

Assessment

<http://asm.sagepub.com>

Behavioral Science Foundations of the Rorschach Test: Research and Clinical Applications

Marvin W. Acklin

Assessment 1999; 6; 319

DOI: 10.1177/107319119900600403

The online version of this article can be found at:
<http://asm.sagepub.com/cgi/content/abstract/6/4/319>

Published by:

 SAGE Publications

<http://www.sagepublications.com>

Additional services and information for *Assessment* can be found at:

Email Alerts: <http://asm.sagepub.com/cgi/alerts>

Subscriptions: <http://asm.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Citations (this article cites 44 articles hosted on the SAGE Journals Online and HighWire Press platforms):
<http://asm.sagepub.com/cgi/content/refs/6/4/319>

BEHAVIORAL SCIENCE FOUNDATIONS OF THE RORSCHACH TEST: RESEARCH AND CLINICAL APPLICATIONS

Marvin W. Acklin
Honolulu, Hawaii

Never without its critics, the Rorschach Test continues to be widely used in clinical settings. The test continues to be criticized vigorously. Rorschach critics appear to fall into two broad groups: those leveling valid methodological concerns about the test's behavioral science foundations and "method critics" who appear to deny the validity of the test on strictly a priori or theoretical considerations. Many critics do not appear to be acquainted with the extensive Rorschach research literature. The current paper provides an overview of several domains of applied and laboratory Rorschach behavioral science, including statistical power analysis, interobserver agreement and interrater reliability, Rorschach assessment of thought disorder, and emerging research linking Rorschach variables with diagnostic criteria from the *DSM-IV*, as a means of educating both adherents and detractors alike concerning the test's scientific track record and applicability to clinical assessment.

Keywords: Rorschach Test, projective techniques, clinical assessment, psychodiagnosis, thought disorder

The Rorschach test has never been without its critics. With the increasing sophistication and methodological acumen of scientist-practitioner clinical psychology, the critics of the Rorschach have likewise become more sophisticated. The value of criticism, of course, particularly criticism leveled on valid methodological grounds, is invaluable for any discipline. The net result of listening to one's critics is an improved and more rigorous methodological foundation. Rorschach critics

appear to be of two kinds: critics who level methodological criticisms based on valid premises and those who may be aptly described as "method critics" who deny the validity of a technique or discipline based on a priori considerations. While we may never, despite the best behavioral science, convince the latter, this article is designed to address, if not convince, the former.

In reality, Rorschach adherents are frequently dismayed by what appears to be ignorance of the Rorschach literature on the part of the critics. Furthermore, Rorschach critics persist in making global assessments of the Rorschach Test without taking into account the complexity and multidimensional nature of the test's yield. This paper is designed to provide an overview of an extensive body of applied clinical research published in respectable scientific journals addressing three broad domains of Rorschach research: statistical

This article is based in part on a symposium (The Rorschach: A Critical Look) presented at the American Psychological Association, August 18, 1999, in Boston. Special thanks to Phillip Holzman, James Kleiger, Mark Hilsenroth, Irving Weiner, Gary Belcher, and Mark Verschell for assistance at various points.

Correspondence concerning this article and requests for offprints should be addressed to Marvin W. Acklin, PhD, 850 W. Hind Drive, Suite 203, Honolulu, HI 96821. E-mail: acklin@hawaii.edu

power analysis, interobserver agreement and interrater reliability, and validity. The review is in the spirit of Weiner (1995, 1996) and Parker, Hunsley, and Hanson's (1999) suggestions that scale focused reviews are more illuminating than considerations of global validity in multidimensional instruments such as the Rorschach.

