and six factor Rorschach solutions. The latter factors became difficult to interpret and it was found that the five and six factor extractions could not be rotated to an oblique solution within the default parameters of SPSSx. These problems suggested that only four factors should be extracted from the Rorschach matrix, even though the scree test suggested the extraction of five or six factors. In the combined mood, personality, and Rorschach data set, however, there was clear evidence from the scree test that six factors should be extracted. When rotated these six factors formed four Rorschach factors and two mood/personality factors. This finding lent further support to the indications that it was most appropriate to extract four factors from the original Rorschach correlation matrix.

DISCUSSION

The present research has demonstrated that the Rorschach test, despite its extensive use and continued popularity, does not have an internally consistent factor structure that corresponds to traditional variable interpretations. Further, this test does not measure the fundamental dimensions of mood and personality that over the course of the past 20 years have become the most widely accepted paradigm for the study of personality and mood. Instead, at the level of its most basic factor structure (the four factor solution), the Rorschach measures response frequency effects with two factors, the tendency to use form-dominated shading determinants with a third factor, and the tendency to use non-form-dominated color and shading gestalts with a final factor. Each of these factors will be discussed in more detail below.

The response frequency factors

In this study response frequency was observed to have two components rather than having its effects localized on a single factor. One of the response frequency factors was that of frequent responding to discrete blot locations versus integrated perceptual gestalts. The other response frequency factor was also bipolar and was of frequent responding and frequent determinant use of all kinds versus unarticulated or non-elaborated perceptions.

It was found that when these two factors were rotated, or when the Affective Ratio was dropped from the correlation matrix, the effects of R could easily be localized on a single factor. When this was done the resulting two factor structure corresponded well with two factors that had been found repeatedly in previous Rorschach factor analyses.

This indicated that the present sample and scoring procedures were not the "culprits" responsible for the fact that the expected Rorschach dimensions did not emerge. In addition, it seems very likely that the correspondence between the two hand rotated factors found in this study and the two dominant factors found in previous research would have been even greater and more remarkable had all previous analyses extracted the same number of factors, and used similar variables, testing procedures, and scoring systems.

The correspondence between this study and previous research makes the discrepancy between the present findings and Exner's factor analysis of data from "normals" (Mason, et al., 1985) even more glaring. Since the present study was the only other factor analytic study which used the Exner scoring system, and since both studies were ostensibly conducted on "normal" populations, there should have been much greater agreement between the results of this study and the Exner study. Part of the observed discrepancies are surely due to the use of slightly different variables in these two studies. However, it is unlikely that this

accounts for all of the observed differences. Further research would be valuable in sorting out additional reasons for the discrepancies between these two studies.

Returning to the two response frequency factors, it was found that they accounted for a substantial proportion of the total variance in the Rorschach correlation matrix (about 30 percent). This is valuable information in its own right, but it is also instructive to determine how much of the common variance the response frequency factors accounted for.

It may be recalled that the principal axes method of factor extraction was attempted on the Rorschach matrix. This procedure partitioned the matrix variance into two components--variance that could be explained by the other variables in the matrix (common variance) and variance that could not be explained by the other variables in the matrix (unique variance). The principal axes extraction was terminated because the Rorschach matrix had problems with colinearity--the fact that some variable(s) could be perfectly predicted by other variables in the matrix. However, the principal axes method was not terminated until after initial communality estimates were made for each of the Rorschach variables. Since the sum of the initial communality estimates gives the amount of common variance present in a matrix, the proportion of common variance accounted for by the Rorschach factors could still be

estimated.

Using this data, it was found that the two response frequency factors account for approximately 73 percent of the common variance among terms. In contrast, the form-dominated shading factor and the non-form-dominated color and shading gestalts factor together account for only about an additional 30 percent of the common variance. The figures indicate that the four factor solution explained more than 100 percent of the common variance in the Rorschach matrix. It is not impossible to explain more than 100 percent of the common variance because factors of "unique variance" can be extracted as well. In fact, this seems to have been the case with the five and six factor Rorschach solutions, as factors that were more idiosyncratic and difficult to interpret emerged in these instances. However, an additional reason why these figures sum to more than 100 percent is because the initial communality estimates tended to be too low and did not reflect the full impact of the colinearity which was present in the matrix. Despite this problem, the essential point that these figures bring home is the fact that the great preponderance of variability within the Rorschach data is simply due to the fact that subjects can give as many or as few responses to each card as they like.

