Rorschach concomitants of intelligence.

Sarah E. A. Bertrim
University of Windsor

Follow this and additional works at: https://scholar.uwindsor.ca/etd

Recommended Citation
https://scholar.uwindsor.ca/etd/3370

This online database contains the full-text of PhD dissertations and Masters' theses of University of Windsor students from 1954 forward. These documents are made available for personal study and research purposes only, in accordance with the Canadian Copyright Act and the Creative Commons license—CC BY-NC-ND (Attribution, Non-Commercial, No Derivative Works). Under this license, works must always be attributed to the copyright holder (original author), cannot be used for any commercial purposes, and may not be altered. Any other use would require the permission of the copyright holder. Students may inquire about withdrawing their dissertation and/or thesis from this database. For additional inquiries, please contact the repository administrator via email (scholarship@uwindsor.ca) or by telephone at 519-253-3000ext. 3208.
RORSCHACH CONCOMITANTS OF INTELLIGENCE

by

Sarah E. A. Bertrim

A Thesis
Submitted to the Faculty of Graduate Studies and Research
through Psychology
in Partial Fulfillment of the Requirements for
the Degree of Master of Arts at the
University of Windsor

Windsor, Ontario, Canada
2002
© 2002 Sarah Bertrim
The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author’s permission.

L’auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

L’auteur conserve la propriété du droit d’auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.
ABSTRACT

This study is an attempt to elaborate on the conceptualization of intelligence as a facet of overall personality organization. The purpose of this study was to evaluate Rorschach variables that have been conceptually or empirically associated with cognitive complexity, and to improve upon previous research in this area. Archival data from a heterogeneous sample of 80 clinical and community adult participants were used. Participants' scores on the Wechsler Adult Intelligence Scale – Revised (WAIS-R) or Third Edition (WAIS-III) and on selected variables of the Rorschach according to the Comprehensive System (Exner, 1993) were analyzed. The Rorschach variables included were Zf, ZSum, W, W+, DQ+, Blends, PureF, M with good form, FQx(0 and +), FQf(0 and +), and R. A principal components analysis (PCA) of these Rorschach data revealed three components, which were named Organizational Complexity, Blends Complexity, and Form Complexity. Simple linear regression analyses revealed that Blends Complexity was the only component reliably predicted by WAIS-R and WAIS-III full scale, verbal, and performance intelligence indices. The Blends Complexity component was defined primarily by the presence of Blends and M with good form, and the absence of Pure Form responses. A logistic regression analysis also revealed that the Rorschach Reflection response was also reliably predicted by WAIS-R and WAIS-III full scale, verbal and performance indices. Finally, exploratory analyses of the relationship between these Rorschach variables and subtests common to the WAIS-R and WAIS-III revealed some points of interest. Of note, the Comprehension subtest was significantly correlated with a wide range of Rorschach variables. In addition, results were also analysed by response style subgroup (ambivalent (n=35), introversive (n=31) and extratensive (n=14)), with only the ambivalent subgroup approximating the results for the overall sample. These results and their relation to previous research were discussed, and limitations of the present study as well as suggestions for future research were also presented.
ACKNOWLEDGEMENTS

I would like to express my gratitude to my thesis advisor, Dr. S. Hibbard, for his continued enthusiasm and support in this endeavour. His guidance and insights were invaluable in shaping this project, and his passion for research has inspired me to pursue additional research ventures.

I would also like to thank the members of my thesis committee, Drs. R. Daly and A. Hall, for their valuable contributions to this project. They provided constructive suggestions that certainly improved the calibre of this study. I am also appreciative of their interest in the topic and their collaborative approach to this process, which ultimately made it a positive experience in my professional development.

Finally, I am indebted to my fiancé Chris Wylie, who has demonstrated unconditional encouragement throughout this lengthy and challenging experience. His patience and support have greatly facilitated my work over the past 2 years, and I am grateful for his continued devotion.
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td></td>
<td>ACKNOWLEDGEMENTS</td>
<td>iv</td>
</tr>
<tr>
<td></td>
<td>LIST OF TABLES</td>
<td>vii</td>
</tr>
<tr>
<td>Chapter I</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>General Overview</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Broadening the Concept of Intelligence</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Integrating Intelligence and Personality</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>The Nature of the Rorschach</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Approaches to the Study of Intelligence and</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Personality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Development of Exner’s Comprehensive System</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>The Rorschach as a Problem-Solving Task</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Developmental Considerations</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>The Rorschach &amp; Intelligence: Conceptual and</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Empirical Associations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limitations of Prior Studies</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>The Present Study: Overview</td>
<td>37</td>
</tr>
<tr>
<td>Chapter II</td>
<td>METHOD</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Participants &amp; Procedure</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Measures</td>
<td>43</td>
</tr>
<tr>
<td>Chapter III</td>
<td>RESULTS</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Interrater Reliability</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Normality of the Data</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Considerations for Regression Analysis</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Data Reduction Analyses</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Regression Analyses</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Regression Analyses by Response Style Subgroup</td>
<td>62</td>
</tr>
</tbody>
</table>
Analysis of the Rorschach Reflection Variable 71
Exploratory Examination of WAIS-R and
WAIS-III Subtests 73

IV DISCUSSION 77
Discussion of Results 77
Response Styles 83
The Reflection Variable 85
Exploratory Findings 86
Strengths, Limitations, and Future Research 90

V REFERENCES 94

VI VITA AUCTORIS 104
LIST OF TABLES

1) Variables Included in the Present Study
2) Rorschach Interrater Agreement
3) Correlations Among Dependent Variables
4) Total Variance Explained for PCA (R excluded from analysis)
5) Variable Loadings on Three Extracted Components (R excluded)
6) Total Variance Explained for PCA (R included)
7) Variable Loadings on Three Extracted Components (R included)
8) Linear Regression Analyses Using FSIQ, VIQ, and PIQ to Predict Outcome
9) Selected Descriptive Statistics for Ambient, Introersive, and Extratensive Subgroups
10) Linear Regression Analyses Using FSIQ, VIQ, and PIQ to Predict Outcome in Ambient Subgroup
11) Linear Regression Analyses Using FSIQ, VIQ, and PIQ to Predict Outcome in Introersive Subgroup
12) Linear Regression Analyses Using FSIQ, VIQ, and PIQ to Predict Outcome in Extratensive Subgroup
13) Logistic Regression to Predict Reflection Category
14) Correlations Between WAIS-R and WAIS-III scores and Rorschach Variables
Chapter I

Rorschach Concomitants of Intelligence

Within the broad theoretical domains of intelligence and personality, contemporary and more traditional theorists have suggested that, when contemplating the way in which an individual functions in his or her world, it is important to consider both personality and cognitive or intellectual factors. Despite the tendency of many professionals, researchers, and theorists to segregate the domains of intelligence and personality, many emphasize that this division is artificial and misleading. As a result, a variety of models have been presented in which personality and intelligence are integrated to more adequately represent the influence of these processes on the individual’s approach to life challenges. While the details of these models differ, they share the idea that cognitive resources and personality characteristics are mutually influential and perhaps impossible to disentangle when considering how an individual functions in the world. Many models include the concept of adaptability and emphasize the importance of the individual’s capacity to be flexible and accommodate for or reconcile changing personal needs and environmental circumstances (Block & Kremen, 1996). Furthermore, some have suggested that intelligence should be considered more broadly in the context of the individual’s overall personality organization (Ackerman & Heggestad, 1997). Specifically, a number of theorists have emphasized the importance of the ego in guiding the individual’s successful adaptation to personal and environmental constraints, with functions of the ego including monitoring and coordinating processes such as controlling and organizing conscious thought, managing reality, reasoning, problem solving, decision making, and intelligence (Ford & Urban, 1998). In this way,
intelligence can be viewed as one function of the ego or an aspect of the individual’s overall personality organization.

Throughout the history of the Rorschach Inkblot test it has been suggested that, in contrast to self report personality tests, an individual’s performance on this task is not only a reflection of personality characteristics, but is also influenced by their level of intelligence or cognitive complexity. Cognitive complexity or ability refers to the capacity for mentally organizing, synthesizing and meaningfully integrating information or features of the environment, and has historically been associated with the task presented in the Rorschach (Blatt & Allison, 1963; Exner, 1993; Viglione, 1999). The Rorschach has traditionally been considered a measure of personality function, and is typically used in that regard. However, it has been acknowledged that cognitive or intellectual capabilities influence performance on the Rorschach in specific ways. In addition, developmental changes are reflected in the Rorschach with the individual becoming more capable of complex and integrative Rorschach responses as s/he matures intellectually and characterologically. Thus, the Rorschach allows the evaluator to observe a sample of the individual’s cognitive and information processing ability as it occurs in the context of a relatively unstructured test of personality function. From this perspective, intelligence can be viewed as one aspect of the individual’s overall personality functioning. The Rorschach is unusual, as it captures both of these aspects of functioning in action as the individual attempts to deal with the challenge presented.

An extensive review of the literature revealed that, while the nature of the relationship between Rorschach variables and measures of intelligence has been explored empirically, most studies on this topic have been flawed and results have been of unclear
significance. Despite the lack of a systematic investigation of intelligence correlates with Rorschach variables, many theorists and researchers in the field of personality assessment maintain that the Rorschach also provides insight into an individual’s level of intelligence or cognitive complexity. As such, further empirical investigation of this question is merited. In particular, intelligence correlates of the Rorschach would be expected to mark the complexity or level of sophistication of the individual’s ability to organize and synthesize discrete pieces of ambiguous information into an integrated, meaningful whole. This would provide an indication of the evaluatee’s cognitive abilities and information processing style as they are applied in the context of his/her overall personality. It has also been suggested that the complexity with which the individual can manage the information presented in a projective personality task like the Rorschach might reflect the individual’s ability to function adaptively in real life (Bruner, 1951; Klein, 1951).

The present study is an attempt to elaborate on the conceptualization of intelligence as a facet of overall personality organization. The primary purpose of this study is to systematically evaluate the relationship between the Wechsler Adult Intelligence Scale - Revised (WAIS-R; Wechsler, 1981) and Wechsler Adult Intelligence Scale - Third Edition (WAIS-III; Wechsler 1997) measures of intelligence and specific Rorschach variables which have been related to intelligence either conceptually or empirically. This will clarify and expand upon previous findings regarding intelligence correlates of the Rorschach by remedying some problematic aspects of prior studies. Second, this study will be exploratory with respect to the relationship between some of the remaining Rorschach variables of the Comprehensive System (CS; Exner, 1993) and
the WAIS-R and WAIS-III. This may provide additional insight into the relationship between personality characteristics and intelligence, and may generate additional hypotheses in this regard. Finally, the results of this study will be used as a basis for future work on clarifying the nature of the relationship between intelligence and personality, including the evaluation of the possible underlying construct of ego resiliency or adaptability. This will contribute to the development of a more broad, contextual understanding of intelligence as it may be reflected in the Rorschach and more generally in an individual's approach to life challenges.

**Broadening the Concept of Intelligence**

In the past, the construct of intelligence has referred primarily to abilities traditionally associated with academia, and some have suggested that this continues to be the focus of work in the area of intelligence (Charlesworth, 1976; Sternberg et al., 2000). However, limitations of this narrow view have been increasingly recognized, and many theorists have attempted to broaden the conceptualization of intelligence, suggesting that the more traditional view does not provide an adequate picture of an individual's actual capabilities. While an individual's performance on traditional tests of intelligence may predict success in academic endeavours (Ackerman & Heggestad, 1997; Sattler, 2001), it may not reflect functioning in other important areas of problem-solving and coping with life challenges. There are many examples of people who perform well on tests of intelligence, but who function relatively ineffectively in life; similarly, there are many examples of those who perform poorly in academic areas, but who are successful in getting along with others, performing well at work, or effectively managing the demands of independent living. Many argue that this type of practical intelligence is more relevant
to daily life, and may be a more accurate reflection of a person’s true capabilities (Sternberg et al., 2000).

As the study of intelligence has evolved over recent decades, there have been attempts to include this aspect of intelligence. For example, practical or applied intelligence (Sternberg et al., 2000), social intelligence (Eysenck, 1994), emotional intelligence (Salovey & Mayer, 1990), creative intelligence (Li, 1996) and multiple specific intelligences (Gardner, 1999), among others have been proposed to acknowledge this applied aspect of an individual’s functioning. In fact, the construct of intelligence has been conceptualized in a variety of ways, resulting in at least 24 formal theories (Li, 1996). It appears that while theorists are unable to agree on the specific nature of intelligence, most acknowledge its multifaceted nature and many include a practical, real-life component (Flanagan, Genshaft & Harrison, 1997; Gardner, 1999; Li, 1996; Sternberg et al., 2000).

In particular, Sternberg is frequently cited for his contributions in this area. He discusses the distinction between “inert intelligence” and “successful intelligence” (Sternberg, 1996). Sternberg used the term “inert” to connote the type of intelligence that does not actively contribute to an individual’s successful action in life; this is the type of intelligence typically valued by academia, including knowledge of factual information and arithmetic skill. “Successful” or “practical” intelligence on the other hand, refers to the application of such information in everyday life to achieve goals and function effectively. Specifically, Sternberg suggested that when confronted with a complex and ill-defined life problem, an individual with practical intelligence will be able to tolerate the ambiguity inherent in the problem, capitalize on strengths and compensate for or
minimize weaknesses, and flexibly adapt his/her approach to the situation. He argued that, while academic intelligence may help individuals solve problems in the classroom, successful or practical intelligence is much more relevant to effective everyday functioning. Sternberg’s attempts to broaden the definition of intelligence echo the concerns of many theorists; it is important for discussions of intelligence to account for the individual’s ability to function adaptively and effectively in everyday life.

**Integrating Intelligence and Personality**

The desire shared by many intelligence theorists to incorporate the non-academic aspects of an individual’s capabilities that allow him/her to function effectively in his/her environment suggests that elements other than purely cognitive functions are relevant to the study of intelligence (for example, Block & Kremen, 1996; Chiu, Hong & Dweck, 1994; Sternberg et al., 2000). It has been increasingly recognized that whenever either intellectual processes or personality characteristics are involved in a task, both processes become active in problem-solving and cannot be disentangled (Blatt & Allison, 1981; Chiu, Hong & Dweck, 1994). Similarly, some theorists have proposed that perception and personality are mutually influential, and that the individual’s expectations and assumptions about the world can strongly influence his/her actual perception and processing of information from the environment (Bruner, 1951). This has been demonstrated with the perception of objectively neutral stimuli like shapes and colours, as well as in the perception of personal attributes and interpersonal situations (Klein, 1951). In addition, Dickman (1985) concluded that highly impulsive individuals tended to have more difficulty integrating fine details and more global information in a laboratory task because they placed more importance on speed relative to accuracy.
Dickman suggested that perceptual-cognitive differences in this instance paralleled personality differences. In each case, the individual’s personality or expectations can drastically influence what they perceive and guide their processing of the stimuli. Thus, while perception or cognitive processing may seem to be actions that can be discussed independently from personality characteristics, it is more realistic to discuss them as interactive components of the overall personality organization. Indeed, Dickman (1985) noted that the distinction between personality and cognitive factors influencing performance on these types of tasks may be somewhat artificial, and that the same psychological processes might be at work in these instances. There may be an underlying process that calls upon both the individual’s style of cognitive processing and personality style when s/he performs a task, whether the task is a personality test like the Rorschach or a more cognitive task. This notion has inspired efforts to understand the combined influence of intelligence and personality on an individual’s overall ability to adapt to circumstances and function effectively in life. Adaptability is one construct that has been discussed in this context.

Interestingly, the idea that adaptability is related to intelligence is almost as old as the study of intelligence itself. Adaptability refers to the individual’s ability to accommodate for or reconcile changing personal needs and environmental circumstances (Block & Kremen, 1996). Binet is well known for his psychometric contributions to the study of intelligence, and particularly for his early versions of current structured intelligence tests (Li, 1996). However, Sternberg (1996) noted that Binet and his colleague Simon considered practical sense and the ability to adapt to circumstances to be among the central elements of intelligence. In fact, in his review of historical
conceptualizations of intelligence, Sattler (2001) listed several prominent intelligence theorists who included adaptation as an important component of the definition. Similarly, in developing the Wechsler Intelligence Scales, Wechsler believed the individual’s personality characteristics and interests were important to consider in evaluating intelligence, and stated that intelligence should be considered a manifestation of the individual’s personality (Ackerman & Heggestad, 1997). Thus, many early intelligence test developers recognized that the individual’s personality characteristics and ability to adapt were relevant to the study of intelligence, and some considered intelligence to be one aspect of personality. The complex integration of personality characteristics adaptability and intelligence may have proved difficult to study, resulting in the tendency to segregate the study of these areas in research and practice (Ackerman & Haggestad, 1997). While isolating personality and intelligence may elucidate specific cognitive or personality characteristics, a more holistic understanding of the individual is required for an accurate representation of how s/he functions in the world.

The idea that adaptability is central to an understanding of intelligence has enjoyed renewed interest in the personality and intelligence literature (Chiu, Hong & Dweck, 1994). Contemporary theorists have attempted to describe a more general manner of adaptive functioning that includes both personality and intellectual characteristics. Block and Kremen (1996) listed over a dozen concepts that have been suggested to describe the characteristic of ‘adaptability’, and used the term ego resiliency in this regard. They suggested that ego resiliency involves both personality structures and cognitive components, and described it as the characteristic that allows the individual to function flexibly and effectively given his/her changing personal requirements and
those of his/her environment (Block & Kremen, 1996). This is consistent with psychoanalytic theory, which suggests that a well-functioning individual is able to balance the demands of the external world with his/her own internal motivations and needs in the face of changing circumstances (Ford & Urban, 1998). This is also consistent with the more broad conceptualization of intelligence discussed above, which includes a practical, real-life component.