Statistical Power Analysis

Following the work of Cohen (1962, 1988) we conducted a statistical power analysis of the Rorschach literature published between the years of 1975 and 1991 (Acklin, McDowell, & Orndoff, 1992). Statistical power analysis, of course, deals with research design sensitivity, specifically the ability of research designs to detect differences that actually exist. Statistical power analysis focuses on reduction of Type II error, namely, the probability of accepting a null hypothesis when it is false. Power depends on several factors, including alpha level, number of participants used, and the quality of instrumentation (Cohen, 1988). We were interested in two issues. First, we were interested in the overall quality of Rorschach research in comparison to behavioral science research in general. Second, we were interested in comparing research conducted using the Rorschach Comprehensive System (Exner, 1991, 1993; Exner & Weiner, 1994) in comparison to non-Comprehensive System research. One of our most interesting findings was the fact that Rorschach research in general compared favorably with behavioral science research overall (Cohen, 1962; Rossi, 1990; Sedlmeier & Gigerenzer, 1989). Second, we found that Rorschach research using Comprehensive System methods of administration and coding yielded research that was more powerful than non-Comprehensive System research.

Interobserver Agreement and Interrater Reliability

Following our work in the area of power analysis, we turned our attention to interobserver agreement and interrater reliability of Comprehensive System codes and variables. The domain of interobserver of agreement and interrater reliability became interesting in the 1960s and 1970s when behaviorists focused on coding systems and observational methodology (Berk, 1979; Suen & Ary, 1989). This continued into the 1970s and 1980s with the

development of the *DSM-III* (Spitzer, Cohen, Fleiss, & Endicott, 1967). We applied basic tenants of applied behavior analysis to the Rorschach Test (McDowell & Acklin, 1996; Acklin, McDowell, & Verschell, in press), viewing it as an observational methodology by means of which a sample of verbal behavior is elicited then scored with a complex system of codes. Aside from the rather profound and convoluted methodological issues which arise in observational methodology, for example, the vicissitudes of calculating coefficients of agreement in low occurrence phenomena, we found that a great majority of Comprehensive System codes and variables yield acceptable levels of interobserver agreement and interrater reliability using conservative means of calculation, namely Cohen's kappa and intra-class correlation coefficients. These findings confirm the findings of Meyer and his colleagues (1999) and as we shall see below are consistent with extensive body of research dealing with the Thought Disorder Index (TDI).

Validity

Garb, Florio, and Grove (1998) published a reanalysis of previously conducted meta-analyses (Parker, 1983; Parker, Hanson, & Hunsley, 1988) concluding that "less emphasis be placed on training in the use of the Rorschach" (p. 404). Citing serious methodological flaws in both the Parker and Garb et al. meta-analyses, a recently conducted meta-analysis of the Rorschach (Hiller, Rosenthal, Bornstein, Berry, & Brunell-Neulieb, in press) yielded highly favorable findings in comparison to the Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1943).

Periodic investigations of test usage have consistently found the Rorschach Test (Archer, Maruish, Imhof, & Piotrowski, 1991; Lees-Haley, 1992; Lubin, Larsen, & Matarazzo, 1984; Pinkerman, Haynes, & Keiser, 1993) among those most commonly used by practicing assessment psychologists, despite chronic criticism from the academic quarter. There is probably a good reason for this, namely, the test works. The remainder of my presentation will focus on two areas where the Rorschach has amply demonstrated its merit as a clinical assessment tool. The first area focuses on what most Rorschach clinicians know well, that is,

the unique sensitivity of the Rorschach Test to detect disturbances and disorders of thinking. The second area recently emerged and focuses on the relationship between Rorschach variables and *DSM-IV* diagnostic criteria.

Thought Disorder Index

Johnston and Holzman (1979), combining earlier systems for the detection of thought disorder into a coding system for the Rorschach and Wechsler scales, developed the Thought Disorder Index (TDI). A revised version of the index was published in 1986 (Solovay et al.) The TDI, derived from standard administration of the Rorschach Test, can be used to quantify the amount and severity of disordered thinking, and to identify qualitative features of thought disorder. The TDI includes 23 categories of thought slippage at four levels of severity. Examples of mild thought slippage include peculiar verbalizations and mild combinatory thinking. Moderately disordered thinking includes phenomena such as looseness, idiosyncratic symbolism, and queer use of language. At the more severe end of the spectrum one finds autistic logic, more serious forms of combinatory thinking, neologisms, and incoherence. The TDI has been shown to be a reliable and valid metric for assessing thought disorder in adults, children, and adolescents. Typically, the patient's responses to the 10 card Rorschach Test are audio-recorded, transcribed, and coded by investigators blind to diagnosis. Four card sets, designed to shorten researcher time, have been shown to be reliable. Originally developed for clinical use, the TDI has been extensively studied in contemporary schizophrenia research. Kleiger (1999) offers an updated description and discussion of the scoring approach. Our next task is to examine this research literature based on 33 studies.