As has been noted earlier, response frequency is the major uncontrolled feature of the Rorschach as a test, and

this feature adds to its clinically desired projective and unstructured nature. However, differential response frequency has also been one of the major problems encountered when utilizing the test for experimental research (e.g., since R is so directly related to many Rorschach determinants, it is impossible to conduct rigorous tests of mean differences for many variables unless R is equated across independent variable groups). Given the problems that response frequency causes in conducting research with the test, and given the fact that response frequency is the dramatic and overwhelmingly dominant source of variability within the matrix of Rorschach scores, it becomes imperative to know how important it is to measure the frequency with which a subject chooses to respond to the stimuli on the test. Fundamentally, it comes down to a question of whether or not response frequency variance is "error" variance or whether it is variance that has substantive clinical importance.

A clue to the appropriate answer to this question comes from a review of Exner's text on the Comprehensive System (1986). At no point in this text does Exner give an interpretation to response frequency, even though the interpretive significance of all other variables is covered in substantial detail. Since no interpretation is given to this variable by Exner, since it is "controlled" for by percentages in the Comprehensive System's structural

summary, and since Exner has not reported any research on its meaning, it seems that Exner himself views this variable as error. At the very best, it seems that Exner's general hope has been that the impact of this variable can be ignored.

In addition to the dearth of information given by Exner on response frequency, there has also been a dearth of other empirical data on response frequency effects. Previously it was noted that out of the sixteen factor analytic studies reviewed, only one had non-Rorschach variables that loaded significantly on the response frequency factor. This was the Williams and Lawrence (1953) study which found verbal and performance IQ to load highly on the response frequency factor. However, this finding was not replicated in six other studies that included measures of IQ (Borgatta & Eschenbach, 1955; Consalvi & Canter, 1957; Cox, 1951; Lotsof, 1953; Lotsof, et al., 1958; Singer, et al., 1956).

Further, when the correlation matrices which accompanied most of the factor analytic studies were evaluated, only Williams and Lawrence (1954) reported substantial raw correlations between R and other non-Rorschach variables. These authors found R to correlate with the following MMPI scales: Ma (.50), Es (or Ego strength, .38), and Pa (-.32). These correlations make sense interpretively. However, given that the Williams and Lawrence data is idiosyncratic

with regards to R and intelligence, these correlations with the MMPI are also somewhat suspect.

In general then, the previous data give little evidence that R has any significant interpretive importance. However, given that the present study has a variety of variables that could shed some interpretive light on R (including MMPI data), exploratory analyses were conducted to further evaluate the meaning (or lack of meaning) for response frequency.

It will be recalled that in the previously reviewed studies R was localized onto a single factor. In the present study, however, R split onto two separate factors, which served to dilute the "pure" impact of response frequency. Therefore, it was decided to simply examine the magnitude of raw correlations between R and the other 231 mood, personality, and intelligence variables that were available. These variables included the WAIS-R measures of verbal, performance, and full scale IQ; the BDI; the ten clinical and three validity scales from the MMPI; the factor analytically derived MMPI scales for E and N; the POMS and MAACL PA and NA scales; the traditional POMS scales; all of the POMS and MAACL individual terms; and three ratings of the strongest emotion from a subject's earliest memory (PA, NA, and love-versus-hate).[5]

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[5] These ratings were blindly made by me on a three point continuum for each dimension.

Out of these 231 variables, response frequency correlated significantly with only three variables (.05, two-tailed). Response frequency correlated with the MMPI extraversion scale at .22 (alpha = .016), the MMPI hypochondriasis scale at .20 (alpha = .02), and the MMPI hysteria scale at .13 (alpha = .041). Since 231 correlations were evaluated at the .05 level of significance for this analysis, approximately ten correlations would be expected to occur by chance alone. Thus, little stock can be placed in the three low-magnitude correlations which did emerge. In addition, it will be noted that the MMPI scales found to correlate significantly in the present analyses do not correspond to the MMPI scales that Williams and Lawrence (1954) found to correlate significantly with R.