Similarly, Loevinger (1966) has taken a holistic view of the individual and suggested ego development was the ‘master trait’ which encompasses personality and intellectual characteristics, as well as other features of human development. Loevinger described the ego as a process that integrates information and makes sense of experience. In this model, all aspects of ego development occur simultaneously, with physical growth, interpersonal functioning, and intellectual and character development progressing hierarchically toward a more sophisticated, complex, adaptive way of functioning. At the highest level of ego functioning, the individual demonstrates the ability to modify or adapt his/her approach in a multitude of ways, and can integrate and understand complex concepts. Loevinger’s model considers personality development and cognitive resources, among other characteristics, to be conceptually distinct yet mutually influential and important to the individual’s ability to function effectively (Hauser, 1976). In reviewing the stages of ego development, it becomes clear that while cognitive and personality style can be considered separately, they share the characteristics of becoming increasingly adaptable, integrative and complex at higher levels of ego development (Loevinger, 1966). Ego resiliency, ego development, and adaptability are ways in which personality and intellectual factors might be related to form a more holistic view of the individual
and provide a better understanding of the individual’s overall functioning. In these instances, intelligence appears to be subsumed under these more general conceptualizations of personality organization or functioning.

The theoretical connections between adaptability, ego development and intelligence have been studied to some extent, and results suggest that the constructs are related. There is a general tendency for measures of ego resiliency or adaptability to correlate somewhat with intelligence (Block & Kremen 1996). Block and Kremen also noted that measures of adaptability should logically correlate with intelligence whether it is broadly or more narrowly defined. The broad conceptualization of intelligence shares some definitive features with the construct of adaptability or ego resiliency, so a correlation would be expected. Similarly, in order for an individual to function in an adaptive manner, s/he must possess certain of the basic abilities involved in more narrow definitions of intelligence, including general factual knowledge, short-term memory, and adequate speed of information processing.

Furthermore, consistent with the idea that intelligence and ego development are related, intelligence as measured by the WAIS-R has been found to correlate negatively with the two lowest levels of Loevinger’s model of ego development, and positively with the three highest ego levels (Cramer, 1999). From a relatively extensive study of these constructs, Cramer concluded that two ego functions - intelligence and defense mechanisms - were independent of one another and that each predicted an individual’s level of ego development, although their predictive power was increased when they were combined. In this and other theories, intelligence is considered to be one function of the ego (Cramer, 1999).
Similarly, Allen, Coyne and David (1986) found a substantial relationship between global intelligence as measured by the WAIS-R and 10 measures of different ego functions as evaluated by scales derived from Bellack et al. (1973), with a multiple correlation of .66 (p<.005). This study also found that intelligence as measured by the WAIS-R correlated most strongly with two ego functions; autonomous functioning which includes “attention, concentration, memory, learning, perception, motor functioning, and intention” (Allen et al., 1986, p. 214), and thought processes which refer to the individual’s ability to conceptualize, with zero-order correlations of 56 and 45, respectively (p<.001). Allen and colleagues concluded that intelligence might be considered one capacity of the ego, and that intelligence is closely related to specific thought processing aspects of ego functions.

Thus, some studies have demonstrated an association between intelligence and the constructs of ego resiliency, specific ego functions, and ego development, with higher levels of intelligence being associated with an increasing ability to adapt, deal effectively with ambiguity, and think flexibly. These findings are consistent with the more broad definition of intelligence discussed above, where more intelligent individuals are able to flexibly and effectively deal with complex situations and changing circumstances. It appears that the study of adaptability, ego resiliency, ego development, broad definitions of intelligence, and integration intelligence and general personality functions are essentially different ways to understand intelligence in the context of the individual’s overall personality organization. As such, it would be useful to continue the investigation of intelligence as an aspect of personality in a more broad, holistic manner.
The Nature of the Rorschach

In considering how these issues might be addressed empirically, projective tests seem to be an appropriate starting point for exploring the influence of intelligence and personality characteristics on an individual’s approach to problem-solving. Projective methods are traditionally believed to yield particularly rich information regarding an individual’s functioning in a variety of spheres, typically with a focus on personality organization. In presenting the individual with a neutral ambiguous stimulus and providing little guidance regarding how to respond, it is expected that the individual’s response will reflect his/her needs, feelings, expectations, and thought processes (Kaplan & Saccuzzo, 1997). In the case of the Rorschach, the individual is presented with a series of 10 inkblots, some with chromatic colours and some with variations of just black, grey and white, and is asked “what might this be”? None of the inkblots resemble a unique object, so the evaluatee is required to organize and synthesize disconnected pieces of information, using the shape, colour, shading, and other aspects of the blot to form an integrated response. The entire blot or a portion of the blot may be used, and one or more objects may be included in a response with varying degrees of relatedness. Essentially, the open-ended and unstructured nature of projective tests forces the individual to use his/her or her own cognitive resources and personal style of problem-solving to deal with the information (Bruner, 1951). The individual’s approach to the Rorschach is believed to echo his/her general psychological organization, as his/her style of perceiving and organizing information in this task parallels his/her approach to everyday life.

The continued popularity and widespread use of projective tests attest to their ability to evaluate aspects of an individual’s functioning that might otherwise remain
obscure. Of 251 clinical settings in the United States, the Rorschach was reportedly used in 91% of sites (Lubin, Wallace & Paine, 1971), and was found to be the second most widely cited personality test (Kaplan & Saccuzzo, 1997). Rorschach proponents claim that this test in particular can evaluate personality, cognitive and emotional processes employed by the individual, as well as the way in which these processes influence each other (Beck, 1981). In essence, the Rorschach provides an opportunity to view the application of an individual’s cognitive ability and personality or emotional resources to meet the challenge presented by this task. Although no studies appear to have used this test specifically to explore intelligence as an aspect of personality, it appears that the Rorschach would be useful in this regard. The nature of the task and the various cognitive characteristics that have been empirically associated with specific Rorschach variables make the Rorschach a particularly intriguing measure with which to evaluate intelligence as a facet of ego function or personality.

**Approaches to the Study of Intelligence and Personality**

Ackerman and Heggestad (1997) suggested that there are two general approaches to the study of intelligence and personality. The first approach attempts to understand this relationship by correlating specific personality traits with intellectual abilities. An example of this would be the correlation between the Five Factor Model’s ‘Openness to experience’ and measures of intelligence (Ackerman & Heggestad, 1997). While investigating the relationship between specific traits and specific intellectual capabilities is informative and perhaps allows for less confounded conclusions, it seems that these isolated pieces of information may be less relevant to real life. This approach may tend to present characteristics and abilities in a static fashion, without considering more
dynamic, contextual or developmental characteristics. The second approach described by Ackerman and Heggestad (1997) takes a more broad, holistic approach to the study of intelligence and personality. While considering intelligence and personality in a more integrated, contextual manner introduces a level of complexity that makes clear conclusions more difficult, this approach may be more representative of reality.

Unlike its paper-and-pencil counterparts, the Rorschach is a personality test believed to glean aspects of both cognitive and personality functioning which are tacitly applied to the task (Ganellen, 1996). That is, thoughts, feelings, ways of perceiving and thinking can be observed in action as the individual complies with the demands of the task, even though s/he might not be consciously aware of these processes. Other forms of personality tests are apparently not able to achieve this. For example, Eysenck (1994) reported that attempts to correlate self report personality tests with intelligence measures have been somewhat mixed. While some have found correlations between the MMPI clinical scales and the Wechsler Intelligence Scales, several independent studies reported nonsignificant results and many have suggested the search for such a relationship be discontinued (Eysenck, 1994). Thus, while self report personality tests are certainly informative and useful in many respects, they do not appear to adequately reflect both cognitive and personality processes. In addition, they may tend to evaluate primarily aspects of functioning that are accessible to the individual’s awareness. In contrast, projective tests like the Rorschach permit the investigation of both cognitive processes and personality characteristics as they are tacitly applied to the task at hand.

Given the advantages of the more broad approach to evaluating the relationship between intelligence and personality, it appears that the Rorschach may provide a better
opportunity to evaluate the individual’s typical approach to a complex, unfamiliar situation or problem. Here, it is possible to evaluate all aspects of an individual’s functioning that are simultaneously called into play, rather than evaluating separate, isolated characteristics. It has also been suggested that, unlike structured intelligence tests, the Rorschach allows residual cognitive skills to emerge and permits a more appropriate evaluation of cognitive resources in some instances (DiNuovo, Colucci, Pellicciotta & Buono, 1997). The Rorschach is a projective personality test in which intelligent processing of information can be observed in the context of the overall personality organization. While many Rorschach supporters have acknowledged the cognitive elements that are inherent in the task, none have recognized the Rorschach as a measure of personality or ego functioning in which a more broad sense of intelligence or adaptability is reflected. In this way, the Rorschach can be viewed as a personality measure in which intelligence, or intelligent processing in the context of an individual’s overall personality functioning, can be observed.

The Development of Exner’s Comprehensive System

The Rorschach has been one of the most widely used tests employed by clinical psychologists since it was officially introduced by Hermann Rorschach in 1912 (Exner, 1993). Since that time, the Rorschach has fostered much debate regarding its validity as an assessment tool, as well as its clinical utility (Hiller, Rosenthal, Bornstein, Berry, & Brunell-Neuleib, 1999; Meyer, 1999; Stricker & Gold, 1999, Viglione, 1999). Much of this debate has stemmed from a long history of different approaches and conceptualizations of the task. Early in the history of the Rorschach, five different systems of applying the test were developed. This lack of standardization, combined
with inadequate empirical validation quickly became problematic in practice and research (Kaplan & Saccuzzo, 1997). These five interpretive systems had little in common aside from the 10 original inkblot stimuli and some basic theories of interpretation (Anastasi & Urbina, 1997). In addition, within each system, professionals demonstrated substantial diversity in their techniques of administration, scoring, and interpretation. In fact, many altered or combined the methods based on personal preference and experience (Exner & Exner, 1972). While many of these approaches proved clinically useful, the lack of standardization of the Rorschach resulted in its inconsistent application in both clinical and research settings. As a result, comparisons across studies and generalizations based on findings were impossible.

Perhaps the controversial nature of the Rorschach is in part due to the complexity of the task. It involves perceptual, cognitive, personality, and situational factors, which combine in a multitude of ways to produce a complex picture of the general personality organization of an individual. Some approaches to the Rorschach emphasize the content of the responses and consider it to be primarily a projective technique, while others view it as a type of standardized clinical interview; alternatively, some deemphasize content and make inferences based on the tendencies in responding and overall profile produced by the individual (Anastasi & Urbina, 1997). The latter approach is concerned with how the individual handles the challenge presented, conceptualizing the Rorschach more as a perceptual problem-solving task rather than a projective personality technique (Exner, 1993). Thus, the varied approaches to understanding and applying the Rorschach create much room for disagreement. Despite these conflicts, those who use it tend to agree that it is useful in evaluating the perceptual, cognitive, and affective aspects of an individual’s
personality (Anastasi & Urbina, 1997). It is likely for this reason the Rorschach has continued to be a popular method of psychological assessment. This also suggests that the Rorschach may be particularly appropriate for the investigation of intelligence as a component of an individual's overall personality organization.

In addition to these conceptual and procedural variations of the Rorschach, a 1970 survey of the Rorschach literature evaluated the 2100 existing research articles, and found that approximately 600 could be considered seriously flawed and another 800 were of questionable validity due to research design and analysis techniques (Exner, 1993). These methodological flaws and substantial differences in applications of the test prevented researchers from drawing meaningful inferences and comparisons across studies. Critics gained a strong voice during this period, calling for the abandonment of the Rorschach, or at least its significant revision as an assessment tool (Exner, 1993). Supporters of the Rorschach, on the other hand, noted that the modifications of these five systems were becoming increasingly divergent from the original conceptualization of the Rorschach (Exner & Exner, 1972). Subsequently, there was an attempt to return to the original intentions of Hermann Rorschach by further developing his postulates through experimentation (Block, 1962; Exner, 1993).

The Rorschach Research Foundation was established in 1968 to evaluate the extent to which these five Rorschach systems were empirically supported, as well as the clinical utility of each approach (Exner, 1993). The Comprehensive System (CS) of the Rorschach was developed largely to address these issues, as it attempted to standardize the administration, scoring, and interpretation of the Rorschach and integrate the more empirically sound aspects of the five Rorschach systems (Kaplan & Saccuzzo, 1997).
While it continues to have its opponents, some suggest that the CS has given the Rorschach a more favourable reputation (Hiller et al., 1999), and has helped provide a forum for conducting research with standardized Rorschach procedures. Despite its tumultuous history, the Rorschach has maintained a strong presence throughout the changing trends in the field of psychology over several decades. In spite of harsh criticism by its many opponents and a recent overall decline in the use of projective tests in clinical practice, the Rorschach remains a popular measure used in a variety of clinical and academic settings (Hunsley & Bailey, 1999). However, it is clear that a great deal of research in this area is still required.

With the advent of the standardization and extensive normative data of the CS, a number of the issues regarding the reliability, validity and utility of the Rorschach have been addressed and resolved to a certain extent. However, many criticisms of this test persist, and researchers and clinicians continue to struggle to reconcile these problems. Hunsley and Bailey (1999) praised the efforts of Exner in bringing the Rorschach closer to acceptable professional standards, but emphasized that these standards will not be met “until there exists replicated, peer-reviewed evidence supporting the reliability, validity, and utility of every scale included in the Comprehensive System” (p. 274). There is a need for investigation into the specific constructs that are purportedly measured by the Rorschach in order to develop a better understanding of what the Rorschach actually measures. Indeed, Exner (1997) emphasized the need for stronger empirical support for certain Rorschach variables. With more extensive investigations into the variety of constructs involved in a Rorschach protocol, an improved understanding of the cognitive and personality characteristics reflected in the Rorschach is possible.
While systematically investigating the Rorschach variables in this manner presents a considerable challenge, it is one that is worthwhile in many respects. First, it will contribute to the conceptual understanding of the Rorschach, augmenting the already significant contributions of Exner's CS. Providing sound empirical evidence for the concepts that comprise the Rorschach will clarify some of the ambiguities surrounding the test. Second, investigating the Rorschach will contribute to the evaluation of the validity of certain aspects of the test, as the constructs in question will be compared against measures with known psychometric properties. This will also allow for more meaningful interpretations of Rorschach protocols because the conclusions drawn will be based on empirically validated constructs. Finally, it will strengthen the empirical basis on which the clinical utility of the Rorschach is judged. This will allow for a more accurate and valid evaluation of the test, and will permit more informed decisions regarding its use. Given the continued popularity of the Rorschach in clinical work and research, meeting these goals will significantly contribute to the field of clinical psychology by providing a more solid empirical basis on which the Rorschach can be assessed. The present study is intended as a preliminary step in this direction. In exploring the relationship between the Rorschach variables and measures of intelligence, this study will clarify which Rorschach variables are related to traditional measures of intelligence or cognitive ability, and will provide a basis for more systematic research in this area.

The Rorschach as a Problem-Solving Task

The Rorschach, in particular the CS, is designed to assess many areas of functioning including an individuals' ideas about themselves, their interpersonal world,
their emotional states, and their ability to tolerate stress (Exner, 1993). In addition, the
CS includes measures of information processing, mediation, and ideation. Information
processing indicates how information is perceived or taken in by the individual, and
includes the effort invested in processing information as well as the quality and efficiency
of processing. Mediation refers to how the individual identifies and translates this
information in a meaningful way. Finally, ideation describes how the individual uses the
information s/he has gathered. Exner (1993) referred to these areas of functioning as the
cognitive triad, which is intended to provide an overview of how the individual
processes, manipulates, and applies information taken from the environment. This is
where the CS most directly addresses an individual’s cognitive ability.

Exner’s (1993) description of the cognitive component of the Rorschach appears
consistent with the way in which Hermann Rorschach understood the task. Exner (1993)
summarized the process by which Rorschach him/herself thought responses were
generated. Rorschach suggested that, when the ambiguous inkblot is perceived, the
individual must integrate his or her perception of the blot with objects stored in memory
in order to identify what the blot most resembles. Thus, Rorschach understood the basic
process of forming a response as more of a perceptual-associative task in which
associations are formed between the blot and existing representations in memory (Exner
1993).

Hermann Rorschach was not the first to conceive of using ambiguous inkblot
stimuli as a means to assess the functioning of an individual. Exner (1993) noted that, in
the late 1800s, Binet and Henri considered including such stimuli in their development of
a test of intellectual ability, but did not do so due to practical constraints. The idea that
inkblots might provide some insight into how an individual perceives, processes and integrates visual material has been considered in early works, and the idea that such activities might be related to intellectual functioning has been explored in the past (Exner, 1993).

Exner (1993) further described the task presented by the Rorschach as a problem-solving situation in which the individual is presented with an ink blot that resembles nothing in particular, and is required to identify or classify it as a known object. This presents a challenge, as the subject is required to think beyond the constraints of the task and generate a feasible response. Viglione (1999) agreed with this conceptualization, suggesting that the Rorschach is a behavioural problem-solving task that evaluates “how one solves a problem in visualizing an internally contradictory and ambiguous stimulus” (p. 260). Viglione also suggested that, while the content of the response may contain personal meaning, the test is essentially a behavioural evaluation of how an individual handles the challenge. In this way, the Rorschach can be considered a problem-solving task in which cognitive ability, or the ability to think in a complex, abstract, and integrative way, plays an important role. Thus, while the Rorschach was not designed as a measure of intelligence, cognitive ability certainly plays a role in an individual’s performance on the task.