Social Class, Race, and Culture

Haimo and Holzman (1979) used the TDI in examining social class and race differences in hospitalized schizophrenic patients, first-degree relatives of schizophrenics, and normal controls. TDI scores accurately distinguished among the three psychiatric categories for both black and white subgroups.

Adolescents and Children

Arboleda and Holzman (1985) examined thought disorder in children using the TDI. They examined

normal children aged 5 to 16 years, hospitalized psychotic children, children hospitalized for nonpsychotic behavioral problems, and non-hospitalized children born to a psychotic parent. The level of thought disorder in psychotic children and high-risk children was about three times higher than that of the normal children, whereas the level of thought disorder of the non-psychotic hospitalized children was no different from that of the normal children. Makowski et al. (1997) used the TDI to examine whether adolescent schizophrenic patients showed the same characteristic features of thought disorder as do adult schizophrenics. They found that the disordered thinking of schizophrenic adolescents resembled that of adult schizophrenics and was distinct from that observed in adolescents with psychotic depression. Skelton, Boik, and Madero (1995) compared thought disorder in identity-disordered and other adolescent psychiatric inpatients noting discrepancies between TDI scores on the Wechsler scales and TDI scores on the Rorschach of identity-disordered patients.

Borderline and Personality Disorders

Using the TDI, Edell (1987) examined at the role of structured versus unstructured test factors. He demonstrated that borderline patients exhibited significantly greater thought disorder on the comparatively unstructured Rorschach Test than did non-psychiatric controls, and were indistinguishable on the TDI from patients with schizophrenic disorder of relatively recent onset. O'Connell et al. (1989) used the TDI to significantly predict prospective psychotic and psychotic-like symptoms in a sample of 49 personality and affective disordered patients. They further demonstrated that the TDI had predictive value above and beyond that of a clinical interview. Harris (1993) compared individuals with borderline personality disorders and other personality disorders with the TDI demonstrating that the borderline group produced a significantly greater number of thought disorder responses on the Rorschach compared to the non-psychiatric controls.

Differential Diagnosis

A number of studies using the TDI have demonstrated its capability in distinguishing types of quality of thought disorder as they apply to the

differential diagnosis of schizophrenia and bipolar disorder. Holzman, Solovay, and Shenton (1985) provided early evidence that the TDI reflected thought disorder across a continuum of severity. Holzman, Shenton, and Solovay (1986) used the TDI to differentiate between quantity and quality of thought disorder in manic, schizophrenic, schizoaffective manic, and schizoaffective depressed patients. They found that quality of thought disorder differs in schizophrenia and in mania, and that the thought disorder of schizoaffective conditions resembles that of schizophrenia. Shenton, Solovay, and Holzman (1987) and Solovay, Shenton, and Holzman (1987) examined thought disorder in 22 patients with schizoaffective disorder, 20 patients with manic conditions, and 43 schizophrenic patients to determine whether the TDI could differentiate between the diagnostic groups. They demonstrated similarities and distinctions between the diagnostic groupings using the TDI. The thought disorder of manic patients was extravagantly combinatorial, usually with humor, flippancy, and playfulness. The thought disorder of schizophrenic patients, on the other hand, was disorganized, confused, and ideationally fluid, with many peculiar words and phrases.

Coleman, Levy, Lenzenweger, and Holzman (1996) used the TDI to quantify and classify thought disorder in individuals with schizotypic characteristics (schizophrenia spectrum disorders). They found that individuals psychometrically identified as schizotypic (using the Perceptual Aberration Scale; Chapman, Chapman, & Raulin, 1978) demonstrated higher TDI scores, supporting the hypothesis that schizotypic individuals display thought disorder similar to that shown by schizophrenic patients and some of their first-degree relatives. Khadivi, Wetzler, and Wilson (1997) used the TDI in a small study but failed to distinguish paranoid schizophrenic from schizoaffective patients groups. Consistent with other TDI research, however, their manic patients showed significantly higher levels of combinatorial thinking.