Thus, consistent with Exner's failure to give an interpretation to response frequency, the empirical evidence suggests that R simply measures error. Given this, it can be concluded that the traditional use of the Rorschach, where a subject can give as many or as few responses as desired, seriously compromises the validity of the test, as approximately seventy percent of the common variability among Rorschach scores is simply due to error (response frequency).

This fact alone calls into question almost all research conducted on the Rorschach, since most studies do not control for this variable. It seems that until response

frequency is adequately controlled, studies that continue trying to validate Rorschach variables will have potentially significant findings "swamped" by the effects of response frequency. Additionally, until R is controlled, significant results that are reported will have to be interpreted with great caution unless replicated by other investigators because many "significant" results may disappear once all the error variance is removed from the data.

In a previous chapter three methods for controlling R were discussed: partialling R from a matrix of variables, turning the sum of each variable into a percentage of R, and determining a set number of responses that should be given to each card. At that time utilizing percentages appeared to be the most promising solution since this would not have affected the unstructured nature of the test. However, several percentages were utilized in the present study (Lambda, the Affective Ratio, and the Egocentricity Index). A review of Table 22 demonstrates that even though these variables are R-controlled, two out of the three variables still load most strongly on one of the response frequency factors. Therefore, the evidence now suggests that the best way to reduce the tremendous amount of error variance within Rorschach scores is to limit the number of responses that each subject can give to each card.

Since the mean number of responses to all ten cards hovers around 20, across all child, adult, patient, and non-

patient samples, it seems reasonable to request that each subject give just two responses per card. Adopting this strategy, or a variation of it as Holtzman has, will perhaps better serve the efforts to place the Rorschach test on a firmer empirical footing.

Researchers may continue to be unwilling to limit the number of responses a subject can give to each Rorschach card for fear of tampering with the projective nature of the test. If this is the case, future research efforts must, at the very least, determine how the Rorschach's factor structure is affected by different methods for controlling R. If the same factors are found (with the exception of response frequency) when the number of responses is fixed, when R is partialled, when all variables are used as percentages, or when no efforts are made to control R, then there is greater hope for a more empirically grounded understanding of the Rorschach's basic structure.

The form-dominated shading factor

The factor of form-dominated shading (FV, Shading Blends, FY, Color-Shading Blends, VF+V, FT, FC', and the Egocentricity Index versus Lambda) accounted for 6.5 percent of the total Rorschach variance. This factor resembled a dimension of N/NA hypothesized to be present in the Rorschach on the basis of traditional theory. As expected from theory, form-dominated vista (FV), form-dominated

diffuse shading (FY), and Shading Blends converge on this factor. However, in contrast to the traditional theory hypotheses, Morbid (Mor), inanimate movement (m), and the Egocentricity Index (Ego) do not load in the expected fashion on this factor. The Egocentricity Index loads on this factor in the direction opposite of prediction, while Morbid and inanimate movement load on separate factors. Additionally, Lambda has a strong negative loading on this factor. According to traditional theory, Lambda was predicted to be independent of this factor. Thus, there is only partial and equivocal support for an internally consistent factor of N/NA within the Rorschach data.

The form-dominated shading dimension is even more questionable as an N/NA factor in light of latter analyses. The extraversion scale loads positively on this factor, while none of the N/NA scales displays a significant association with this dimension. Therefore, it seems clear that the form-dominated shading factor can not be considered a neuroticism dimension.

Oddly enough, however, a post-hoc exploration of what else this factor measures, revealed that it correlates significantly (alpha = .05, two-tailed) with 44 of the 231 other mood, personality, and intelligence variables. These significant correlations are presented in Table 30.

From the table it can be seen that this factor does seem to tap negative and unpleasant moods (measured as both

Table 30. The statistically significant (.05, two-tailed) correlations between the form-dominated shading factor and the 231 other personality, mood, and intelligence variables.