As mentioned, many intelligence theorists including Wechsler conceptualized intelligence broadly, emphasizing the individual’s “capacity to act purposefully, to think rationally, and deal effectively with his [or her] environment” (Wechsler, as cited in Kaufman & Lichtenberger, 1999). This is conceptually similar to the more broad definitions of intelligence outlined above, which include practical or applied intelligence
and adaptability. It is also comparable to the idea of ego resiliency or higher levels of
ego development. These definitions of intelligence as a global capacity for dealing
effectively with one's surroundings provide a basis for understanding how intelligence is
relevant to the task presented by the Rorschach. The Rorschach draws on an individual's
ability to perceive, process, and combine features of an ambiguous visual stimulus to
produce an integrated response. The individual is essentially required to detect and
process elements of his or her environment, and combine them with his or her own
thoughts and ideas in an effective way. It seems logical that those with superior
intellectual or adaptive functioning would have greater facility with certain aspects of this
task, producing more complex, well-integrated responses with some level of
sophistication. On the other hand, those with a relatively low level of intellectual or
adaptive functioning would be expected to have more difficulty and produce simpler, less
integrated responses.

Developmental Considerations

In evaluating the relationship between intelligence measures and certain
Rorschach variables, it is useful to consider these questions from a developmental
perspective. In many respects, human development occurs in a relatively consistent,
structured pattern. While individual differences certainly exist, commonalities in
development permit some comparisons between the individual's actual level of
functioning and the typical functioning for their developmental level. As the individual
evolves, s/he typically becomes better able to organize and integrate information, and has
more ways in which s/he may deal with complex situations. Both the Rorschach and the
Wechsler Adult Intelligence Scales are sensitive to these types of developmental changes.
In attempting to integrate different aspects of human development, it may be that cognitive and personality characteristics develop similarly as a result of an underlying factor apart from age. Specifically, the developmental features of intelligence and the developmental characteristics of Rorschach responses may be related to a more fundamental characteristic of ego development or general adaptability in which the individual becomes increasingly able to understand and integrate complex, contradictory or ambiguous information. In other words, measures of intelligence and Rorschach variables might be correlated because intelligence is a facet of the overall personality organization or of the individual’s general adaptability.

In terms of developmental features of intelligence, it has been generally understood that older children tend to have greater intellectual capabilities than younger children. Historically, this fact has been considered in each version of intelligence tests since the early Binet scales of 1905 (Kaplan & Saccuzzo, 1997). However, this progressive increase in abilities does not continue in a regular manner into adulthood, and age-related changes in intellectual abilities should be considered. In their investigation of 1500 men and women aged 17 to 94, Kaufman and Horn (1996) compared age-related changes in performance on fluid reasoning which referred to the ability to solve novel problems, and crystallized knowledge which referred to acquired knowledge or information. Unlike many previous studies, Kaufman and Horn controlled for educational attainment which is known to correlate with performance on intelligence tests (Kaufman & Lichtenberger, 1999). They found that participants’ performance on measures on fluid reasoning tended to decline steadily over adulthood, and that the decline accelerated after age 55; in contrast, performance on measures of crystallized
knowledge increased through the 20s and remained constant throughout adulthood until about age 60, after which performance declined (Kaufman & Horn, 1996).

It has been noted that the Wechsler Intelligence Scales' verbal scale and performance scale measures correspond with general measures of crystallized and fluid ability, respectively (Kaufman & Lichtenberger, 1999). As such, similar findings have been reported with respect to the WAIS-III. Specifically, Kaufman and Lichtenberger (1999) described age-related patterns based on unpublished standardization data for the WAIS-III, which they obtained from the Psychological Corporation. They noted that WAIS-III verbal intelligence quotients were generally maintained across the adult life span, and that performance intelligence quotients tended to peak around age 20, and declined steadily thereafter.

In terms of age corrections by the Wechsler scales, the WAIS-R compares raw subtest scores for all ages to a reference group aged 20 to 34 in order to obtain scaled subtest scores, and then determines quotient scores according to age group (Wechsler, 1981). However, age-based normative data for WAIS-R subtests are available, and can be determined as needed (Wechsler, 1981). The WAIS-III was developed such that the participant's subtest scores are always compared to his/her age group, and index scores are calculated using these age-based scaled scores (Wechsler, 1997). Thus, both the WAIS-R and WAIS-III allow the option of correcting for these age-related changes, rather than comparing younger and older participants to the same criteria. Due to the age-related changes in certain cognitive abilities noted above, the present study utilized age-based scaled scores for the individual subtests, as well as their aggregates. This ensured that scores would reflect each participant's performance as compared with others
in his/her age group, and age-related changes in abilities would not confound the results of this study.

Similarly, certain Rorschach variables have been demonstrated to be developmentally sensitive, as the frequency and patterning of some response characteristics tend to change as the child moves towards adulthood. Indeed, many responses typical of younger children would often be considered abnormal in an adult’s record. Ames (1952) provided an extensive review of developmental trends in the Rorschach by evaluating children of above average intelligence. Fifty records were reviewed at each half-yearly age level from age 2 through 5.5 years, and at yearly age levels from 6 through 10 years. Among the variables found to change with age, Ames found that the total number of responses provided (R) increases with age, and that although the number of whole responses (W) generally remains constant, the quality of these responses improves with increased organization and better use of form. That is, as age increases, responses tend to reflect a more sophisticated approach to putting together discrete pieces of the blot in a meaningful way by recognizing and integrating more elements of the stimulus field. Ames also found that the number of responses that are based strictly on the form of the blot (F) tends to decrease with age, and that the quality of form (F+%) improves when form is used.

In terms of responses reflecting movement, animal movement (FM) was found to predominate in childhood, where adults tend to give more human movement (M) responses (Ames, 1952). In an extensive review of the literature, Exner (1993) suggested that human movement responses are generally believed to reflect reasoning ability, imagination, and a higher manner of conceptualizing external stimuli, which would
logically be associated with the ability to think in a complex, sophisticated manner.

Regarding responses reflecting colour use, Ames (1952) found that colour played a more primary role in children's responses (CF or C), while form played an increasingly central role in determining colour responses as age increased (FC). The content of responses was also found to change, with animal content decreasing and human content increasing with age. Ames reported that typically, the content of child and adolescent protocols consisted of 50% animal responses, which decreased with age. In contrast, human content was quite low in children's records, and gradually increased with age. In addition, the percentage of popular responses (P%) was found to increase with age. Ames also noted that it was typical for high functioning children to give responses that might be considered a reflection of pathology in an adult record.

In addition, while Loevinger's (1976) stages of ego development are not explicitly age-specific, typically the earliest stages occur in young children, and the highest stages are virtually impossible in childhood and rare in adolescence. Thus, while individuals may progress through stages at different rates, there appears to be a general tendency for stages to progress with age (Loevinger, 1966). Specifically, as the individual matures, s/he is better able to perceive distinct features of his/her environment, and understand them in relation to one another in a more complex, integrated manner.

Thus, throughout the first ten years of life, the child's developmental changes are paralleled in the Rorschach protocol. Ames (1952) suggested that this manner of perceiving, degree of emotional adjustment, and personality structure are reflected in the Rorschach as the child matures, perhaps until age 20. Here, while individuality is certainly apparent in protocols, the child's responses reflect increasing complexity until
early adulthood. Into adulthood, these striking patterns in Rorschach protocols appear to cease, and variability appears to reflect individual differences in personality functioning rather than predictable developmental changes. The variables that are sensitive to child development are of interest to this study, as they could be reflective of increasing complexity and cognitive ability. Further, since there do not appear to be predictable age-related changes in the Rorschach protocols of adults, age should not be a confounding variable in this study. However, to ensure that age is not contributing to systematic variability in Rorschach protocols, analyses will be examined when age is controlled for and when age is allowed to vary.

The Rorschach & Intelligence: Conceptual and Empirical Associations

Exner (1993) described a number of variables that appear to be closely related to the cognitive processes described above. Whether or not these and other Rorschach variables reflect intelligence was a topic that generated a number of studies in the 1940’s, 50’s, and 60’s, the results of which were generally inconclusive. One variable that is frequently associated with intelligence is the developmental quality (DQ) of the response. Each response to a Rorschach inkblot is assigned a DQ level, which considers how many objects are included in the response, whether the objects are described as being in a meaningful relationship with one another, and whether the objects have a typical or natural shape. The highest level of DQ, which is coded as DQ+, requires that there are two objects, both of which have a definite shape, that are described as being in a meaningful relationship with one another, as in “two people dancing together”. This type of response requires significant thought and organization on the part of the subject. In a response with a lower level of DQ, coded DQv, one object with no specific form is
described, as in “It looks like a cloud”. While it is important to consider other factors, such as motivation to comply with the task, the latter response clearly requires less organization and cognitive complexity.

The relationship between DQ and intelligence has been investigated by a number of researchers. Generally, higher DQ levels have been found among individuals with higher intelligence test scores, while lower levels of DQ have been found among children and those with lower levels of cognitive functioning (Exner, 1993). Goldfried (as cited in Friedman & Orgel, 1964) found significant correlations between intelligence and developmental level, a construct similar to DQ, in a sample of neuropsychiatry patients, although Friedman & Orgel’s study of a more diverse sample found no significant correlations. In many cases, DQ has been evaluated in combination with responses that integrate the whole inkblot (W) and has been found to be significantly correlated with general and nonverbal measures of intelligence (Allison & Blatt, 1964; Blatt & Allison, 1963). More recently, Acklin and Fechner-Bates (1989) investigated the relationship between DQ and intelligence as measured by the WAIS-R, and found that W responses with the most sophisticated DQ, referred to as W+, accounted for significant variation in three components of IQ, namely verbal, performance, and freedom from distractibility.

In addition, Greenberg & Cardwell (1978) conducted a study in which Friedman’s developmental level, a measure related to DQ, was found to be correlated with general intelligence as measured by the WAIS. Conceptually, DQ and Friedman’s developmental level are similar, so this finding might logically extend to DQ in the CS.

Hermann Rorschach believed that another aspect of the response, the whole response (W) in which the subject integrates all components of the blot into a single
response, was related to intelligence (Exner, 1993). The ability to organize and synthesize the various elements of the entire inkblot into a coherent whole is thought to require more complex cognitive processes than, for example, the processing of a single aspect or detail of the inkblot. For example, integrating all aspects of the blot and responding "it looks like a wolf's face" is a more cognitively sophisticated response than referring to a small detail of the blot as "a hand". This idea has been generally accepted in the Rorschach literature, and the W response has frequently been associated with various aspects of intellectual ability, including the ability to think abstractly, the ability to integrate information, and scholastic achievement (Allison & Blatt, 1964; Blatt & Allison, 1963; Saziouk, 1984; Taulbee, 1955; Wittenborn, 1949). As noted above, it has been suggested that when evaluating an individual's level of cognitive complexity, it is most useful to consider the whole response and DQ simultaneously (Allison & Blatt, 1964; Blatt & Allison, 1963; Exner, 1993; Marsden, 1970). Here, a response that has good form quality, uses the entire blot (W), and describes two objects with clear form demand that are in a meaningful relationship with one another (DQ+) reflects the most sophisticated and complex cognitive processing. This type of response requires the individual to recognize, organize, and put together discrete aspects of relatively unfamiliar and ambiguous stimuli in order to create a meaningful representation of what the blot might be.

Investigation of the whole response was a popular area of research. In particular, some correlational studies found low to moderate correlations between W and IQ (Abrams, 1955; Armitage et al., 1955), while others found nonsignificant correlations (McCandless, 1949; Wittenborn, 1950). Other results suggested that W is not related to
general intelligence, but rather to verbal fluency (Lotsoff, 1953). Indeed, the correlations between W and various measures of verbal and nonverbal indicators of intelligence has ranged from as low as 0.008 to as high as 0.59 (Blatt & Allison, 1963). More recently, Marsden (1970) found that intelligence as measured by the Wechsler Intelligence Scale for Children (WISC) was positively correlated with well-integrated W responses of good form level. Similarly, other studies have linked complex W responses with measures of cognitive ability including nonverbal problem-solving tasks (for example, Allison & Blatt, 1964).

The concept of organizational activity (Z) is related to W, as a numerical Z score is assigned if the individual demonstrates an effort to integrate the blot in various ways. That is, in a single response, integrating the features of the entire blot (W), integrating the white space with the ink, or placing two objects in a meaningful relationship with one another (Exner, 1993). Examples of these would be any whole response, “a face, and the white circles are the eyes”, or “two people holding hands”. The frequency of responses that are given a Z score (Zf) and sum of the Z scores (ZSum) are reflections of this type of organization, and are traditionally thought to be related to intelligence (Kropp, 1955; Sisson & Taulbee, 1955; Spiegelman, 1956; Taulbee, 1955).

With respect to organizational activity, results have also been somewhat mixed. A study by Jolles (as cited in Kropp, 1955) found that Z was not related to intelligence in a group of developmentally challenged children and adolescents. However, another study found significant correlations between Z and intellectual ability in a group of adult neurotics (Wishner, 1948). Sisson and Taulbee (1955) found similar correlations between measures of Z and intellectual ability. In addition, in a factor analytic study, Z
and W have been noted as defining variables for a factor of abstract intelligence (Borgatta & Eschenbach, 1955).

In terms of other Rorschach variables that have been conceptually related to intelligence, similar inconsistent findings are evident. The number of blends in a Rorschach protocol may also reflect some form of cognitive complexity. A blend is a response in which the individual reports using multiple features of the blot to determine their response. For example, "Two bears fighting" might be seen in the blot due to the shape of the figures perceived, the colour or shading of what is perceived as their fur, and the perception of movement. A blend is scored when the subject uses more than one feature of the blot to determine the response. In this case, the subject demonstrates an ability to process multiple components of the blot simultaneously and combine them to form a relatively complex and integrated response.

While the number of blends was not extensively researched before the 1960s, Wagner, Young and Wagner (1992) found a correlation between the number of blends and intelligence as measured by the WAIS. In addition, a recent study of 30 gifted children and 30 nongifted children revealed that the gifted children tended to produce more Rorschach blend responses, while the nongifted children tended to offer responses based on pure form (Wideman, 1998). This finding was replicated in a pilot study for this project, which evaluated Rorschach protocols from 70 adults (Bertrim & Hibbard, 2001). Contrary to this finding, Exner (1993) describes two studies in which blends were not highly correlated with intelligence, although he noted that the formation of blend responses appears to require at least average cognitive ability. As noted above, pure form responses are more common in young children, and the proportion of pure form
responses decreases as the child develops (Ames, 1952). The pure form response may represent a less sophisticated mode of processing, and could be considered the conceptual opposite to a blend response. Thus, the blend response might be expected to represent a more complex, integrative form of processing in the Rorschach.

In addition, Rorschach considered the clarity or accuracy of an individual’s perception and association to be related to intellectual capacity (Spiegelman, 1956). Exner (1993) also described this characteristic of an individual’s response, which he referred to as ‘conventional form’. In the CS, two percentages are calculated to reflect the extent to which the individual uses the contours of the inkblot in a conventional or typical manner. Specifically, they evaluate the extent to which the individual’s response is consistent with the actual shape of the inkblot. Normative data exists regarding the conventionality of various responses, and the individual’s response is compared to the conventional or typical responses for that blot or detail of the blot. The value of F+\% indicates how well the individual’s response adheres to the contours of the blot for those responses that are based exclusively on form (Exner, 1993). That is, only responses that have been determined solely by the shape of the blot are included in this calculation. The value of X+\% indicates how well the individual’s response adheres to the contours of the blot for the entire protocol, which includes responses that are based on form as well as those based on other aspects of the blot (Exner, 1993). These values are thought to reflect the individual’s ability to perceive things accurately or realistically, and have been associated with the process of formal reasoning (Exner, 1993). Consistent with other early Rorschach research, correlations between F+\% and intelligence indicators ranged widely, from 0.08 to 0.64 (Spiegelman, 1956, Taulbee, 1955).
Finally, Rorschach believed that the human movement response (M) was related to intelligence. This response is one in which human activity is perceived in the blot and, while the actors are typically human, any human behaviour is scored (Exner, 1993). For example, both “people dancing” or “bears talking” reflect human movement or behaviours. Rorschach believed that the perception of M reflected a capacity for ‘inner creation’ or the ability to generate imaginative and creative responses, which he thought was related to intelligence (Exner, 1993; Spiegelman, 1956).

A survey of studies on the relationship between M and intelligence was conducted by Levine, Spivack and Wight (1959) and revealed some variability in findings, although relatively low but significant correlations were noted across a variety of populations. Furthermore, one pilot study found a low correlation between reflection responses (Fr or rF) and intelligence as measured by the WAIS-R and WAIS-III (Bertrim & Hibbard, 2001). Reflection responses indicate the perception of a reflection or mirror image, and are believed to reflect some degree of thinking or examining the self (Exner, 1993). It is possible that the tendency to look inside the self in an evaluative way is associated with intelligence because it requires some level of introspection and abstract thinking. In addition, a reflection response requires the individual to account for the symmetrical nature of the blot in a meaningful and integrative way (i.e. “it’s looking in a mirror” or “it’s reflected in a lake”), which may necessitate more sophisticated cognitive functions.

Limitations of Prior Studies

While these findings suggested a relationship between intellectual ability and some Rorschach variables, they are exceedingly difficult to interpret. More recent studies improved upon some of the problematic aspects of early studies, but significant
limitations remain. The studies reported often used relatively small and homogeneous samples. For example, studies used 'emotionally disturbed and retarded' children (Levine, Spivack & Wight, 1959), patients diagnosed with schizophrenia or 'organic' disorders (Greenberg & Cardwell, 1978; Levine et al., 1959; Taulbee, 1955; Wagner & Frye, 1990) patients diagnosed with other psychiatric disorders (Allison & Blatt, 1964; Spiegelman, 1956; Wishner, 1948), neuropsychiatric patients (Friedman & Orgel, 1964), students (Acklin & Fechner-Bates, 1989; Blatt & Allison, 1963; Lotsof, Comrey, Bogartz & Arnsfield, 1958), children (Gerstein, Brodzinsky & Reiskind, 1976) and air force personnel (Borgatta & Eschenbach, 1955). Given the homogeneity of samples used in these studies, the generalizability of the results are quite limited. If results apply only to the specific population studied, the results cannot be confidently discussed in relation to other populations. This is particularly true where samples consisted of subjects who were psychotic or had neuropsychiatric impairments, as the nature of these impairments involve unique difficulties in the cognitive realm (Allison & Blatt, 1964).