Neuropsychological Correlates and Biological Markers

The TDI has been used in neurophysiological and neuropsychological studies of schizophrenia.

Solomon and her colleagues (1987) found significant relationships between eye-tracking dysfunctions and thought disorder using the TDI. Shenton and her colleagues have used the TDI extensively in schizophrenia research focusing on auditory P200 and P300 topography deficits and neuropsychological deficits in schizophrenia. The TDI discriminated between chronic medicated schizophrenics and normal controls on these measures of brain function (Shenton, Ballinger et al., 1989; Shenton, Faux, McCarley, Ballinger, Coleman, & Duffy, 1989). Shenton, Faux, McCarley, Ballinger, Coleman, Torello, and Duffy (1989) noted that brain processing disturbances in positive symptoms schizophrenia may be reflected by electrophysiological abnormalities detected in the temporal lobe region. In these neurophysiological studies of schizophrenia, they noted more severe symptomatology in individuals with right temporal deficits. Shenton et al. (1992) found that the volume of the left posterior superior temporal gyrus correlated with TDI scores in 13 patients evaluated. They found that the degree of formal thought disorder correlated with the reduction in volume of the left superior temporal gyrus, confirming earlier studies using Computed tomography, which showed an association between an increase in the left sylvian fissure and the presence of positive psychotic symptoms.

Daniels and her colleagues (1988) used the TDI in a study comparing patients with unilateral right hemisphere cortical damage, bipolar mania, and schizophrenia. There were no differences in the total amount of thought disorder in these groups, but the groups showed unique patterns of thought disorder reflecting the TDI's ability to distinguish quality of disorder thought. In their neuropsychological analysis of schizophrenic thought disorder, Nestor et al. (1998) found that TDI scores correlated strongly with tests of verbal memory and abstraction and executive functions, and modestly with tests of working memory, but did not correlate with scores on tests of visual memory.

Medication Response

Hurt, Holzman, and Davis (1983) examined the usefulness of the TDI for distinguishing thought disorder across a range from subtle to flagrant.

The TDI charted changes in thought disorder upon administration of antipsychotic medications and showed a high congruence with concurrently administered scales of thought disorder. Gold and Hurt (1990) found that the TDI was sensitive enough to detect subtle changes in disturbed thinking following the administration of the antipsychotic medication haloperidol to psychiatric inpatients. Levy et al. (1993) used the TDI with schizophrenics and normal controls demonstrating that methylphenidate, a stimulant medication, but not apomorphine increased thought disorder and schizophrenic patients but not normal controls.

Family Studies

The TDI has been particularly useful in family studies of schizophrenia. Shenton, Solvay et al. (1989) used the TDI to examine first-degree relatives of schizophrenic, manic, and schizoaffective patients. In all three groups, there was a tendency for probands with higher thought disorder to have first-degree relatives with higher thought disorder.

Hain, Maier, Hoechst-Janneck, and Franke (1995) assessed the frequency and quality of formal thought disorder in schizophrenic patients and their first-degree relatives: a consecutive series of 36 unmedicated patients, 20 siblings of these patients, and 37 normal control individuals using the TDI in a German-speaking sample. Siblings of schizophrenic patients demonstrated an intermediate level of thought disorder between patients and controls. They concluded that their findings lent support to the notion of subclinical thought disorder as an indicator of familial vulnerability to schizophrenia.

Koistinen (1995) examined thought disorder in a Finnish adoption study. He concluded that the quantity and quality of Rorschach TDI scores predicted levels of psychopathology along a continuum.

Kinney et al. (1997) examined TDI scores in schizophrenic and control adoptees and their respective biological adoptive relatives. Results suggested that the elevated

TDI scores in the relatives of persons with schizophrenia reflect the operation of genes increasing the liability for schizophrenia.

Reliability

All of the studies previously reviewed report adequate to excellent interrater reliability using the TDI. Coleman et al. (1993) independently evaluated thought disorder in 20 Rorschach protocols using the TDI. High levels of agreement were obtained using Spearman rank order and intraclass correlations, a finding consistent with the overall literature.