Variable	Corr	Variable	Corr	Variable	Corr
M-hopeless	26	P-uncertain	18	P-quiet	-15
M-awful	24	M-bashful	-17	P-sad	15
M-desperate	24	P-helpful	17	P-fatigued	14
M-tense	23	P-patient	-17	M-clean	-14
P-blue	20	P-sympathetic	-17	M-lively	14
M-offended	20	P-uneasy	17	P-muddled	14
P-weary	20	P-worn out	17	P-peeved	14
M-adventurous	-19	M-annoyed	16	P-resentful	14
Extraversion	19	M-grim	16	P-restless	14
P-Fatigue sc.	19	P-relaxed	16	P-unhappy	14
M-goodnatured	-19	P-Tension sc.	16	P-Depressed sc.	13
MMPI-Hy	19	P-bushed	15	P-miserable	13
M-shaky	19	M-discouraged	15	M-agreeable	-13
M-discontented	18	P-NA scale	15	WAIS-FSIQ	12
P-exhausted	18	P-on edge	15		

Note. M = MAACL, P = POMS, sc. = scale. Decimals have been omitted.

states and traits), particularly those that are of high intensity (e.g., hopeless, awful, desperate), or those that denote fatigue and listlessness (e.g., weary, fatigued, worn-out, etc.). However, this relatively clear picture is muddled because this factor is also associated positively with variables like the extraversion scale (as found in the factor analysis), and the Hysteria scale from the MMPI. Further, the factor displays an odd pattern of correlations. For example, both "relaxed" and "tense" correlate positively with the factor, as do "lively" and the various fatigue terms. In a similar vein, "helpful" is positively correlated with the factor but "sympathetic" is negatively correlated with the factor.

In summary, the form-dominated shading factor is only partially consistent with the hypotheses generated on the basis of traditional Rorschach theory. In the post hoc analyses this factor does display some convergent correlations with measures of negative affect. However, in the factor analysis some important Rorschach variables hypothesized to be present on this factor do not load as expected, and the strongest convergent loading on this factor from a self-report measure of personality or mood is from the extraversion scale. Further, this factor has paradoxical correlations with other mood and personality measures. Finally, all the correlations between this factor and other variables are of a very low magnitude. Taken together, the

evidence suggests that the form-dominated shading factor is not an internally consistent nor an externally validated neuroticism-Negative Affect factor.

The non-form-dominated color and shading gestalts factor

The non-form-dominated color and shading gestalts factor (CF+C, YF+Y, m, C'F+C', W, C-Sh-Bl, TF+T vs Ego) found in this study is similar to factors found in previous research. For example, the factor found in this study bears similarity to the "cognitive/emotional investment factor" found in studies 1, 2, 3, 5, 8, and perhaps 7 from Table 6. In addition, the present factor is similar to the "general emotional investment factor" found in studies 6, 7, 8, and 11 from Table 8. None of these factors are identical to the factor found in the present study, but they all have a notable resemblance.

It seems likely that the non-form-dominated color and shading factor would also be comprised of vague perceptions, had Exner's scores for developmental quality been included in the matrix. (This hypothesis is suggested because the color and shading features of perception take dominance over the form features.) The fact that "whole" responses also load strongly on this factor indicates that the perceptions being tapped by this factor are vague but holistic "impressions", rather than acutely focused and differentiated perceptions. This interpretation of the factor is further

supported by its negative loading from the Egocentricity Index (the egocentricity index is predominantly comprised of pair responses which tend to be discrete, well differentiated, and sharply focused perceptions).

The significance of this factor can profitably be considered from the theoretical conceptualizations articulated by David Shapiro. In 1977 Shapiro discussed the perceptual foundation for color responding. In his conceptualization, a firm distinction is made between form-dominated color perception and non-form-dominated perception. He states:

> (non-form-dominated) Color perception as such is a more immediate and passive experience than form perception, requiring less in the way of perceptual tools or organizing capacity. It is associated with a passive perceptual mode in that it becomes more dominant, more compelling in quality, and perhaps even antagonistic to form articulation in conditions in which active perceptual organizing capacity is impaired or is only rudimentary... (p. 269).

For Shapiro the "passive", non-form-dominated mode of perception and the "active", form-dominated mode of perception can be seen as two potentially interacting modes of perception. However, he believes that the non-form-dominated perceptual style is a developmental precursor to the more active and differentiated form-dominant style, as it is

a more sensorially direct and immediate perceptual style that has the quality of "capturing" attention, much like the attention of a child is captured by what is bright, shiny, or novel.

Interestingly, and in contrast to traditional Rorschach theory, Shapiro (1977) does not relate non-form-dominated color responses to affective experience per se. As evidence he cites the well known examples of non-form-dominated but "affectless" color responses that are gathered from schizophrenic or psychopathic patients. Instead, Shapiro argues that unmodulated affect expression, the traditional interpretation of non-form-dominated color responses, is only one potential experience of the general non-form-dominated cognitive style.