In addition, the studies often evaluated a few isolated Rorschach variables and related them only to general measures of intelligence. Few studies reported Rorschach variables in combination, for example whole responses in the context of DQ. This failure to consider the complexity of the whole response is considered a significant deficiency in the literature prior to the 1960s (Blatt & Allison, 1963). Similarly, most studies focused on general indicators of intelligence, with few reporting on specific areas of cognitive function including verbal ability and non-verbal ability. While the simplicity of these analyses may serve to reduce potentially confounding variables, they appear to be too simplistic to capture the richness of the Rorschach response and the individual's manner
of approaching the task. Most conceptualizations of cognitive ability are hierarchical, consisting of a general cognitive capacity and a number of more specific, subordinate abilities (Loevinger, 1983). More specific abilities include verbal comprehension and expressiveness, nonverbal problem-solving and reasoning, mental manipulation of information in short term memory, and speed of accurate information processing (Kaufman & Lichtenberger, 1999). It is doubtful that Rorschach variables are related to intelligence in a simple manner, and it is unlikely that any one Rorschach variable is reflective of the global intelligence evaluated by these studies (Blatt & Allison, 1963). Thus, a more detailed analysis of global and specific cognitive abilities would prove useful in understanding the relationship between traditional measures of intelligence and the Rorschach.

Perhaps one of the greatest challenges in understanding these results is interpreting results from the variety of measures used in these studies. Obviously, given the time at which many of these studies were conducted, they did not use Exner’s CS, the first volume of which was not developed until 1974 (Exner, 1993). Nor did they use an alternative standardized format for the administration, scoring and interpretation of the Rorschach. Rather, they employed a variety of approaches to the scoring and interpretation of the test, and often made no mention of the specific conditions of administration. These are important factors to consider as it is known that conditions of administration can significantly influence Rorschach results (Exner, 1993). In addition, as measures of cognitive ability, the studies used various measures of intelligence including the Wechsler-Bellvue (Spiegelman, 1956; Taulbee, 1955), WAIS (Allison & Blatt, 1964), Wechsler Intelligence Scale for Children (Levine et al., 1959) Ravens
Matrices (Saizouk, 1984), and academic performance (Blatt & Allison, 1963; Wittenborn, 1949). In some studies (Friedman & Orgel, 1964; Jolles, as cited in Kropp, 1955), two or more different tests of intelligence were used within the same study. As a result of the tremendous variability of tests used across studies, it is difficult, if not impossible, to compare these results and evaluate their merit. In order to determine whether these results are meaningful reflections of intellectual ability, it is necessary to use contemporary conceptualizations of the constructs in question, as well as current standardized tests.

In addition to these methodological problems, Exner (1995, 1997) criticized researchers for omitting the issue of response style in their analyses. Response style refers to an individual’s problem solving and decision-making tendency, and is evaluated as part of the CS. Introversive types tend to be logical and set feelings aside, relying largely on their own evaluation of the situation and internal processes for decision-making and problem-solving. Extratensive types tend to combine thoughts and feelings in making decisions and solving problems, and are more influenced by external factors. Finally, ambivalent types use both response styles but apply them in an inconsistent manner (Exner, 1993). In essence, the individual’s response style refers to his or her habitual approach to processing information and making sense of the world. The validity and stability of these types has gained some support in the literature (Exner, 1997; Exner, Armbruster & Viglione, 1978). While the impact of these problem-solving and decision-making approaches on tests of cognitive ability is unclear, the existence of consistent differences among response styles has been supported and is an important consideration in Rorschach research (Exner, 1997).
Similarly, the value of Lambda is an important consideration that has been neglected in research on the Rorschach and intelligence (Exner, 1995). Lambda is a ratio purported to reflect the individual’s style of information processing, with a high value of Lambda indicating a tendency to oversimplify complex stimuli in order to make them more manageable (Exner, 1993). For example, in a Rorschach response, an individual with this style would respond only based on the shape of the blot – with many pure form responses – and ignore the more complex features of colour and shading. This may result in the neglect of certain aspects of the environment and failing to consider more complex aspects of the environment. The presence of high Lambda appears to affect information processing more when the subject is extratensive (Exner, 1993). Nonetheless, given the impact that the high Lambda style might have on the variables in question, it is an important consideration in research evaluating cognitive ability and the Rorschach.

The Present Study: Overview

Hermann Rorschach, and later Exner (1993) in the CS, considered a number of Rorschach variables to be related to cognitive ability, a conceptualization that has been investigated in many studies since the initiation of the Rorschach. Cognitive complexity or ability refers to the capacity for organizing, synthesizing and meaningfully integrating features of the environment, and has historically been associated with the task presented in the Rorschach (Blatt & Allison, 1963; Exner, 1993; Viglione, 1999). In recent decades, theorists in the areas of personality and intelligence have emphasized the need to study intelligence and personality in a more broad and holistic way. Broad definitions of intelligence, adaptability, ego resiliency or ego development are all ways in which theorists have attempted to understand and integrate the constructs of personality and
intelligence. Although the Rorschach is traditionally considered a personality test, it also provides information on the individual's cognitive functioning as it exists in the context of the overall personality organization. As such, cognitive correlates of the Rorschach should mark the level of complexity of the individual's overall personality organization. Early studies attempted to investigate the relationship between a number of Rorschach variables and cognitive ability or intelligence, often yielding mixed results. Later studies improved upon some of the significant methodological and conceptual problems encountered in early studies, but remained somewhat limited in their interpretability and applicability to contemporary psychological assessment.

The primary purpose of the present study was to evaluate certain Rorschach variables that are believed to relate to cognitive ability. Based on an extensive review of the literature, it was hypothesized that the variables that have been traditionally and empirically associated with cognitive ability would be significantly correlated with global measures of intelligence. This study attempted to improve upon prior research in the area of intelligence and the Rorschach by providing a more methodologically sound evaluation of the relationship between Rorschach variables and tests of cognitive ability. First, Rorschach variables were carefully selected for inclusion in the study. Variables that have been associated empirically or conceptually with intelligence were included. Specifically W, W+, DQ+, Zf, ZSum, Blends, Response, F+, X+, Fr and M have all been associated with intelligence in some way. In addition, Rorschach variables were considered individually and in combination to allow a more accurate picture of the quality of the Rorschach response. For example, a whole response (W) may only be reflective of complex cognitive ability if it has good form and is well-integrated (DQ+).
Similarly, human movement responses (M) might only be related to intelligence when they involve good form. Prior studies often did not make these distinctions, and indiscriminately included all W and M responses, which may have confounded their results. As such, only M responses with good form will be included, and both W and W+ responses will be considered.

It has also been noted that utilizing X+\% and F+\% in parametric analyses can be problematic (Exner, 1995), so related frequency variables were used instead of these ratios. Specifically, the frequency of ordinary and elaborated form quality over the entire record (FQ(x(0,+))) and for just the pure form responses (FQ(+,0)) were used instead of X+\% and F+\% respectively. The number of pure form responses (PureF) was also included in this study, as it is practically and conceptually related to the Blend response. That is, a pure form response is essentially the opposite of a blend response, as the pure form response represents a way of simplifying the stimulus field by not incorporating the various features of the blot.

In addition, this study aimed to evaluate the relationship of these Rorschach variables with both global and specific measures of cognitive ability. This included verbal and nonverbal measures of intelligence, as well as more specific abilities that are evaluated by the subtests of the WAIS-R and WAIS-III. There appear to be a variety of cognitive processes involved in completing the Rorschach, including perception, associative skills, memory, organization, attention, and verbal expressiveness. Prior studies, which focused on only global measures of intelligence, may not have captured the diverse cognitive processes involved in the Rorschach.
Furthermore, the most recent versions of these tests were used to ensure that recent improvements in the normative data, test content, and standardization of administration, scoring and interpretation were implemented. This study also utilized a larger and more heterogeneous sample than has been evident in the literature to date, in order to promote generalizability. Finally, this analysis considered the introersive, extratensive, and ambient response styles, as well as Lambda. These general response styles or approaches to the Rorschach are important considerations when evaluating Rorschach variables and cognitive ability (Exner, 1995). It is possible that differences in the individual’s habitual approach to processing information and understanding his or her world might impact his or her performance on tasks of cognitive or intellectual ability. Therefore, these variables will be considered in the present study.

It was hypothesized that intelligence as measured by the WAIS-R and WAIS-III would predict Rorschach scores on the variables in question. That is, Full Scale Intelligence Quotient (FSIQ) scores would account for a significant amount of variance in Rorschach scores on the following variables: Zf, ZSum, W, W+, Blends, PureF, DQ+, GoodM, FQx(+,o), and FQf(+,o). The FSIQ is comprised of a Verbal Intelligence Quotient (VIQ) that reflects abilities including word knowledge and verbal reasoning, and a Performance Intelligence Quotient (PIQ) that reflects abilities including perceptual organization and nonverbal problem-solving. Given the different types of abilities reflected in the VIQ and the PIQ, analyses will be repeated with each of these indices in order to evaluate whether there is a differential relationship between the VIQ and Rorschach variables on one hand, and the PIQ and Rorschach variables on the other. Given the paucity of literature on the relationship between the Rorschach variables and
the more specific abilities measured by individual WAIS-R and WAIS-III subtests, no
specific hypotheses will be made regarding associations between the Rorschach variables
and Wechsler subtests. These analyses will be considered purely exploratory. Table 1
lists the variables that will be utilized in this study.

Table 1:

**Variables Included in the Present Study**

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rorschach Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Whole Response</td>
<td>W</td>
</tr>
<tr>
<td>Whole Response with High Developmental Quality</td>
<td>W+</td>
</tr>
<tr>
<td>High Developmental Quality</td>
<td>DQ+</td>
</tr>
<tr>
<td>Frequency of Z Responses</td>
<td>Zf</td>
</tr>
<tr>
<td>Sum of Z Responses</td>
<td>ZSum</td>
</tr>
<tr>
<td>Blend Response</td>
<td>Blend</td>
</tr>
<tr>
<td>Number of Responses</td>
<td>Responses</td>
</tr>
<tr>
<td>Human Movement with Good Form</td>
<td>Good M</td>
</tr>
<tr>
<td>Number of Good Form Responses for the Entire Protocol</td>
<td>FQx (+,o)</td>
</tr>
<tr>
<td>Number of Good Form Responses for Pure Form Responses</td>
<td>FQf(+,o)</td>
</tr>
<tr>
<td>Number of Pure Form Responses</td>
<td>Pure F</td>
</tr>
<tr>
<td>Reflection Responses</td>
<td>Reflections</td>
</tr>
<tr>
<td><strong>WAIS-R &amp; WAIS-III Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Full Scale Intelligence Quotient</td>
<td>FSIQ</td>
</tr>
<tr>
<td>Verbal Intelligence Quotient</td>
<td>VIQ</td>
</tr>
<tr>
<td>Performance Intelligence Quotient</td>
<td>PIQ</td>
</tr>
<tr>
<td>Vocabulary Subtest</td>
<td>V</td>
</tr>
<tr>
<td>Information Subtest</td>
<td>I</td>
</tr>
<tr>
<td>Similarities Subtest</td>
<td>S</td>
</tr>
<tr>
<td>Comprehension Subtest</td>
<td>C</td>
</tr>
<tr>
<td>Digit Span Subtest</td>
<td>DS</td>
</tr>
<tr>
<td>Arithmetic Subtest</td>
<td>A</td>
</tr>
<tr>
<td>Picture Completion Subtest</td>
<td>PC</td>
</tr>
<tr>
<td>Picture Arrangement Subtest</td>
<td>PA</td>
</tr>
<tr>
<td>Block Design Subtest</td>
<td>BD</td>
</tr>
<tr>
<td>Digit Symbol Coding Subtest</td>
<td>CD</td>
</tr>
</tbody>
</table>
Chapter II

Method

Participants & Procedure

The archival test data from 80 participants were used (46 females, 34 males). The mean age for participants was 28.7 years (27.37 for females, 30.47 for males). All of the cases were obtained from the archival files of the thesis supervisor for this project, Dr. Stephen Hibbard. Fifty-one of these cases were community volunteers who had been evaluated in the course of training classes at a clinical psychology training program, and 29 of the cases were clinical cases from Dr. Hibbard’s private practice. For the purposes of this study, maximum generalizability is preferred. As such, participants ranged from age 18 to age 64 and were from a diverse range of socioeconomic and ethnocultural backgrounds. All participants had been evaluated as part of a psychological assessment including either the WAIS-R (58 cases) or WAIS-III (22 cases) and the Rorschach according to the CS. Tests were administered or supervised by a certified psychologist in order to maximize the quality and accuracy of standardized administration and scoring. Further, 25% of the protocols were randomly selected and re-scored by a graduate student trained in the CS to ensure adequate interrater reliability.

For inclusion, cases were required to have a complete Rorschach protocol, administered and scored according to the CS. Cases were required to include the complete records and scoring materials to allow for verification of interrater reliability. Rorschach protocols with less than 14 responses were excluded as they are of questionable validity (Exner, 1993). Similarly, protocols with more than 30 responses were excluded, as certain variables are known to disproportionately increase in these
cases (Wagner & Frye, 1990). Further, individuals with a high Lambda style as indicated by a proportion of pure form responses more than 2 standard deviations above the mean were excluded, as their tendency to oversimplify their responses renders the interpretation of the Rorschach protocol questionable (Exner, 1993; Exner 1995). This study also excluded cases of mental retardation and other pervasive developmental disorders, psychosis, and neurological or neuropsychiatric disorders, as these are associated with specific cognitive impairments that would confound the results.

Cases were also required to have a complete WAIS-R or WAIS-III protocol. Although it would be preferable to use only those cases with the most updated version of this test, there were an insufficient number of such cases available. Only those subtests and indices common to both versions of the WAIS were included in the analysis. Furthermore, cases with a full scale IQ of less than 70 were excluded. Finally, this study utilized the age-based scaled scores for the WAIS-R and WAIS-III subtests, which allowed age related changes to be controlled for.

**Measures**

**The Comprehensive System (CS).** The CS is the most recent and arguably the most popular Rorschach technique today. The standardization of the test, the extensive normative data on adults and children, and the various psychiatric reference samples have contributed to the development of psychometric data on the CS. In addition to Exner’s (1993) extensive normative data, Shaffer, Erdborg and Haroian (1999) have provided current normative data for a nonclinical population. In terms of reliability, a number of variables in the CS have shown remarkable reliability across time, as well as good interrater reliability when judges are well trained in the CS (Hunsley & Bailey, 1999;
Viglione, 1999). While the validity of the CS has been debated, there is evidence that the test is valid when it is used appropriately, for example the examinee is not acutely psychotic, and the protocol consists of no less than 14 responses (Hiller et al., 1999). The convergent validity of the CS with other indices has been comparable to that of the MMPI (Anastasi & Urbina, 1997; Hiller et al., 1999). It is also interesting to note that the CS has also demonstrated versatility in cross-cultural applications (Viglione, 1999). This is relevant for research that may involve culturally diverse participants.

The WAIS-R and WAIS-III. While the WAIS-III is the most recent version of the Wechsler Adult Intelligence Scale, the psychometric properties of the WAIS-III and WAIS-R are similar. The split-half and test-retest reliability for both versions are very good, in the range of 0.91-0.98 for FSIQ, VIQ and PIQ (Kaufman & Lichtenberger, 1999). The concurrent validity of the WAIS-R has been supported by correlations with achievement tests and formal education, and the construct validity has been supported by factor analytic studies (Kaplan & Saccuzzo, 1997; Sattler, 2001). Similar validity data exists for the WAIS-III, as the two versions of the test are similar in many respects. In addition, both versions have excellent standardization samples, and recent normative data is available (Anastasi & Urbina, 1997; Shaffer et al., 1999; Wechsler, 1997).
Chapter III

Results

Independent samples t-tests revealed no significant differences between male and female participants on the intelligence indices or on the Rorschach variables of interest. As such, male and female participants were combined in all subsequent analyses.

Interrater Reliability

Given the demonstrated interrater reliability and highly structured standardization procedures for the WAIS-R and WAIS-III (Wechsler, 1997), an evaluation of the interrater reliability for these measures was deemed unnecessary. However, Exner (1995) emphasized the importance of evaluating interrater reliability of Rorschach protocols, and suggested that percentage agreement is a practical and adequate method. Exner, Kinder and Curtiss (1995) suggested that, when there are multiple examiners, 25% of protocols should be re-scored. Thus, 20 Rorschach protocols were randomly selected, photocopied, removed from the original scored protocols, and re-scored by the author who has been trained in the CS. The author’s scored protocols were then compared with those of the original raters. For each response in the 20 protocols, the author’s scoring on each variable was compared with that of the original scorer. In each comparison, scores were considered in agreement when both raters indicated the presence of the variable in question, or when both raters indicated the absence of the variable in question. According to Exner et al. (1995), when there is little interpretive value in stringently comparing the specific differences between scorer, it is acceptable to apply this more general method of comparison.
The percentage of agreement was calculated for the overall location, W location, overall DQ, DQ+, overall determinants, reflection responses, M responses with good form, blend responses, all FQ, FQ+ and FQo responses for the entire record, FQ+ and FQo responses for the pure form responses, frequency of Z responses, and the value of the Z responses (Table 2). With the exception of DQ+ (78.9%), the percentage of agreement for these variables were generally well above 80% which Exner et al. (1995) suggested should be the minimum percentage of agreement required in Rorschach research. Although it would be preferable to have all interrater agreement values above 80%, the percentage of agreement on the DQ+ variable was considered adequate for the purposes of this study.