Across the board these studies have demonstrated that coding of the Rorschach TDI could be accomplished with high levels of interobserver agreement. The TDI has demonstrated a robust and clinically meaningful factor based on a priori and empirical factors. Validation criteria for these studies have inevitably involved objective indices, often biological and not paper-and-pencil or other Rorschach scales. The index has shown its usefulness in making subtle and clinically significant distinctions. In overview, the Rorschach TDI scoring approach has demonstrated a robust ability to elucidate clinically and diagnostically meaningful distinctions in disturbed thinking.

The Rorschach and DSM-IV

A recent line of research has linked various Rorschach variables to the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (*DSM-IV*, 1994), including personality disorder issues and criteria and schizophrenia. Hilsenroth and his colleagues (1997) examined selected Rorschach variables in relationship to *DSM-IV* criteria for Axis II disorders. Results indicated that Rorschach variables could effectively differentiate patients with Narcissistic Personality Disorder (NPD) from a nonclinical sample and from patients with Cluster A, Cluster C, or other Cluster B personality disorders. The same research group found two Rorschach variables to be significantly and meaningfully correlated with both the *DSM-IV* Histrionic Personality Disorder (HPD) total score (number of criteria) and individual HPD criteria (Blais, Hilsenroth, & Fowler, 1998). Baity and Hilsenroth (1999) found that six Rorschach

aggression variables could be scored reliably, demonstrated a robust factor structure, and were found to be empirically related to *DSM-IV* diagnostic criteria for antisocial and borderline personality disorders. A reanalysis of their data set (Blais, Hilsenroth, Castlebury, Fowler, & Baity, in press) examined the incremental validity of Rorschach and in MMPI data for predicting *DSM-IV* personality disorders. They showed that both MMPI and Rorschach data independently and significantly contributed to the prediction of total number of *DSM-IV* antisocial, borderline, and narcissistic personality disorder criteria. Blais, Hilsenroth, Fowler, and Conboy (1999) explored the relationships among six psychoanalytically derived Rorschach scales and core features of Borderline Personality Disorder (BPD). They found that five Rorschach variables correlated with BPD core features. Hilsenroth, Fowler, and Padawer (1998) examined the performance of the Comprehensive System Schizophrenia Index (SCZI). They found that SCZI could be reliably scored, was internally consistent, and differentiated psychotic patients from a nonclinical sample, *DSM-IV* Cluster A and C personality disorders, and Borderline Personality Disorder.

This overview by no means exhausts the behavioral science foundations of the Rorschach Test. The domains reviewed here were chosen for both their robustness and clinical salience. To conclude, as Garb, Florio, and Grove (1998) do in their recent article, that the Rorschach should be de-emphasized in clinical training is, in Rorschach terminology, a CONFAB, reflecting *pars pro toto* thinking, in which faulty conclusions are reached on the basis of inadequate data. Rorschach clinicians, like all behavioral scientists, should welcome valid methodological criticism. As noted previously, valid criticism of the Rorschach inevitably enriches and sharpens knowledge—both assets and limitations—of the test. Rorschach critics, on the other hand, have a responsibility to be sufficiently informed about the status and quality of the research literature.