In his earlier and classic work Neurotic Styles, Shapiro (1965) links the cognitive styles discussed above with individual differences in personality. He believes the non-form-dominated color response style is the mode of perception used by the hysterical personality type. This mode of perception is in stark contrast to the active, differentiating, and form-dominated mode of the obsessive or compulsive personality type. Shapiro states:

> I am suggesting that hysterical cognition in general is global, relatively diffuse, and lacking in sharpness, particularly in sharp detail. In a word, it is impressionistic. In contrast to the active,

> intense, and sharply focused attention of the obsessive-compulsive, hysterical cognition seems relatively lacking in sharp focus of attention; in contrast to the compulsive's active and prolonged searching for detail, the hysterical person tends cognitively to respond quickly and is highly susceptible to what is immediately impressive, striking, or merely obvious.
>
> These same characteristics are evident in the Rorschach test...(pp. 111-112).

Elsewhere, for both theoretical and empirical reasons it has been argued that the distinctions between chromatic color, achromatic color, shading, and texture are overblown and unnecessary (see Singer & Brown, 1977; Wittenborn, 1950a, 1950b). The present analysis lends further credence to this position, but only <u>for non-form-dominated responses</u>. At the non-form-dominated level there appears to be little need for differentiating color and shading responses into discrete scoring categories, as all categories converge on a single factor. It should be noted, however, this is not as clearly the case with form-dominated responses. At this level of analysis chromatic and achromatic color responses appear to be similar to each other, as they converge together on a factor. However, these determinants are different from the shading, texture, and vista responses, which in turn, are similar to each other and converge on a separate factor.

With these conceptualizations in mind, it seems fairly clear that the non-form-dominated color and shading gestalts factor found in this study corresponds both to the findings of previous research and to the "hysterical" mode of cognition articulated by Shapiro. Thus, while this factor does not correspond to self-report measures of the dominant personality and mood dimensions, there is theoretical evidence suggesting that this factor corresponds to a potentially significant cognitive style that has not yet been fully validated empirically. It would be valuable for future research to pursue this connection further in order to either substantiate or discredit this interpretation of the non-form-dominated color and shading gestalts factor.

Along these lines it may also be valuable to examine the concordance of this factor with Jung's (1971) personality dimension of intuition versus sensing. For Jung, the intuitive person perceives with intuitive, almost unconscious hunches, and focuses on potentials and possibilities with a "head in the clouds" style of approaching the world. This is in contrast to the realistic, data-driven, "stick to the facts" approach of the sensing type. Further, it is the intuitive person who comes away from an experience with a "feel" for what happened, rather than a veridical recollection of the point by point occurrences (see also Keirsey & Bates, 1984).

In an effort to discern what else this factor is

associated with, factor scores from this factor were correlated with the other 231 mood, personality, and intelligence variables. The significant correlations (alpha = .05, two-tailed) from this exploratory study are presented in Table 31.

It can be seen that this factor is slightly related to measures of personality and mood (primarily traits). There is both a positive and negative quality to these traits, though in general the terms and scales that correlate with this factor carry a sense of impulsiveness or highly charged experience. Additionally, as Shapiro's conceptualization would suggest, this factor is positively related to the "hysteria" scale from the MMPI.

The movement scores

In a previous chapter the question was raised as to whether or not it would be best to conceptualize movement scores as being on a continuum, rather than differentiating them according to content and treating them as discrete scoring categories. The present results do not directly address the continuum scoring part of this question. However, this study does provide data that have bearing on the portion of the question related to differentiating movement scores on the basis of content.

From the factor loading matrices it can be seen that Human Movement and Animal Movement scores display the same

Table 31. The statistically significant (.05, two-tailed) correlations between the non-form-dominated color and shading gestalts factor and the 231 other personality, mood, and intelligence variables.