Table 2:

Rorschach Interrater Agreement

<table>
<thead>
<tr>
<th>Variable</th>
<th>Agreement (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location (overall)</td>
<td>96.0</td>
</tr>
<tr>
<td>W</td>
<td>99.5</td>
</tr>
<tr>
<td>DQ (overall)</td>
<td>88.3</td>
</tr>
<tr>
<td>DQ+</td>
<td>78.9</td>
</tr>
<tr>
<td>Determinants (overall)</td>
<td>82.6</td>
</tr>
<tr>
<td>Reflections</td>
<td>99.0</td>
</tr>
<tr>
<td>M with good FQ</td>
<td>95.3</td>
</tr>
<tr>
<td>Blends</td>
<td>94.3</td>
</tr>
<tr>
<td>FQ (overall)</td>
<td>82.5</td>
</tr>
<tr>
<td>FQ+ (overall)</td>
<td>98.5</td>
</tr>
<tr>
<td>FQo (overall)</td>
<td>90.0</td>
</tr>
<tr>
<td>FQ+ (pure F responses)</td>
<td>99.3</td>
</tr>
<tr>
<td>FQo (pure F responses)</td>
<td>94.5</td>
</tr>
<tr>
<td>Zf</td>
<td>92.8</td>
</tr>
<tr>
<td>Z value</td>
<td>93.0</td>
</tr>
</tbody>
</table>
Normality of the Data

In order to evaluate the normality of the data, SPSS was used to obtain values of skewness and kurtosis for the continuous dependent and independent variables. In addition, a histogram with a normal curve superimposed was created for each variable, and normal probability plots were produced. It was important to evaluate the degree of skewness and kurtosis to determine whether the data deviate enough from normality to produce important differences in the analyses.

Regarding the independent variables, skewness values for the FSIQ, VIQ, and PIQ were negative but closely approached zero, indicating very little skewness in these data. Kurtosis values for these variables were low and negative, indicating that the distributions were slightly flat but sufficiently close to normality for analysis. Visual inspection of the frequency histograms and normal probability plots confirmed these findings.

The distribution of Rorschach variables has been discussed as a challenge to Rorschach research (Exner, 1995). In order to evaluate these data, skewness and kurtosis values for each Rorschach variable were produced. Kurtosis values for these variables deviated moderately from zero in all cases (KU $< |1.00|), with the exception of the reflections variable, which was high and positive (KU=2.217). It has been suggested that Rorschach variables with skewness values of greater than 1.00 tend to present problems in data analyses (Viglione, 1995). All of the variables in question demonstrated some degree of positive skewness, as the values were greater than zero. However, with the exception of the reflections variable discussed below, all of the Rorschach variables demonstrated only moderate skewness (SK$<=|1.00|). Visual inspection of the frequency
histograms and normal probability plots confirmed that, while these variables were positively skewed, the distributions approximated a normal curve. The number of reflection responses was unique as it was the only variable with a skewness value greater than 1.00 (SK=1.629). Visual inspection of the distribution of reflection responses supported the finding that the variable was significantly skewed.

Consistent with these data, Viglione (1995) provided a list of Rorschach variables deemed ‘generally suitable’ for parametric analyses without transformations. This list was based on descriptive statistics for a variety of clinical and non-clinical reference samples, and suggested that under many circumstances it is suitable to use the variables of interest in this study without transformation (Viglione, 1995). However, Viglione noted that the number of reflection responses is generally not suitable for parametric analyses. Given this guideline, combined with the significantly skewed distribution of the reflections data in this case, reflection responses were deemed inappropriate for parametric analyses in this study. As suggested by Exner (1995), reflections were coded as a categorical variable, with 1 indicating the presence of a reflection in the response and 0 indicating the absence of a reflection in the response. The analysis of the reflection variable is discussed below.

In order to verify the potential effect of transformation of the more moderately skewed data (Zf, ZSum, W, W+, Blends, Pure F, DQ+, GoodM, FQx(+,o) and FQf(+,o)), a LOG 10 transformation was applied to correct for the moderate skewness. The skewness values and histograms of the transformed data were examined, and the analyses were re-run using the transformed data. This procedure was repeated using a square root transformation, which can also be helpful in transforming positively skewed data. In
both cases the skewness statistics, histograms, normal probability plots, and results from 
the principle components analysis were comparable to those derived from the 
untransformed data. As is often the case with moderately skewed data, the 
transformations changed moderately positively skewed data into moderately negatively 
skewed data and there was no advantage to the transformation (Tabachnick & Fidell, 
2001). Therefore, it was determined that utilizing transformed data had no discernable 
effect, and the analyses were conducted using untransformed data. As a final precaution, 
residual scatterplots of regression analyses were examined, and these revealed that the 
assumptions of normality had been met satisfactorily.

Considerations for Regression Analysis

Simple regression analyses were planned, with each analysis using one 
independent (predictor) variable (FSIQ, VIQ, or PIQ) to predict scores on the dependent 
(outcome) variable (individual Rorschach variables). Since these predictor variables 
were to be used independently in separate simple regression analyses, the issue of 
colinearity among predictor variables was not of concern for the analysis.

Since the Rorschach variables selected for analysis were conceptually linked, it 
was noted that they would likely be correlated to some degree. This was confirmed by a 
bivariate correlation matrix of the Rorschach variables, which is presented in Table 3. 
Given the number of variables and the moderate intercorrelations among variables, a data 
reduction technique was applied to reduce these data and produce a smaller subset of 
meaningful variables. As such, principal components analysis (PCA) was employed to 
establish which components exist within the data, and to allow a view of how each
variable contributes to each component. Factor scores were obtained, and these were used as the dependent variables in the regression analyses.

Of note, there has been debate regarding the decision to control for the number of responses (R) in the analysis of Rorschach data (Mcguire, Kinder, Curtiss & Viglione, 1995). Some researchers warn that important data might be lost if R is controlled in the analyses (Mcguire et al., 1995). As such, R was included as a Rorschach variable for these analyses. However, in light of the uncertainty surrounding the role of R, data were examined when R was controlled as well. Partial correlations in which R was controlled were run, and few changes in the correlation matrix of Rorschach variables were produced. Furthermore, the possibility that age could have an effect on these variables was noted, and partial correlations were re-run controlling for age alone, both with and without controlling for number of responses. Controlling for age had no discernable effect on the correlation matrix, as the significance status of each correlation coefficient did not change when age was controlled. Given the minimal impact of controlling for R and age, analyses proceeded and included R as a variable in its own right.
Table 3:

Correlations Among Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>Zf</th>
<th>ZSum</th>
<th>W</th>
<th>W+</th>
<th>Blends</th>
<th>Good M</th>
<th>DQ+</th>
<th>Pure F</th>
<th>FQx (o,+</th>
<th>FQf (o,+</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zf</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZSum</td>
<td>.94**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>.69**</td>
<td>.55**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W+</td>
<td>.61**</td>
<td>.70**</td>
<td>.62**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blends</td>
<td>.33**</td>
<td>.35**</td>
<td>.25*</td>
<td>.37**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good M</td>
<td>.51**</td>
<td>.45**</td>
<td>.25*</td>
<td>.45**</td>
<td>.37**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DQ+</td>
<td>.65**</td>
<td>.70**</td>
<td>.18</td>
<td>.67**</td>
<td>.33**</td>
<td>.53**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pure F</td>
<td>-0.09</td>
<td>-0.17</td>
<td>-0.10</td>
<td>-.44**</td>
<td>-.54**</td>
<td>-.24*</td>
<td>-.37**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FQx(o,+</td>
<td>0.18</td>
<td>0.03</td>
<td>.24*</td>
<td>0.04</td>
<td>0.07</td>
<td>.26*</td>
<td>-0.05</td>
<td>.23*</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FQf(o,+</td>
<td>-0.19</td>
<td>-0.30**</td>
<td>0.01</td>
<td>-.33**</td>
<td>-.46**</td>
<td>-.29*</td>
<td>-.42**</td>
<td>.68**</td>
<td>.46**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>.34**</td>
<td>.24*</td>
<td>.21</td>
<td>-0.03</td>
<td>0.01</td>
<td>0.20</td>
<td>0.10</td>
<td>.55**</td>
<td>.48**</td>
<td>.26*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*p<.05  Correlation is significant at the 0.05 level (2-tailed)

**p<.01  Correlation is significant at the 0.01 level (2-tailed)
Data Reduction Analyses

Appropriateness of data reduction for dependent variables. The assumptions for principle components analysis and appropriateness of data reduction were assessed. As noted above, the dependent variable data were deemed sufficiently close to normality for analysis. In terms of sample size, Tabachnick and Fidell (2001) suggested having at least 5 cases for each observed variable, which for this study would require a minimum of 55 cases. Field (2000) noted that sample sizes of less than 100 might be appropriate for factor analysis if all communalities are above 6.00, which was found to be the case for this study.

Scatterplots of the correlations among Rorschach variables revealed linear relationships. Boxplots were created for each Rorschach variable, in order to evaluate possible outliers that would unduly influence results. Outliers were defined as data points that fell outside of the range of data defined by the boxplot, and no outliers were detected for the Zf, Response, DQ+, FQx (+,o) and FQf (+,o). One outlier was detected for the Zsum, W, PureF and Good M variables, while two outliers were found for the W+ and Blends variables. The Cook’s distance and leverage values for the outliers were calculated to establish the degree of influence the outliers. These were obtained from linear regression analyses using FSIQ scores as the independent variable and the individual Rorschach variables as the dependent variables. Cases with Cook’s distance values of greater than 1 were considered problematic (Cook & Weisberg, 1982), as were leverage values of greater than three times the average leverage value (Stevens, 1992). In each case, Cook’s distance values were well below 1.00, and the leverage values fell
below the critical cutoff, suggesting that these outliers would not exert undue influence on the analyses. Therefore, all data were retained in their original form.

The correlation matrix (Table 3) was then examined for its suitability for factor analysis. Colinearity was not a concern, as none of the correlations were inordinately high. The moderate correlations indicated that the Rorschach variables were sufficiently correlated for factor analysis. Bartlet’s test of sphericity was significant ($\chi^2(55, N=80) = 702.37, p<0.01$), essentially confirming that the Rorschach variables are in fact correlated. The Kaiser-Meyer-Olkin (KMO) statistic was calculated to determine whether the variables in the correlation matrix belong together psychometrically. The KMO statistic evaluates whether pairs of variables can be explained by the other variables, and a value of below 0.50 is considered too low for a factor analysis (Zillmer & Vuz, 1995). The KMO value was 0.62, which is in the mediocre range according to Field (2000), but still fell in the acceptable range for factor analysis.

Since the purpose of the factor analysis was primarily to reduce the number of Rorschach variables into a more manageable, meaningful set of data, Principal Components Analysis (PCA) was used. Tabachnick and Fidell (2001) cited PCA as the best choice when an empirical summary of the data set is desired. This method extracts the maximum variance from a data set with a few orthogonal components. That is, it aims to establish which linear components exist within the data, and how each variable contributes to that component. In this method, common, unique, and error variance are all distributed to the components, so the correlation matrix is essentially duplicated in a different form. PCA was conducted using oblique rotation ($\Delta=0$), as the likelihood of correlations among factors was uncertain. Factor intercorrelations were weak to
moderate ($r_{max} = .32$), therefore, orthogonal rotation was justified (Pedhazur & Schmelkin, 1991). Varimax rotation was selected as it simplifies the factors by increasing high loadings and decreasing low ones, which facilitates the determination of which variables load on which factor (Tabachnick & Fidell, 2001). As noted above, the role of the R variable in Rorschach research is unclear. In order to determine whether R had a meaningful role in the outcome, separate factor analyses were conducted including and excluding R as a variable.

**PCA Excluding R.** A PCA using a Varimax rotation was conducted, and the following variables were included in the analysis: Zf, ZSum, W, W+, Blends, PureF, DQ+, GoodM, FQx(+,o), FQf(+,o). The R variable was excluded from this analysis. Inspection of a scree plot suggested the retention of three components. This was supported by the fact that three components had eigenvalues greater than one, indicating that they explained a significant amount of variance. In fact, these three components were found to explain 75.83% of the variance (Table 4). Including a fourth component only increased the total amount of variance explained by 8.59%, so it was determined that three components provided the most complete and parsimonious representation of these data.

Table 4:

<table>
<thead>
<tr>
<th>Component</th>
<th>Total Eigenvalue</th>
<th>% of Variance</th>
<th>Cumulative % of Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.51</td>
<td>45.07</td>
<td>45.07</td>
</tr>
<tr>
<td>2</td>
<td>2.02</td>
<td>20.23</td>
<td>65.31</td>
</tr>
<tr>
<td>3</td>
<td>1.05</td>
<td>10.52</td>
<td>75.83</td>
</tr>
</tbody>
</table>
Stevens (1992) recommended that loadings of .512 or greater should be considered significant for a sample of this size. Examination of the rotated component matrix (Table 5) revealed that the Zf, ZSum, W, W+, and DQ+ variables loaded positively on the first component. Blends loaded positively on the second component, while PureF and FQf(+,o) loaded negatively on the second component. Of note, GoodM loaded moderately on all three components, but closely approached significance on the second component. Finally, the third component was defined largely by FQx(+,o), but the loading of FQf(+,o) approached significance on this component.

Table 5:

**Variable Loadings on Three Extracted Components (R excluded)**

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zf</td>
<td>.937</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>ZSum</td>
<td>.950</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>W</td>
<td>.762</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>W+</td>
<td>.761</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Blends</td>
<td></td>
<td>.764</td>
<td>---</td>
</tr>
<tr>
<td>PureF</td>
<td></td>
<td>-.850</td>
<td>---</td>
</tr>
<tr>
<td>DQ+</td>
<td>.674</td>
<td>.430</td>
<td>---</td>
</tr>
<tr>
<td>GoodM</td>
<td>.432</td>
<td>.488</td>
<td>.412</td>
</tr>
<tr>
<td>FQx (+,o)</td>
<td></td>
<td>---</td>
<td>.930</td>
</tr>
<tr>
<td>FQf (+,o)</td>
<td></td>
<td>-.765</td>
<td>.462</td>
</tr>
</tbody>
</table>
PCA Including R. A PCA using a Varimax rotation was conducted, and the following variables were included in the analysis: Zf, ZSum, W, W+, Blends, PureF, DQ+, GoodM, FQx(+,o), FQf(+,o), Responses. The R variable was included in this analysis in order to evaluate whether it added anything significant to the above PCA. As with the above PCA, an inspection of the scree plot suggested the retention of three components and three components had eigenvalues greater than one. In this case, these three components were found to explain 73.51% of the variance (Table 6). Including a fourth component only increased the total amount of variance explained by 8.52%, so it was determined that three components provided the most complete and parsimonious representation of these data.

Table 6:

<table>
<thead>
<tr>
<th>Component</th>
<th>Total Eigenvalue</th>
<th>% of Variance</th>
<th>Cumulative % of Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.52</td>
<td>41.10</td>
<td>41.10</td>
</tr>
<tr>
<td>2</td>
<td>2.49</td>
<td>22.67</td>
<td>63.77</td>
</tr>
<tr>
<td>3</td>
<td>1.07</td>
<td>9.75</td>
<td>73.51</td>
</tr>
</tbody>
</table>

Using the same criteria for loadings, an examination of the rotated component matrix (Table 7) revealed that, much like the previous analysis, the Zf, ZSum, W, W+, and DQ+ variables loaded positively on the first component. Similarly, Blends loaded positively on the second component. However, in this analysis, GoodM also loaded significantly on the second component. As with the first PCA, PureF and FQf(+,o) loaded negatively on the second component. Finally, the third component was defined
largely by FQx(+,o). However, in this analysis, the loading of FQf(+,o) reached
significance, and R loaded highly on the third component. Interestingly, R appears to be
a potentially informative variable, and is not defining the first component of this PCA.
As such, Lipgar's (1992) recommendation to allow R to vary will be followed, as it
appears that R might provide valuable information. Factor scores were then produced
using the regression method, a technique that considers the initial correlations between
variables. This approach tends to stabilize differences in units of measurement and
variable variances (Field, 2000). Factor scores represent a composite score for each
participant on a particular factor. The factor scores from this PCA including the R
variable were then used as the dependent variables in the regression analyses.

Table 7:

Variable Loadings on Three Extracted Components (R included)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zf</td>
<td>.915</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Zsum</td>
<td>.942</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>W</td>
<td>.772</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>W+</td>
<td>.764</td>
<td>.367</td>
<td>---</td>
</tr>
<tr>
<td>Blends</td>
<td>---</td>
<td>.786</td>
<td>---</td>
</tr>
<tr>
<td>PureF</td>
<td>---</td>
<td>-.755</td>
<td>.492</td>
</tr>
<tr>
<td>DQ+</td>
<td>.650</td>
<td>.457</td>
<td>---</td>
</tr>
<tr>
<td>GoodM</td>
<td>.363</td>
<td>.618</td>
<td>.357</td>
</tr>
<tr>
<td>FQx (+,o)</td>
<td>---</td>
<td>---</td>
<td>.870</td>
</tr>
<tr>
<td>FQf (+,o)</td>
<td>---</td>
<td>-.655</td>
<td>.515</td>
</tr>
<tr>
<td>Response</td>
<td>---</td>
<td>---</td>
<td>.762</td>
</tr>
</tbody>
</table>
In terms of conceptualizing these components, the first component seems to be primarily composed of variables related to the organization of the stimulus field. That is, $Z_f$ and $Z_{Sum}$ are indicators of the participant's ability to organize the inkblot in a meaningful way. The remaining variables that load significantly on this component are related to organization in more specific ways. The W response occurs when the participant utilizes the entire blot, rather than a discrete part of the blot. Similarly, $W+$ and $DQ+$ involve more organizational energy, as they require the individual to analyze and organize the stimulus field so that two or more objects are involved in a meaningful relationship with one another. Given the nature of the variables that comprise this component, it will be referred to as the Organizational Complexity component.