References

- Acklin, M. W., McDowell, C. M., & Orndoff, S. (1992). Statistical power and the Rorschach: 1975-1991. *Journal of Personality Assessment*, *59*, 366-379.
- Acklin, M. W., McDowell, C. M., & Verschell, M. S. (in press). Interobserver agreement, intraobserver reliability, and the Rorschach Comprehensive System. *Journal of Personality Assessment*.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Arboleda, C., & Holzman, P. S. (1985). Thought disorder in children at risk for psychosis. *Archives of General Psychiatry*, *42*, 1004-1013.
- Archer, R. P., Maruish, M., Imhof, E., & Piotrowski, C. (1991). Psychological test usage with adolescent clients: 1991 survey findings. *Professional Psychology: Research & Practice*, *22*, 247-252.
- Baity, M. R., & Hilsenroth, M. J. (1999). Rorschach aggression variables: A study of reliability and validity. *Journal of Personality Assessment*, *72*, 93-110.
- Berk, R. A. (1979). Generalizability of behavioral observations: A clarification of interobserver agreement and interobserver reliability. *American Journal of Mental Disability*, *83*(5), 460-472.
- Blais, M., Hilsenroth, M., Castlebury, F., Fowler, J., & Baity, M. (in press). Predicting *DSM-IV* Cluster B personality disorder criteria from MMPI-2 and Rorschach data: A test of incremental validity. *Journal of Personality Assessment*.
- Blais, M. A., Hilsenroth, M. J., & Fowler, C. (1998). Rorschach correlates of the *DSM-IV* histrionic personality disorder. *Journal of Personality Assessment*, *70*(2), 355-364.
- Blais, M., Hilsenroth, M., Fowler, C., & Conboy, C. (1999). A Rorschach exploration of the *DSM-IV* borderline personality disorder. *Journal of Clinical Psychology*, *55*, 1-10.
- Chapman, L., Chapman, J., & Raulin, M. (1978). Body-image aberration in schizophrenia. *Journal of Abnormal Psychology*, *87*, 399-407.
- Cohen, J. (1962). The statistical power of abnormal-social psychological research. *Journal of Abnormal and Social Psychology*, *65*, 49-55.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.
- Coleman, M. J., Carpenter, J., Wateraux, C., Levy, D., Shenton, M., Perry, J., Medoff, D., Wong, H., Monoach, D., Meyer, P., O'Brian, C., Valention, C., Robinson, D., Smith, M., Makowski, D., & Holzman, P. (1993). The Thought Disorder Index: A reliability study. *Psychological Assessment*, *5*(3), 336-342.
- Coleman, M., Levy, D., Lenzenweger, M., & Holzman, P. (1996). Thought disorder, perceptual aberrations, and schizotypy. *Journal of Abnormal Psychology*, *105*(3), 469-473.
- Daniels, E. K., Shenton, M., Holzman, P., Benowitz, L., Coleman, M., Levin, S., & Levine, D. (1988). Patterns of thought disorder associated with right cortical damage, schizophrenia, and mania. *American Journal of Psychiatry*, *145*(8), 944-949.