Variable	Correlation	Variable	Correlation
M-daring	24	MMPI-Hy	16
M-awful	19	M-alive	15
M-panicky	18	M-happy	15
M-sunk	18	M-pleased	15
M-terrified	18	M-stormy	15
M-upset	18	P-active	14
M-inspired	17	MMPI-Hs	14
M-loving	17	MMPI-Pd	13

Note. M = MAACL, P = POMS. Decimals have been omitted.

pattern of convergent and discriminant loadings. The patterns for these scores, however, are very different from the pattern of loadings shown by the Inanimate Movement scores. Inanimate Movement scores consistently load on the non-form-dominated color and shading gestalts factor. This finding suggests that Inanimate Movement is perceptually much more similar to the diffuse "hysterical" style of cognition discussed by Shapiro than the other forms of movement.

In addition, Exner (1986) reports that the "most common types of Inanimate Movement responses include fireworks, explosions, blood dripping, water falling, and trees bending" (p. 105). Except for the last example, these common types of Inanimate Movement are considered vague perceptions in Exner's scoring system for developmental quality. Further, all of these responses, except the last, can be considered "non-form-dominated movement" responses, as the features of movement outweigh the sharply defined form features of perception. Since most Inanimate Movement responses tend to be non-form-dominated, and since m consistently loads on this factor in the present study, it would seem most useful to measure movement in the same manner that other determinants are measured--namely by their degree of form dominance, rather than by their content. Since content is always scored separately within the Exner system, little of empirical value would be lost by adopting

this strategy.

At the same time, however, it is recognized that the Human Movement score--in particular--holds an almost sacrosanct position in the hearts of many Rorschach clinicians. Altering the scoring of movement responses would likely meet with a great deal of resistance because of this, and because it would necessitate a rather broad revision of Rorschach conceptualization and clinical lore. However, adopting a form-dominated versus non-form-dominated approach to scoring movement responses would not prevent the coding for Human Movement, and it would have three additional benefits. All of these benefits would serve to amend the somewhat contorted logic that is present within the current scoring of Human Movement responses.

First, within the Exner system, Human Movement responses assume the presence of form (see Exner, 1986, p. 104). For example, the response "this is two women stirring a kettle over a fire" to Card III is a typical Human Movement response. However, the same Human Movement score is given to the responses "anger", "depression", or "love", even though nothing else may be articulated. Obviously the psychological processes involved in these two kinds of responses are dramatically different. The suggested form- versus non-form-dominated movement scoring would capture these differences much more adequately than the present system.

Second, there is often confusion present in differentiating Human and Animal Movement responses. The rule is that Animal Movement is scored when the object is moving in some species-specific way. If an animal is involved in some action that is not species specific, the score is Human Movement to reflect the fact that the percept has been elaborated by fantasy. With this twist on the general logic, responses such as "a dancing bear", "a flying elephant", or "a talking horse" obtain Human Movement scores. However, bears dance in circuses, "Dumbo" the elephant did fly in the Disney movie, and "Mr. Ed" did "talk" in the popular television series. Further, many birds "talk" (parrots and mynas); seals, dolphins, and whales play catch and other games; and chimpanzees and apes communicate, smile, and have other "human" reactions. Changing to a form-dominated/non-form-dominated scoring of movement would dismiss the problem of determining whether an activity is species-specific or not.

Finally, another point where the distinction between Human and Animal Movement scores breaks down is with regards to mythological creatures. The present scoring system does not indicate how to score the common "bigfoot" or "monster" seen on Card IV. The same problem is present with less common creatures such as a "centaur" or a "harpy". Should they be coded "man" or "beast"? Does it really matter? The present research suggests that it does not matter whether

these responses are scored M or FM. Again, the factor loadings for both of these variables are so similar to each other across factors that they could be interchangeable.

The point of this is simply to note that the present scoring system for movement obscures what may be the most important issue--that there is a replicated and theoretically articulated perceptual style factor which the Rorschach appears to measure and which it could measure better if more care was taken within the scoring system. Very little data emerged from the present study which gave credence or potential validity to the Rorschach. The non-form-dominated gestalts factor is essentially the most salient positive finding. From an empirical standpoint any future efforts to validate this test should attempt to refine and maximize this factor. Changing the content based scoring of movement responses to a form-dominated/non-form-dominated scoring system would be one step in this direction.