The second component seems to be primarily concerned with Blends, which occur when the participant uses multiple determinants in his response. That is, the colour, form, shading and perception of movement are integrated and articulated in the response. The negative loadings of the PureF and $FQ_f$ variables are consistent with this notion. A PureF response is essentially the opposite of a Blend, as it involves an oversimplification of the stimulus field and a blocking out of the complexity of the blot. As such, this component will be referred to as Blend Complexity component. In addition, GoodM loads on this factor, and has been associated with higher levels of intellectual thinking, including abstract thinking, creativity and fantasy, as well as behavioural and interpersonal effectiveness (Exner, 1993).

The third component appears to be related to the number of responses produced by the participant, and how typical or ordinary the form quality is for each response. An ordinary form quality response ($FQ_o$) is when the individual perceives something that
was frequently reported by Exner's (1993) standardization sample, and the percept
involves blot contours that actually exist. A form quality response that is elaborated
(FQ+) occurs when the participant volunteers an unusually detailed description of the
percept's form. Of note, there were only two FQ+ responses in the entire study. As such,
this component will be referred to as the Form Complexity component.

**Regression Analyses**

It was hypothesized that intelligence as measured by the WAIS-R and WAIS-III
would predict scores on the Rorschach variables, with individuals scoring higher on the
intelligence measure demonstrating more organized, complex, integrated responses on
the Rorschach. Specifically, the full scale intelligence quotient (FSIQ) was used as the
independent (predictor) variable, and the factor scores on each of the three components
extracted from the PCA were the dependent (outcome) variables. Pearson correlations
revealed that only the Blend Complexity component was significantly correlated with
FSIQ ($r=.43, N=80; p<.001$). The first component, Organizational Complexity, and the
third component, Form Complexity, did not even approach significance ($r=.12, N=80;
p>.10$; and $r=-.08, N=80; p>.10$, respectively).

As the first step in the regression analyses, three separate linear regression
analyses were conducted with FSIQ as the predictor, and the factor scores on each
component as the outcome variables. Table 8 presents the values for $R^2$, $F(1,78)$,
unstandardized regression coefficient ($B$), and the standardized regression coefficient ($\beta$).
Consistent with the Pearson correlation findings, factor scores on the Blend Complexity
component was the only outcome variable to be significantly predicted by FSIQ
($R^2=.184, F(1,78) = 17.63; p<.001$). FSIQ did not significantly predict factor scores on
the Organizational Complexity component or the Form Complexity component. Scatterplots of the regression standardized residuals and regression standardized predicted values confirmed that the assumptions of homoscedasticity and linearity were adequately met. Consistent with the analysis of outliers for individual Rorschach variables, the residual plots were scanned for outliers, and for each case, Cook’s distance and leverage values were well below the critical cutoffs noted above. One outlier, observed on the residual plot for the Organizational Complexity analysis, raised concern as it’s standardized residual value was 3.36. Field (2000) noted that standardized residuals greater than 3.00 can be problematic, and recommended that analyses be re-run with the problematic case omitted to evaluate the impact of the case on the regression analysis. As such, the three regression analyses were re-run with the outlying case omitted. The results of the analyses did not change significantly, and it was determined that this case was not exerting undue influence on these analyses.

The WAIS-R and WAIS-III are divided into a verbal portion (VIQ) and a nonverbal portion (PIQ). Therefore, the second step in the regression analyses was to evaluate whether the verbal and/or performance portions of the tests would predict Rorschach scores on the three components. Since VIQ and PIQ were highly correlated \((r=.71, N=80; p<0.001)\), simple linear regressions were conducted. A total of six separate simple linear regression analyses were conducted using first the VIQ, then the PIQ as predictors of the three outcome variables (Table 8). Regarding the Blend Complexity outcome variable, VIQ significantly predicted factor scores on the Blend Complexity component \((R^2=.186, F(1,78)= 17.79; p<.001)\). Similarly, PIQ significantly predicted factor scores on the Blend Complexity component \((R^2=.126, F(1,78)= 11.28; p<.001)\).
This suggests that both the VIQ and PIQ indices can predict a significant amount of variance in Blend Complexity scores. However, as with the FSIQ results, VIQ and PIQ scores did not significantly contribute to our ability to predict the Organizational Complexity or the Form Complexity outcome variables. In other words, the regression lines in these cases are essentially flat, and the predictors are no better at estimating outcome than the mean value of the outcome variable itself.

Table 8:

Linear Regression Analyses Using FSIQ, VIQ and PIQ to Predict Outcome (N=80)

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Outcome Variable</th>
<th>$R^2$</th>
<th>$F(1,78)$</th>
<th>Unstandardized regression coefficient (B)</th>
<th>Standardized regression coefficient (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSIQ</td>
<td>Organizational Complexity</td>
<td>.015</td>
<td>1.167</td>
<td>.008</td>
<td>.121</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.184</td>
<td>17.626**</td>
<td>.027</td>
<td>.429**</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.006</td>
<td>0.485</td>
<td>-.005</td>
<td>-.079</td>
</tr>
<tr>
<td>VIQ</td>
<td>Organizational Complexity</td>
<td>.011</td>
<td>0.904</td>
<td>.006</td>
<td>.107</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.186</td>
<td>17.785**</td>
<td>.026</td>
<td>.431**</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.009</td>
<td>0.673</td>
<td>-.006</td>
<td>-.093</td>
</tr>
<tr>
<td>PIQ</td>
<td>Organizational Complexity</td>
<td>.014</td>
<td>1.076</td>
<td>.008</td>
<td>.117</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.126</td>
<td>11.278**</td>
<td>.025</td>
<td>.355**</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.000</td>
<td>.009</td>
<td>-.001</td>
<td>-.011</td>
</tr>
</tbody>
</table>

*p<.05  Correlation is significant at the 0.05 level (2-tailed)

**p<.01  Correlation is significant at the 0.01 level (2-tailed)
Regression Analyses by Response Style Subgroup

As noted, it has been suggested that analyses should consider the individual’s response style. Exner (1993) described these styles as introversion, extraversion, and ambivalent, and noted that they tend to be quite stable over adulthood. In order to evaluate the potential impact of response style on these analyses, the linear regression analyses were repeated for the ambivalent group (n=35), the introversion group (n=31) and the extraversion group (n=14). Using the same procedures as in the above regression analyses, it was determined that the data for each subgroup were sufficiently close to normality for analysis. Scatterplots confirmed linear relationships between predictor and outcome variables, and boxplots were examined to identify outliers. Cook’s Distance and leverage statistics confirmed that no outliers were exerting undue influence on the analyses.

Some selected descriptive data for these three groups are presented in Table 9. Of note, these data overall are comparable to the recent normative data provided by Shaffer et al. (1997), which consisted of WAIS-R and Rorschach scores from 123 community cases. The data from the present study have a slightly higher mean and slightly wider range most variables. Shaffer et al. (1997) also did not provide a breakdown by response style, so comparisons in this area were not possible. In the present sample, the extraversion group had a more restricted age range than the other subgroups, although the mean ages of the groups were comparable. Also, the mean FSIQ scores were somewhat variable by subgroup, particularly when considering the ambivalent group (M=103.7, n=35) and the introversion group (M=109.5, n=31). However, the ranges of scores were very similar, and the mean FSIQ scores for each subgroup fell within the average range.
Table 9:

Selected Descriptive Statistics for Ambient, Introversive, and Extratensive Subgroups

<table>
<thead>
<tr>
<th>Response Style</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient</td>
<td>28.6</td>
<td>5.9</td>
<td>18.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Introversive</td>
<td>29.9</td>
<td>11.0</td>
<td>18.0</td>
<td>64.0</td>
</tr>
<tr>
<td>Extratensive</td>
<td>26.3</td>
<td>4.29</td>
<td>20.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Overall</td>
<td>28.7</td>
<td>8.1</td>
<td>18.0</td>
<td>64.0</td>
</tr>
<tr>
<td><strong>FSIQ</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient</td>
<td>103.7</td>
<td>17.1</td>
<td>71.0</td>
<td>139.0</td>
</tr>
<tr>
<td>Introversive</td>
<td>109.5</td>
<td>15.9</td>
<td>76.0</td>
<td>139.0</td>
</tr>
<tr>
<td>Extratensive</td>
<td>107.9</td>
<td>13.7</td>
<td>80.0</td>
<td>123.0</td>
</tr>
<tr>
<td>Overall</td>
<td>106.7</td>
<td>16.1</td>
<td>71.0</td>
<td>139.0</td>
</tr>
<tr>
<td><strong>VIQ</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient</td>
<td>105.1</td>
<td>17.4</td>
<td>72.0</td>
<td>133.0</td>
</tr>
<tr>
<td>Introversive</td>
<td>110.4</td>
<td>16.6</td>
<td>80.0</td>
<td>149.0</td>
</tr>
<tr>
<td>Extratensive</td>
<td>107.7</td>
<td>14.9</td>
<td>77.0</td>
<td>125.0</td>
</tr>
<tr>
<td>Overall</td>
<td>107.6</td>
<td>16.7</td>
<td>72.0</td>
<td>149.0</td>
</tr>
<tr>
<td><strong>PIQ</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient</td>
<td>101.2</td>
<td>16.0</td>
<td>69.0</td>
<td>138.0</td>
</tr>
<tr>
<td>Introversive</td>
<td>106.7</td>
<td>14.1</td>
<td>74.0</td>
<td>132.0</td>
</tr>
<tr>
<td>Extratensive</td>
<td>106.6</td>
<td>8.6</td>
<td>92.0</td>
<td>118.0</td>
</tr>
<tr>
<td>Overall</td>
<td>104.3</td>
<td>14.3</td>
<td>69.0</td>
<td>138.0</td>
</tr>
<tr>
<td><strong>Responses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient</td>
<td>18.3</td>
<td>3.1</td>
<td>14.0</td>
<td>27.0</td>
</tr>
<tr>
<td>Introversive</td>
<td>20.5</td>
<td>4.5</td>
<td>15.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Extratensive</td>
<td>19.2</td>
<td>2.8</td>
<td>14.0</td>
<td>24.0</td>
</tr>
<tr>
<td>Overall</td>
<td>19.3</td>
<td>3.8</td>
<td>14.0</td>
<td>30.0</td>
</tr>
</tbody>
</table>

\[a\ n=35; \ b\ n=31; \ c\ n=14; \ d\ N=80\]
Given the absence of literature regarding response styles and intelligence measures, no hypotheses were made. Considering the relatively smaller sample sizes, particularly in the case of the extratensive group, these analyses will be viewed primarily as exploratory endeavors.

Ambient subgroup. The first set of analyses was performed with the ambient subgroup, which made up 43.8% of the sample (n=35). This group consisted of 19 females and 16 males, and was comprised of 12 clinical cases and 23 community cases. As with the above regression analyses, the full scale intelligence quotient (FSIQ) was used as the independent (predictor) variable, and the factor scores on each of the three components extracted from the PCA were the dependent (outcome) variables. Then the VIQ was used as the predictor variable, and finally the PIQ was used as the predictor variable. In all, nine separate linear regression analyses were performed for this subgroup, and results are presented in Table 10. Pearson correlations revealed that, for the ambient group, only the Blend Complexity component was significantly correlated with all three intelligence indices. Significant Pearson correlations were found between Blend Complexity and FSIQ ($r=.52, N=35; p<.001$), VIQ ($r=.53, N=35; p<.001$), and PIQ ($r=.42, N=35; p<.01$). Organizational Complexity and Form Complexity were not significantly correlated with any of the intelligence indices.

As noted above, a linear regression analysis was conducted with FSIQ as the predictor, and the factor scores for the Blends Complexity component as the outcome variable. Factor scores on the Blends Complexity component were found to be significantly predicted by FSIQ ($R^2=.27, F(1,33)= 12.15; p<.001$). Similarly, VIQ was found to significantly predict Blends Complexity ($R^2=.28, F(1,33)= 13.10; p<.001$),
was PIQ ($R^2=.18, F(1,33)= 7.25; p<=.01$). These analyses were repeated, first using Organizational Complexity as the outcome variable, and then using Form Complexity as the outcome variable. In each case, none of the predictor variables (FSIQ, VIQ, and PIQ) explained a significant amount of variance. In fact, they added virtually nothing to our ability to predict outcome above and beyond the mean for the dependent variable.

**Introversive subgroup.** The second set of analyses was performed with the introversive subgroup, which made up 38.8% of the sample ($n=31$). This group consisted of 17 females and 14 males, and was comprised of 14 clinical cases and 17 community cases. Of note, 29 of the 31 cases were classified as pervasive introverts. A pervasive response style indicates that the style is very pronounced. Pearson correlations revealed that, for the introversive group, none of the outcome variables were significantly correlated with the intelligence indices.

As with the ambident subgroup, nine separate linear regression analyses were conducted, with FSIQ, VIQ, and PIQ entered as predictor variables, and Blends Complexity, Organizational Complexity and Form Complexity measured as outcome variables (Table 11). In the case of the introversive subgroup, the outcome variables were not significantly predicted by FSIQ, VIQ, or PIQ. That is, none of the predictor variables (FSIQ, VIQ, or PIQ) explained a significant amount of variance. In fact, for the most part, they added virtually nothing to our ability to predict outcome above and beyond the mean for the dependent variable. It is interesting to note that the ability of VIQ to predict Form Complexity approached significance ($R^2=.11, F(1,29)= 3.58; p=.069$), and that the slope of the regression line was negative in this case ($B=-2.203E-02$). This indicates that for every unit increased in VIQ, Form Complexity decreases by
0.022. However, it should be stressed that no inferences can be made given the nonsignificance of this finding.

**Extratensive subgroup.** The third set of analyses was performed with the extratensive subgroup, which made up 17.5% of the sample (n=14). This group consisted of 10 females and 4 males, and was comprised of 3 clinical cases and 11 community cases. Of note, all cases were classified as pervasive extratensives. Given the particularly small size of this subgroup, results were interpreted cautiously. Regression analyses proceeded as above. Pearson correlations were calculated for FSIQ, VIQ, PIQ, Blends Complexity, Organizational Complexity, and Form Complexity. For the extratensive group, only the PIQ was significantly correlated with the Blend Complexity component (r=.61, n=14; p<.05). All other correlations were found to be nonsignificant.

Again, nine separate linear regression analyses were conducted, with FSIQ, VIQ, and PIQ entered as predictor variables, and Blends Complexity, Organizational Complexity and Form Complexity measured as outcome variables. Results of these analyses are reported in Table 12. FSIQ and VIQ did not significantly predict any of the outcome variables, and PIQ did not significantly predict Organizational Complexity or Form Complexity. However, consistent with the Pearson correlations, PIQ was found to significantly predict Blends Complexity ($R^2=.38, F(1,12)= 7.22; p<.05$). As noted above, given the relatively small size of this subgroup, this finding should be interpreted with caution.