Problems with the present study

The present study has several notable problems which make interpretation of the results somewhat tentative. First, as was noted and discussed earlier, the Rorschach norms for the current sample of college students are different than the norms reported by Exner. This leaves the study open to criticisms on these grounds, and could suggest

to some that the sample was the reason the major hypotheses of this study (finding corollary dimensions of E/PA and N/NA within the Rorschach) are not supported. However, it was shown earlier that Exner's norms are idiosyncratic when compared to norms collected by other investigators, while the norms for the present study are more compatible with the values found by other researchers. In addition, the factor structure of the Rorschach found in the present sample is in greater agreement with previous factor analytic studies than is Exner's analysis of data from normals. These points are further evidence that the current sample is not responsible for the lack of concordance between the Rorschach and other measures of mood and personality.

It is still unclear, however, why the factor structure found in the present study is so different from the factor structure found by Exner and his associates (Mason, et. al, 1985). Part of the discrepancy may be due to the inclusion of slightly different variables in each study. For example, the present study excluded special scores and scores of form quality and developmental quality. It is conceivable that inclusion of these variables would have led to a different observed factor structure--and perhaps one that was more complimentary to the factor structure observed by Mason et. al (1985). Further, inclusion of these scores may have yielded additional information about the quality of perceptual capacities. However, it is still very unlikely that

this additional information would have had significant overlap with personality and mood measures.

Finally, the greatest problem with this study is its lack of other measures of personality and mood. Before discussing this problem in greater detail, however, it must be pointed out that the lack of other measures of personality and mood is only a problem with regards to the external validity of the Rorschach. Thus, this problem does not ameliorate or dilute the significant finding that the Rorschach lacked a theoretically predicted factor structure. In other words, the present study found no evidence for an internally valid two-dimensional structure. This structure should have been present on the basis of traditional Rorschach variable interpretation. Since it was not, the addition of other personality or mood measures could not alter this fact.

Despite this caveat, it is clear that the approach taken in this study for operationalizing mood and personality was limited. It may be recalled that Leary (1957) differentiated three levels of personality measurement. Level I is the "observational level", in which an individual's behavior and actions can be rated by an observer. Level II is the self-report or "conscious level", in which individuals' rate or reveal themselves on questionnaires, checklists, or in interviews. Level III, is the "private level", in which data about the individual is collected from

projective techniques that access more tacit or unconscious aspects of personality.

All external validity measures for this study come from the domain of Level II. Great care was taken to ensure that the broadest, most well replicated and validated mood and personality scales from within this domain were included. However, within the domain of self-report measures, the E and N and PA and NA scales represent only a small percentage of measures that are available. A more comprehensive test, such as one based on the currently popular five-factor model of personality (e.g., Costa & McCrae, 1985), or a test based on other conceptualizations of personality (e.g., Jung's), may have been appropriate to include.

Additionally, it is possible that other measures from the domain of Level III would have demonstrated greater convergence with the Rorschach dimensions. For example, it may have been valuable to include scales from the Thematic Apperception Test or the Sentence Completion Test since, theoretically, these measures operate at a similar level of analysis.

Finally, given the perceptual capacities that appear to be an inherent aspect of the single Rorschach factor that has found some consistent support over the years--the non-form-dominated color and shading gestalts factor--it may have been valuable to include other perceptual tests as external validity criteria. Several perceptual and neuro-

psychological tests come to mind in this regard: the Rod-and-Frame test to measure internal-external locus of control; the Halsted-Rietan's Trail Making test; or the Booklet Category Test.

Conclusion

In summary, it was found that the Rorschach test does not display the internally consistent two-dimensional structure of personality and mood that was predicted to be present on the basis of traditional variable interpretation. Further, the Rorschach does not display any systematic relationship to the E/PA and N/NA dimensions of personality and mood.

The most promising Rorschach finding from this study is the presence of a non-form-dominated color and shading gestalts factor. This factor is similar to a factor found consistently in previous Rorschach factor analytic research. Further, this factor shows promise as being an operationalization of the "hysterical versus obsessive" cognitive style discussed by Shapiro (1965, 1977). Efforts to maximize the fidelity of this factor should begin by discarding the content-based scoring of movement responses in favor of adopting the form- non-form-dominated scoring that typifies all other Rorschach determinants.

Finally, the results indicate that response frequency is the overwhelming source of common variance within a

matrix of Rorschach variables. This variance was determined to be error variance, and a strong argument was made for fixing the number of responses a subject can make to each card in order to limit the impact of this source of error. Limiting this source of error is seen as the only way to adequately evaluate the strengths and weaknesses of the Rorschach as a test.

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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