In all of the above subgroups, scatterplots of the regression standardized residuals and regression standardized predicted values were examined to evaluate the assumptions of homoscedasticity and linearity. Histograms of the residuals were plotted with a
superimposed normal curve, and normal probability plots were scrutinized. In the cases of the ambient and introersive subgroups, these assumptions were adequately met. However, in the extratensive subgroup the residual plots were questionable, as the distribution of residuals did not appear normal. For all subgroups, the residual plots were scanned for outliers, and for each case, Cook’s distance and leverage values were well below the critical cutoffs noted above.
Table 10:

**Linear Regression Analyses Using FSIQ, VIQ and PIQ to Predict Outcome in Ambent Subgroup (n=35)**

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Outcome Variable</th>
<th>$R^2$</th>
<th>F(1,33)</th>
<th>Unstandardized regression coefficient ($B$)</th>
<th>Standardized regression coefficient ($\beta$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSIQ</td>
<td>Organizational Complexity</td>
<td>.029</td>
<td>0.970</td>
<td>.010</td>
<td>.169</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.269</td>
<td>12.158**</td>
<td>.026</td>
<td>.519**</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.003</td>
<td>0.090</td>
<td>.003</td>
<td>.052</td>
</tr>
<tr>
<td>VIQ</td>
<td>Organizational Complexity</td>
<td>.045</td>
<td>1.541</td>
<td>.013</td>
<td>.211</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.284</td>
<td>13.099**</td>
<td>.026</td>
<td>.533**</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.006</td>
<td>0.204</td>
<td>.004</td>
<td>.078</td>
</tr>
<tr>
<td>PIQ</td>
<td>Organizational Complexity</td>
<td>.005</td>
<td>0.160</td>
<td>.005</td>
<td>.070</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.180</td>
<td>7.247*</td>
<td>.023</td>
<td>.424**</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.001</td>
<td>0.042</td>
<td>.002</td>
<td>.036</td>
</tr>
</tbody>
</table>

* $p<.05$ Correlation is significant at the 0.05 level (2-tailed)
** $p<.01$ Correlation is significant at the 0.01 level (2-tailed)
Table 11:

**Linear Regression Analyses Using FSIQ, VIQ and PIQ to Predict Outcome in Introversive Subgroup (n=31)**

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Outcome Variable</th>
<th>$R^2$</th>
<th>$F(1,29)$</th>
<th>Unstandardized regression coefficient ($B$)</th>
<th>Standardized regression coefficient ($B$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FSIQ</strong></td>
<td>Organizational Complexity</td>
<td>.004</td>
<td>0.109</td>
<td>-.003</td>
<td>-.061</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.066</td>
<td>2.051</td>
<td>.016</td>
<td>.257</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.076</td>
<td>2.400</td>
<td>-.019</td>
<td>-2.76</td>
</tr>
<tr>
<td><strong>VIQ</strong></td>
<td>Organizational Complexity</td>
<td>.021</td>
<td>0.629</td>
<td>-.008</td>
<td>-.146</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.082</td>
<td>2.582</td>
<td>.017</td>
<td>.286</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.110</td>
<td>3.577</td>
<td>-.022</td>
<td>-.331</td>
</tr>
<tr>
<td><strong>PIQ</strong></td>
<td>Organizational Complexity</td>
<td>.004</td>
<td>0.118</td>
<td>.004</td>
<td>.064</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.027</td>
<td>0.799</td>
<td>.011</td>
<td>.164</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.012</td>
<td>0.351</td>
<td>-.009</td>
<td>-.109</td>
</tr>
</tbody>
</table>

*p<.05  Correlation is significant at the 0.05 level (2-tailed)
**p<.01  Correlation is significant at the 0.01 level (2-tailed)
Table 12:

**Linear Regression Analyses Using FSIQ, VIQ and PIQ to Predict Outcome in Extratensive Subgroup (n=14)**

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Outcome Variable</th>
<th>$R^2$</th>
<th>$F(1,12)$</th>
<th>Unstandardized regression coefficient (B)</th>
<th>Standardized regression coefficient (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSIQ</td>
<td>Organizational Complexity</td>
<td>.009</td>
<td>0.115</td>
<td>.007</td>
<td>.097</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.258</td>
<td>4.178</td>
<td>.044</td>
<td>.508</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.018</td>
<td>0.225</td>
<td>-.009</td>
<td>-.136</td>
</tr>
<tr>
<td>VIQ</td>
<td>Organizational Complexity</td>
<td>.010</td>
<td>0.118</td>
<td>.007</td>
<td>.099</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.190</td>
<td>2.812</td>
<td>.035</td>
<td>.436</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.015</td>
<td>0.184</td>
<td>-.008</td>
<td>-.123</td>
</tr>
<tr>
<td>PIQ</td>
<td>Organizational Complexity</td>
<td>.010</td>
<td>0.121</td>
<td>.012</td>
<td>.100</td>
</tr>
<tr>
<td></td>
<td>Blends Complexity</td>
<td>.376</td>
<td>7.223*</td>
<td>.085</td>
<td>.613*</td>
</tr>
<tr>
<td></td>
<td>Form Complexity</td>
<td>.014</td>
<td>0.165</td>
<td>-.012</td>
<td>-.117</td>
</tr>
</tbody>
</table>

*p<.05  Correlation is significant at the 0.05 level (2-tailed)

**p<.01  Correlation is significant at the 0.01 level (2-tailed)
Analysis of the Rorschach Reflection Variable

As noted above, the number of reflection responses on the Rorschach is a highly skewed variable, and some have suggested it should be considered categorical (Mcguire et al., 1995). Interpretively, there is little difference in Rorschach protocols that contain one versus two or more reflections, and protocols are in part evaluated in terms of whether they contain reflection responses or not (Exner, 1993). As such, this study will consider the Reflection variable to be a categorical variable defined by the presence or absence any reflection responses (where 0 represents cases with no reflection responses, and 1 represents cases with one or more reflection responses). For the overall sample (N=80), 47 records contained no reflections, while 33 records contained at least one reflection.

Logistic regression was used, as it permits the outcome variable (reflections) to be categorical, while the predictor variables (FSIQ, VIQ, and PIQ) may be categorical or continuous. Logistic regression also overcomes the problems created when using a dichotomous variable, particularly violations of the assumption of linearity (Field, 2000). Three separate logistic regression analyses were conducted. First, FSIQ served as the predictor (independent variable), and the probability of reflection responses occurring was the outcome (dependent) variable. In the second analysis, VIQ was used as the predictor, and in the final analysis PIQ was used as the predictor. Table 13 presents relevant statistics for these three analyses.

A test of the ability of FSIQ against a constant to predict reflection category membership was statistically significant, $\chi^2 \ (1, \ N=80) = 5.57; \ p<0.05$. This indicates that FSIQ reliably distinguishes between participants with and without reflection responses.
A Homer-Lemershow goodness-of-fit test confirmed that the observed data are not significantly different from the predicted values, \( \chi^2 (7, N=80) = 11.10; p>0.05 \), suggesting that the model predicts the data well. It was possible for FSIQ to accurately predict 83.0% of cases with no reflections and 42.4% of cases with reflections, resulting in an overall prediction accuracy rate of 66.3%. The value for \( \beta \) in logistic regression is similar to \( \beta \) in linear regression. In this case, \( \beta \) was found to be significantly different from zero, indicating that the predictor is making a significant contribution to the outcome. That is, FSIQ is significantly contributing to our ability to classify cases in either the ‘reflections’ or ‘no reflections’ category. Finally, the \( \exp(\beta) \) value is greater than one, indicating that as FSIQ increases, the odds of a reflection occurring increases. The confidence intervals (C.I.) for \( \exp(\beta) \) indicate that there is a 95% probability that the value for \( \exp(\beta) \) falls between 1.01 and 1.07. Since these numbers are both greater than one, it is likely that the model is generalizable to the population (Field, 2000).

Table 13 also presents the statistics for predicting reflections from VIQ, and for predicting reflections from PIQ. In both of these analyses, similar results were found, with the predictor variable contributing significantly to our ability to predict category membership for the reflections variable. Also in both cases, Homer-Lemershow goodness-of-fit tests confirmed that the observed data are not significantly different from the predicted values when VIQ (\( \chi^2 (8, N=80) = 4.90; p>0.05 \)) or PIQ (\( \chi^2 (8, N=80) = 2.73; p>0.05 \)) are used as predictors, suggesting that the models each predict these data well. In all three analyses, residuals were examined and no outliers were detected.
Table 13:

Logistic Regression to Predict Reflection Category (N=80)

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>Overall % Predicted</th>
<th>Chi-square</th>
<th>-2 Log likelihood</th>
<th>B</th>
<th>Exp(β)</th>
<th>95% C.I. for EXP(β)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSIQ</td>
<td>66.3</td>
<td>5.573*</td>
<td>102.87</td>
<td>.035*</td>
<td>1.036</td>
<td>1.005-1.068</td>
</tr>
<tr>
<td>VIQ</td>
<td>63.8</td>
<td>4.189*</td>
<td>104.25</td>
<td>.029*</td>
<td>1.029</td>
<td>1.000-1.059</td>
</tr>
<tr>
<td>PIQ</td>
<td>58.8</td>
<td>5.493*</td>
<td>102.95</td>
<td>.039*</td>
<td>1.040</td>
<td>1.005-1.077</td>
</tr>
</tbody>
</table>

*p<.05 Correlation is significant at the 0.05 level (2-tailed)

**p<.01 Correlation is significant at the 0.01 level (2-tailed)

As noted above, it has been suggested that response style should be considered in these analyses. As such, the above analyses were repeated for the ambident, introversive, and extraversive subgroups. For the ambident, introversive, and extraversive subgroups, none of the predictor variables were found to significantly predict outcome. That is, FSIQ, VIQ and PIQ did not significantly contribute to our ability to predict the dichotomous reflections variable. It was noted that some of these models approached significance somewhat, but could not be interpreted in their own right. It is likely that the larger sample size is required to illustrate these results.

Exploratory Examination of WAIS-R and WAIS-III Subtests

Given the relative absence of literature on the relationship between the Rorschach and the specific WAIS-R and WAIS-III subtests, Pearson correlations were calculated in order to generate hypotheses regarding specific WAIS-R and WAIS-III abilities and the Rorschach variables in question. Table 14 presents the significant Pearson correlations between index and age-based subtest scores for the WAIS-R and WAIS-III and the selected Rorschach variables. Only the subtests that are common to both versions of the WAIS were used. Subtests that comprise the VIQ include Vocabulary (V), Information
(I), Similarities (S), Comprehension (C), Digit Span (DS), Arithmetic (A). Subtests that comprise the PIQ include Picture Completion (PC), Picture Arrangement (PA), Block Design (BD), and Digit-Symbol Coding (CD).

Table 14:

Correlations Between WAIS-R and WAIS-III Scores and Rorschach Variables

<table>
<thead>
<tr>
<th></th>
<th>Zf</th>
<th>ZSum</th>
<th>W</th>
<th>W+</th>
<th>Blend</th>
<th>R</th>
<th>PureF</th>
<th>DQ+</th>
<th>Good M</th>
<th>FQx (+,0)</th>
<th>FQf (+,0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSIQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.275*</td>
<td>.373**</td>
<td></td>
<td>-.449**</td>
<td></td>
<td>.255*</td>
<td>-.297**</td>
</tr>
<tr>
<td>VIQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.282*</td>
<td>.398**</td>
<td></td>
<td>-.456**</td>
<td></td>
<td>.254*</td>
<td>-.251*</td>
</tr>
<tr>
<td>PIQ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.281*</td>
<td></td>
<td></td>
<td>-.347**</td>
<td></td>
<td></td>
<td>-.294**</td>
</tr>
<tr>
<td>Subtest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.311**</td>
<td>.452**</td>
<td></td>
<td>-.504**</td>
<td></td>
<td>.262*</td>
<td>-.232*</td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.290**</td>
<td>.370**</td>
<td></td>
<td>-.455**</td>
<td></td>
<td>.274*</td>
<td>-.228*</td>
</tr>
<tr>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.295**</td>
<td></td>
<td>-.400**</td>
<td></td>
<td>.225*</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>.305**</td>
<td>.358**</td>
<td>.222*</td>
<td>.326**</td>
<td>.371**</td>
<td></td>
<td></td>
<td>-.418**</td>
<td></td>
<td>.236*</td>
<td>.330**</td>
</tr>
<tr>
<td>DS</td>
<td></td>
<td></td>
<td>.358</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td></td>
<td></td>
<td>.221*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.257*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05 Correlation is significant at the 0.05 level (2-tailed)

**p<.01 Correlation is significant at the 0.01 level (2-tailed)

Each WAIS subtest requires a variety of skills, some of which are shared with other subtests. However, subtests each require specific abilities that are relatively unique to the particular subtest in question. For example, the Similarities subtest (along with
some other verbal subtests) requires word knowledge, verbal reasoning, and expressive language skills. However, the Similarities subtest is unique in that it requires the participant to think in logical, abstract categories. Thus, while there is some overlap between subtests, they are unique in other respects. The pattern of Pearson correlations in Table 14 suggest that certain Rorschach variables may be differentially associated with some specific abilities as measured by the WAIS-R and WAIS-III.

Consistent with the above regression analyses predicting factor scores on the Blend Complexity component derived from the Principal Components Analysis, FSIQ, VIQ and PIQ were strongly correlated with the number of blend responses, and negatively correlated with PureF and the form quality of the PureF responses. FSIQ and VIQ were also strongly correlated with GoodM responses, while the correlation between PIQ and GoodM approached but did not reach significance. This is consistent with the relatively lower factor loading of GoodM on the Blends Complexity component. A review of the WAIS subtest correlations with the variables comprising the Blends Complexity component revealed that GoodM is moderately correlated with the WAIS subtests relating primarily to the comprehension of verbal material and higher-order verbal reasoning. Similarly, the number of blends is correlated with these particular subtests. However, the number of blends is also significantly correlated with two subtests of nonverbal problem-solving and visual attention to detail (BD and PC). This suggests that GoodM is more specifically correlated with verbal ability, and is not significantly related to nonverbal measures of intelligence. On the other hand, the number of blends seems to be related to more broad measures of intelligence, as it is significantly correlated with measures of both verbal and nonverbal abilities.
Also consistent with the regression analyses, Rorschach variables that loaded on the Organizational Complexity component from the PCA were overwhelmingly uncorrelated with FSIQ, VIQ and PIQ. However, the W+ variable was the exception, as it was significantly correlated with both FSIQ and VIQ. Closer inspection of correlations between WAIS subtests and the W+ variable revealed significant correlations with the Vocabulary, Information, and Comprehension subtests. This suggests that more frequent W+ responses tend to occur when higher scores on these verbal subtests are present. Since the remaining Rorschach variables that loaded on the Organizational Complexity component were nonsignificant, the potential importance of the W+ variable was overlooked. Of note, the W variable and the DQ+ variable were found to be nonsignificant, suggesting that important information can be gained when these variables are combined. That is, W alone is not correlated with intelligence indices, nor is DQ+ alone. This suggests that this area warrants further investigation.

It is noteworthy that the Digit Span and Arithmetic subtests from the WAIS-R and WAIS-III were overwhelmingly uncorrelated with Rorschach variables. These two subtests are similar in that they primarily evaluate the participants' ability to take in simple information presented verbally, hold the information in his working memory, manipulate the information, and respond verbally. These are considered tests of working memory in both versions of the WAIS, and they both contribute to the VIQ along with the other verbal subtests. Similarly, Digit-Symbol Coding was not correlated with the Rorschach variables in this study. This task is essentially a test of the participants’ ability to quickly and accurately copy symbols that are paired with numbers. It is generally referred to as a task of processing speed in both versions of the WAIS.
It is also interesting to note that the Comprehension subtest was significantly correlated with all but two of the Rorschach variables. The Comprehension subtest requires the participant to apply practical knowledge to solve everyday problems or social concerns. This subtest was significantly correlated with the Rorschach variables that comprised the Blends Complexity component, as well as from the Organizational Complexity component. The Comprehension subtest was not significantly correlated with the Form Complexity component, which was comprised of the number of responses, and good form quality for the overall record.

Finally, the subtests that comprise indices of nonverbal intelligence, specifically the Block Design and Picture Completion subtests, were only correlated with the Blends Component variables. These Wechsler subtests measure an individual’s ability to attend to details of the environment, organize visual spatial stimuli and synthesize nonverbal information. It is interesting to note that these subtests were entirely uncorrelated with the Rorschach variables associated with Organizational Complexity and Form Complexity.

Chapter IV

Discussion

The primary purpose of this study was to evaluate the relationship between intelligence as measured by the WAIS-R and WAIS-III, and Rorschach variables that have been empirically or conceptually associated with intelligence. A PCA revealed that the Rorschach variables in this study clustered in three components. The first component was referred to as Organizational Complexity, and was comprised of Rorschach variables associated with the visual organization of the inkblot stimulus in a variety of meaningful
ways (Zf, ZSum, W, W+, DQ+). For example, these variables reflect attempts to organize the blot into more than one object in a meaningful relationship, using the entire blot rather than part of the blot, and using the ink and the white space in a single response.

The second component was referred to as Blends Complexity, and was defined by the presence of blend responses and human movement responses with good form (Blends, GoodM) and the absence of pure form responses (reflected by PureF, FQf + and o). The presence of blends and absence of pure form responses reflects the participant’s willingness and/or ability to integrate various features of the ink into a single response, including shape, colour, shading, the perception of movement, the perception of depth, and so on. Human movement responses are believed to involve a higher form of conceptualization, as well as a more deliberate examination of the stimulus field than is the case with other determinants in the Rorschach protocol (Exner, 1993). Human movement has also been associated with behavioural and interpersonal effectiveness (Exner, 1993). Finally, the third component was defined primarily by the number of responses in the protocol, and the form quality for both the entire protocol and the pure form responses. This component was referred to as Form Complexity.

Regression analyses revealed that FSIQ predicted a significant amount of variance in scores on the Blend Complexity component, but not on the Organizational or Form Complexity components. Similarly, VIQ and PIQ were independently able to predict Blend Complexity factor scores, but not factor scores on the other two components. The positive finding regarding the Blend Complexity component is consistent with findings that the number of blends is related to intelligence (Bertrim & Hibbard, 2001; Wagner et
al., 1992), as is the number of human movement responses (Abrams, 1955; Levine et al., 1959). As noted above, much of the research on these variables has yielded mixed results, arguably due to problems in statistical analyses and methodological design. As such, the improvements implemented in the present study increase the confidence in this finding.

Conceptually, forming a blend response requires the ability to perceive and integrate various features of the blot and synthesize them into a single response. A blend response occurs when the participant is relatively comfortable with the ambiguous nature of the task, and embraces the varied features of the blot and puts them together in a synthesized way. This could be considered a parallel to the participant’s ability to attend to the varied aspects of his/her world, and to combine and use this complex information to make sense of what is going on around him/her and guide behaviour. Similarly, human movement responses require a certain degree of contemplation or deliberation, as no objective movement actually occurs in the blot. That is, the participant engages in some higher-order thinking, rather than just responding with a reflexive perception. In contrast, the pure form response could be considered a parallel to the participant’s inability or discomfort with the ambiguous or complex characteristics of his/her world, and signifies an overly simplistic way of functioning.

It is somewhat surprising that the Organizational Complexity component was not significantly predicted by intelligence indices. As noted above, there are a number of studies suggesting that higher frequencies of responses with DQ+, W, W+, and Z are related to higher levels of intelligence. However, it was noted that these findings were somewhat inconsistent, and that there were a number of methodological flaws in these
studies. It may be that the present study corrected these flaws to some extent and that these results illustrate a more accurate representation of the relationship between the participant’s intelligence as measured by the WAIS-R or WAIS-III and his/her organizational ability on the Rorschach. It is possible that organizational ability is representative of somewhat of a lower-order ability, rather than the higher-order abilities evaluated by the Wechsler scales. This possibility is supported by the finding that, in the exploratory analyses, W+ was significantly correlated with FSIQ and VIQ while W alone and DQ+ alone were uncorrelated with intelligence indices. It may be that W+ represents a higher level of complexity, as it involves two distinct organizational activities – integrating the entire blot rather than a part of the blot, and viewing two distinct objects in a meaningful relationship – in forming a single response.

Alternatively, it may be that these variables related to organizational activity are reflected in intelligence scores in some circumstances but not others. For example, it may be that variables related to organizational activity may be predicted by intelligence in certain clinical diagnostic or community groups but not others. Therefore, this sample may have been too heterogeneous to reflect certain relationships between Rorschach variables and intelligence. As such, further investigation in this area is required to delineate these issues. Specifically, obtaining additional demographic data and details on clinical status would be helpful in evaluating the relationship between these Rorschach variables and intelligence.

Similarly, the Form Complexity component was not predicted by intelligence indices. Since the Form Complexity component seems to be primarily related to the form quality of the responses and the number of responses, this nonsignificant finding is not
particularly surprising. Indicators of form quality generally are used to evaluate the
degree of conventionality or typicality with which the participant perceives the inkblot.
Rather than relating to complex cognitive processes, these indicators are most often
viewed as a measure of the participant’s ability to perceive the stimulus in an ordinary,
conventional, reality-based manner. Logically, the tendency to produce conventional
responses would not necessarily be related to intelligence or complex cognitive
processing.

Thus, the ability of the IQ indices to reliably predict the Blends Complexity
cOMPONENT but not the other components suggests that the Blends Complexity component
could reflect a higher-order manner of integrating and organizing the stimulus in the blot.
As such, individuals with higher scores on structured measures of global intellectual
ability would be expected to produce more blends, more human movement responses
with good form, and fewer pure form responses on the Rorschach. The finding that this
is true for VIQ, PIQ and FSIQ suggests that this is a relatively global capacity that is not
restricted to a purely visual-spatial or verbal problem-solving characteristic.

This is consistent with the finding that young children who are cognitively less
developed produce more pure form responses, fewer blends, and fewer human movement
responses (Ames, 1952). Further, Ames also found that as children matured over the first
10 to 20 years of life, they tend to produce fewer pure form responses, more blends, and
more human movement responses, with these evening out into adulthood. Similarly,
Wideman (1998) found that intellectually gifted children produced more blends and
fewer pure form responses than nongifted children. As such, it seems that perhaps the
developmental pattern of becoming more cognitively complex, more capable of thinking
about and integrating various pieces of information simultaneously, and having more ways to deal with a given problem are associated with both an increase in Rorschach blends and human movement as well as in intelligence as measured by structured tests. As noted, this is also consistent with Loevinger’s (1966) stages of ego development, suggesting that perhaps a global capacity to deal with complex, ambiguous information in a flexible way may be underlying performance on structured intelligence tests and certain variables of the Rorschach.

If intelligence in its broad sense is considered one indication of adaptability, and the Rorschach is a type of behavioural test of how the individual functions in his/her world, then the relationship between intelligence and the Blends Complexity component suggests that this cluster of Rorschach variables may reflect the individual’s ability to function adaptively.

Considering this from an evolutionary perspective, the ability to attend to the complex features of the environment and integrate them in a sensible way would be essential, as it would allow the individual to function with increasing effectiveness in his/her environment to acquire or accomplish what is required for survival. In contrast, blocking out the complexity of one’s environment would result in missing important cues that could be relevant to self-preservation. This could be true in intellectual, interpersonal, intrapsychic, or other domains of functioning. This notion is also consistent with the psychodynamic perspective, which stipulates that psychologically healthy individuals have many ways of dealing with life challenges. Further, psychologically unhealthy individuals are described as approaching all situations in the same manner, and are typically unable to satisfy their needs as a result. Thus, the Blends
Complexity component may be predicted by intelligence because both mark the individual’s ability to attend to, use, and effectively apply information in his or her environment. This also underscores the notion that intelligence and personality are intertwined, as this capacity is not exclusively a function of cognitive or personality functioning. As such, it is important to consider the individual in a holistic way, respecting the fact that the same person brings the same resources and styles to all tests or life challenges.

Response Styles

Since the response style of the participant is often neglected in Rorschach research, the present study analyzed the data for the three response style subgroups. Regarding the analysis of the ambent, introversive and extratensive subgroups, the results of the ambent subgroup (n=35) most closely approximated the results of the entire sample (N=80). That is, FSIQ, VIQ, and PIQ each independently predicted Blend Complexity scores for the ambent subgroup, but did not predict Organizational Complexity or Form Complexity. The other two subgroups, introversives (n=31) and extratensives (n=14) were quite different from the ambent group and the overall sample, as the findings for these two groups were largely nonsignificant. The only significant finding was that PIQ predicted Blends Complexity for the extratensive group.

It may be that, because the introversive and extratensive subgroups were overwhelmingly pervasive styles (93.5% and 100%, respectively), these subgroups were uncharacteristically extreme representations of these response styles. It is possible that results would be different if these analyses were conducted with more moderate (non-pervasive) introversive and extratensive styles. Also, the extratensive subgroup was very
small (n=14), rendering the interpretability of the results for this group particularly questionable. It would be useful to replicate this study with larger subgroups of pervasive introversive, non-pervasive introversive, pervasive extratensive, non-pervasive extratensive, and ambient response styles. These preliminary exploratory data suggest that there may be important differences in how response style may be predicted by cognitive complexity or intelligence.

It is interesting to note that the distribution of response styles in the present sample is quite dissimilar to Exner’s (1993) nonpatient normative data. Exner reported that 20% of nonpatients were ambient, 40% were introversive, and 40% were extratensive in his normative data. The present study was comprised of 43.8% ambient, 38.8% introversive, and 17.5% extratensive. Considering that 63.8% of the present sample consisted of community volunteers, this striking difference was unexpected. Looking at the normative data for a variety of diagnostic groups including depression and schizophrenia, the distribution of response styles in the present sample most closely approximated the normative data for patients with characterological problems (41% ambient, 35% introversive, and 24% extratensive). It has been noted that individuals with an ambient response style are believed to be particularly vulnerable to intrapsychic or interpersonal problems and apply inconsistent coping behaviours (Exner, 1993). It is possible that a disproportionate number of the community cases in this study were individuals with characterological problems, resulting in a disproportionate increase in the ambient response style. Regardless, it is somewhat surprising that the ambient subgroup in this study was the only subgroup in which the results of the regression analyses were reproduced. However, Wideman’s (1998) study in which more blends
were found in gifted children’s protocols when compared to nongifted children is intriguing, as she noted that the ambent style was the most prevalent response style in both groups. Given this study’s relatively small n’s in each subgroup and the absence of demographic and diagnostic information, replication of these analyses with larger groups and more extensive demographic information is needed in order to make sound interpretations of these results. Clearly, more research in this area is needed and would likely prove worthwhile.

The Reflection Variable

The Rorschach reflection response was also considered in this study, and was treated as a categorical variable. Logistic regression analyses revealed that FSIQ, VIQ and PIQ were each able to predict category membership on the reflections variable. The relationship between Rorschach reflection responses and intelligence indices does not appear to have been evaluated empirically. Conceptually, the perception of a reflection or mirror image in a response is believed to reflect some degree of thinking or examining of the self (Exner, 1993). The presence of reflections responses in adult records are interpreted as an overinflated sense of self worth that tends to dominate the individuals interactions with others (Exner, 1993). It is possible that the tendency to look at the self in an evaluative way is associated with intelligence because it requires some level of introspection and higher-order abstract thinking. In addition, a reflection response requires the individual to account for the symmetrical nature of the blot in a meaningful and integrative way (i.e. “it’s a woman looking in a mirror” or “it’s a bear and his image is reflected in a lake”), which may necessitate more sophisticated cognitive functions.
No consistent differences in response style were observed in relation to the finding that intelligence scores predict category membership for the reflection response variable.

It is interesting to note that 41% of the sample for the present study had at least one reflection response. According to Exner’s (1993) normative data, 7% of nonpatient adults have reflection responses, and the proportion tends to increase in patient groups with the highest proportion occurring in the characterological disorder group (approximately 20%). Of note, Exner (1993) explained that the proportion of reflection responses among nonpatients varies with occupation, as approximately 30% of the clergy demonstrate reflection responses. Thus, the proportion of participants who demonstrated reflections responses in the present study is quite high, and somewhat unexpected given the normative data. Considering that this sample included 20 participants with superior to very superior IQ’s (falling at or above the 91st percentile), it may be that the high number of reflections responses is indicative of a genuine sense of superiority and a healthier form of narcissism. Exner (1993) explained that in very high functioning or successful individuals, reflection responses may indicate a relatively accurate superior self-evaluation. Nonetheless, the relationship between intelligence and reflections responses is an interesting and apparently new finding that merits further investigation.

**Exploratory Findings**

A second goal of this study was to explore the relationship between the Rorschach variables and specific WAIS-R and WAIS-III indices and subtests. As noted, certain subtests evaluate some abilities in common with other subtests, but each subtest also places its own unique demands on the participant. These analyses were intended primarily to provide some context for interpreting the above results, and to generate
hypotheses for future studies. Exploration of the relationship between subtests revealed four points of particular interest. First, the W+ variable, which loaded on the Organizational Complexity factor, correlated significantly with FSIQ and VIQ. However, since the Organizational Complexity factor was not predicted overall by intelligence indices, the relationship between W+ and intelligence was initially overlooked. This supports the notion that perhaps simple efforts at organizing the stimulus are not correlated with intelligence, but that increasing levels of organization and integration reflect increasing intelligence and complexity. For example, using the whole blot (W) involves more complex organization than using a small detail of the blot, but it is considerably less complex than using the whole blot and describing a meaningful relationship between two objects (W+). This would explain why DQ+ alone and W alone were not correlated with intelligence measures. As such, delineating and investigating the variables that comprise this component would contribute to our understanding of the idea of organizational complexity and its relation to intelligence.

The second noteworthy finding from exploratory analyses of indices and subtests revealed that the Comprehension subtest of the WAIS-R and WAIS-III was significantly correlated with a variety of Rorschach variables reflecting both Blends Complexity and Organizational Complexity. This suggests that the abilities associated with the Comprehension subtest, including practical sense and problem-solving in everyday life, might be reflected more widely in the Rorschach than are other abilities related to general intelligence. Specifically, the Comprehension subtest correlated significantly with Rorschach variables that reflected a wide range of ways to organize and integrate the stimulus field into more complex, inclusive responses. As such, the Comprehension
subtest might be associated with a more general notion of cognitive complexity, which includes perceptual, organizational, and integrative complexity. Furthermore, since the Comprehension subtest involves the use of practical knowledge in problem-solving, it could be argued that this subtest is a reflection of the more broadly defined, applied intelligence described above. This is an intriguing finding, and it merits further investigation. The lack of a correlation between the comprehension subtest and the variables related to Form Complexity supports the notion that the Form Complexity component is primarily related to conventionality in perception, rather than to the higher-order processes involved in cognitive complexity or intelligence.

Third, the exploratory subtest analyses revealed that the Digit Span, Arithmetic and Digit-Symbol Coding subtests were overwhelmingly uncorrelated with the Rorschach variables in question. This pattern of correlations suggests that tests requiring the use of working memory and processing speed are generally not correlated with these Rorschach variables. This suggests that perhaps basic-level information-processing functions such as these are not reflected in these particular Rorschach variables, while subtests reflecting higher-order verbal and nonverbal abilities are reflected in certain Rorschach variables. This pattern of results suggests intriguing implications for further studies. Specifically, the WAIS-R and WAIS-III both break the FSIQ into a VIQ representing the verbal portion of the test, and PIQ representing the nonverbal portion. However, the WAIS-III further breaks down these indices, with the VIQ being formed by a verbal comprehension index and a working memory index, and the PIQ being comprised of a perceptual organization index and a processing speed index. Since these exploratory analyses suggest that working memory and processing speed might not be
reflected in the Rorschach variables traditionally believed to be associated with intelligence, an analysis of WAIS-III indices on the lowest index level (verbal comprehension index, working memory index, perceptual organization index, and processing speed index) could prove informative. Since the VIQ and PIQ are comprised of these more specific indices, any differential associations between them would be overlooked if VIQ and PIQ were used. Future studies in this area should use the WAIS-III and consider these index scores in addition to more global indices of intelligence.

Finally, it is interesting to note that the Wechsler subtests that are traditionally described as tasks of nonverbal reasoning, visual spatial organization, and attention to the detail of visual stimuli were largely uncorrelated with the Rorschach variables examined in this study. These subtests correlated with the Rorschach variables that comprised the Blends Complexity component, but they were uncorrelated with the Organizational Complexity and Form Complexity component variables. The Block Design and Picture Completion subtests are components of the PIQ, and are often referred to as perceptual organization tasks. It seems paradoxical that these Wechsler subtests would be uncorrelated with Rorschach variables related to organization and synthesis of information, including Zf, ZSum, W, W+, and DQ+. As discussed above, these Rorschach variables are defined primarily as the perceptual-organizational aspects of a response. Given that the Rorschach is often viewed as a perceptual-organizational task, one might expect that structured intelligence tasks that evaluate the ability to perceive, organize, and synthesize nonverbal information would be associated with these types of Rorschach variables.
One explanation for this seemingly paradoxical finding may be found in the fundamental nature of these two tests. In particular, the WAIS-R and -III are highly structured tests in which the individual is given specific instructions and guidance as the test proceeds. Furthermore, without assisting the individual in his or her performance, the WAIS-R and -III aim to elicit a sample of the individual's best possible performance on each task presented. In contrast, the Rorschach is an ambiguous, unstructured task in which the individual is offered virtually no guidance or instruction as the task proceeds. The aim of the Rorschach is to elicit a sample of the individual's habitual or typical approach to a task, rather than to evaluate his or her maximum potential. The differences in the fundamental nature of these two tests may partially account for the finding that the perceptual organization subtests of the Wechsler did not correlate with variables associated with perceptual organization indices on the Rorschach. It is possible that the ability to organize one's world perceptually is differentially represented by these two types of tests. This area merits further empirical investigation.

Strengths, Limitations, and Future Research

Overall, this study achieved its goal of improving upon prior research on the relationship between intelligence as measured by the WAIS-R and WAIS-III, and certain Rorschach variables that have been associated with intelligence. The present study utilized a larger, more heterogeneous sample to promote generalizability. Rorschach variables were evaluated alone and in combination, in order to try and capture the more complex relationship that may exist between Rorschach variables. Similarly, global and more specific indices of intelligence were used, in order to try and evaluate whether there were differences in specific intellectual capacities. The most updated versions of the tests
were used so that updated administration procedures, standardization and normative data were applied which ensured consistency across participants. Interrater reliability was verified, which is often lacking in Rorschach research (Exner et al., 1995).

Furthermore, Kinder (1992) emphasized that Rorschach research often ignores the issue of nonnormality and skewness. This study was careful to consider and address these issues to ensure the analyses and results would be sound. In addition, Anderson and Dixon (1993) suggested factor analytic research is a useful technique in Rorschach research. They also noted that, although Exner's CS presents a selection of the most important variables from several systems, variables should be carefully selected to avoid including categorical or very skewed variables for factor analysis. Further to this point, since there is much debate surrounding the relative importance of including R as a variable versus controlling for R in analyses, statistical analyses in the present study were performed using R in both ways. That is, the role of R in these analyses was examined in order to ensure results would not be adversely affected by an erroneous assumption — to control R, or to allow it to vary.

Finally, it has been suggested that in addition to evaluating Rorschach results by comparing an individual’s results on a single variable to the standardized normal population, it would be useful to examine how the individual variables combine to evaluate more general constructs (Anderson & Dixon, 1993). Considering factors or components of Rorschach variables promotes this approach, by encouraging researchers and clinicians to think of clusters and patterns of Rorschach variables as meaningful, rather than relying on single variables. Analyses were also considered in the context of
response styles, and results suggested that this is an important consideration in Rorschach research as suggested by Exner (1995).

Despite these improvements on prior research, there are several important limitations of the present study that must be acknowledged. Unfortunately, very little demographic data was available for this study. Future studies should obtain information on socioeconomic status, education level, and ethnocultural identity so these variables can be included in the analyses. It is possible that some of these variables might be influencing the results in an important way. For example, education level might be correlated with both intelligence measures and certain Rorschach variables, and could partially explain this relationship. Furthermore, since this study combined community and clinical cases, it would be useful to cross-validate these analyses using separate clinical and community samples. It would also be useful to evaluate clinical samples based on diagnostic category, as there may be differences among diagnostic groups. It should also be noted that, given the exclusion criteria, the results of this study cannot be generalized to individuals diagnosed with schizophrenia, neuropsychiatric problems, and IQs at the borderline range or lower. Similarly, individuals with extremely high Lambda values were not included, so results cannot be generalized to this group. Finally, as noted, response style subgroups provided interesting hypotheses, but pervasive styles and small n’s made it difficult to draw firm conclusions in this area.

Overall, this study provides a basis for future research in this important area. Specifically, it would be important to systematically investigate the differential relationship between intelligence and Rorschach variables in the context of response styles. The relationship between reflections responses and intelligence should also be
investigated more rigorously and systematically. More attention should be given to extraneous variables that might contribute to these relationships, including socioeconomic status, educational background, and ethnocultural background. In addition, since the Blend Complexity component and intelligent functioning may be related because they both reflect adaptive functioning, future work should evaluate these and other constructs with an external, behavioural measure of adaptive functioning. This would improve our understanding of what the Rorschach actually measures, and research in these areas would certainly improve the clinical utility of the test.
References


VITA AUCTORIS

Sarah Bertrim was born on April 29, 1975 in Perth, Ontario. In June 1994, she received her High School Diploma from Perth and District Collegiate Institute. In October 1998 she graduated with Distinction from McGill University with a Bachelor of Arts degree, major in Psychology. From 1998 to 2000, she worked as a psychometrist at the Royal Victoria Hospital of the McGill University Health Centre in Montreal. In September 2000 she began graduate studies in Clinical Psychology at the University of Windsor, and hopes to complete her doctorate in 2005.