- Edell, W. S. (1987). Role of structure in disordered thinking in borderline and schizophrenic disorders. *Journal of Personality Assessment*, 51(1), 23-41.
- Exner, J. E. (1991). *The Rorschach: A Comprehensive System. Vol. 2: Interpretation* (2nd ed.). New York: John Wiley & Sons.
- Exner, J. E. (1993). *The Rorschach: A Comprehensive System. Vol. 1: Basic foundations* (3rd ed.). New York: Wiley & Sons.
- Exner, J. E., & Weiner, I. B. (1994). *The Rorschach: A Comprehensive System. Vol. 3: Assessment of children and adolescents*. New York: John Wiley & Sons.
- Garb, H., Florio, C., & Grove, W. (1998). The validity of the Rorschach and Minnesota Multiphasic Personality Inventory: Result from meta-analyses. *Psychological Science*, 9(5), 402-404.
- Gold, J. M., & Hurt, S. (1990). The effects of haloperidol on thought disorder and IQ in schizophrenia. *Journal of Personality Assessment*, 54(1&2), 390-400.
- Haimo, S., & Holzman, P. S. (1979). Thought disorder in schizophrenics and normal controls: Social class and race differences. *Journal of Consulting and Clinical Psychology*, 47(5), 963-967.
- Hain, C., Maier, W., Hoechst-Janneck, S., & Franke, P. (1995). Subclinical thought disorder in first degree relatives of schizophrenic patients. *Acta Psychiatrica Scandinavica*, 92, 305-309.
- Harris, D. (1993). The prevalence of thought disorder in personality-disordered outpatients. *Journal of Personality Assessment*, 61(1), 112-120.
- Hathaway, S. R., & McKinley, J. C. (1943). *Manual for the Minnesota Multiphasic Personality Inventory*. New York: The Psychological Corporation.
- Hiller, J. B., Rosenthal, R., Bornstein, R. F., Berry, D., & Brunell-Neulieb, S. (in press). Rorschach and MMPI validity. *Psychological Assessment*.
- Hilsenroth, M. J., Fowler, C., & Padawer, J. (1998). The Rorschach Schizophrenia Index (SCZI): An examination of reliability, validity, and diagnostic efficiency. *Journal of Personality Assessment*, 70, 514-534.
- Hilsenroth, M. J., Fowler, J. C., Padawer, J. R., & Handler, L. (1997). Narcissism in the Rorschach revisited: Some reflections on empirical data. *Psychological Assessment*, 9(2), 113-121.
- Holzman, P. S. (1986). Thought disorder in schizophrenia: Editor's introduction. *Schizophrenia Bulletin*, 12, 342-347.
- Holzman, P. S. (1995). Thought disorders and the fundamental disturbance in schizophrenia. *Schizophrenia*, 38, 409-417.
- Holzman, P. S., Coleman, M., Lezenweger, M., Levy, D., Matthysee, S., O'Driscoll, G., & Park, S. (1995). Working memory deficits, antisaccades, and thought disorder in relation to perceptual aberration. In A. Raine (Ed.), *Schizotypal personality*. New York: Cambridge University Press.
- Holzman, P. S., Shenton, M., & Solovay, M. (1986). Quality of thought disorder in differential diagnosis. *Schizophrenia Bulletin*, 12(3), 360-372.
- Holzman, P. S., Solovay, M., & Shenton, M. (1985). Thought disorder specificity in functional psychoses. In M. Alpert (Ed.), *Controversies in schizophrenia* (pp. 228-245). New York: Guilford Press.
- Hurt, S., Holzman, P., & Davis, J. (1983). Thought disorder: The measurement of its changes. *Archives of General Psychiatry*, 40, 1281-1285.
- Johnston, M. H., & Holzman, P. S. (1979). *Assessing schizophrenic thinking*. San Francisco: Jossey Bass.
- Khadivi, A., Wetzler, S., & Wilson, A. (1997). Manic indices on the Rorschach. *Journal of Personality Assessment*, 69(2), 365-375.
- Kinney, D. K., Holzman, P., Jacobsen, B., Jansson, L., Faber, B., Hildebrand, W., Kasell, E., & Zimbalist, M. (1997). Thought disorder in schizophrenic and control adoptees and their relatives. *Archives of General Psychiatry*, 54, 475-479.
- Kleiger, J. H. (1999). *Disordered thinking and the Rorschach: Theory, research, and differential diagnosis*. Mahwah, NJ: Analytic Press.
- Koistinen, P. (1995). *Thought disorder and the Rorschach*. Oulu, Finland: Oulun Yliopisto.
- Lees-Haley, P. (1992). Psychodiagnostic test usage by forensic psychologists. *American Journal of Forensic Psychology*, 10, 25-30.
- Levy, D. L., Smith, M., Robinson, D., Jody, D., Lerner, G., Alvir, J., Geisler, S., Szymanski, S., Gonzalez, A., Mayerhoff, D., Lieberman, J., & Mendell, N. (1993). Methylphenidate increases thought disorder in recent onset schizophrenics, but not in normal controls. *Biological Psychiatry*, 34, 507-514.
- Lubin, B., Larsen, R. M., & Matarazzo, J. (1984). Patterns of psychological test usage in the United States: 1935-1982. *American Psychologist*, 39, 451-454.
- Makowski, D., Waternaux, C., Lajonchere, C., Dicker, R., Smoke, N., Koplewicz, H., Min, D., Mendell, N., & Levy, D. (1997). Thought disorder in adolescent-onset schizophrenia. *Schizophrenia Research*, 23, 147-165.
- McDowell, C. M., & Acklin, M. W. (1996). Standardizing procedures for calculating Rorschach interrater reliability: Conceptual and empirical foundations. *Journal of Personality Assessment*, 66(2), 308-320.
- Meyer, G., Baxter, D., Exner, J., Fowler, C., Hilsenroth, M., & Piers, C. (1999). *An examination of interrater reliability for scoring the Rorschach Comprehensive System in five data sets*. Manuscript submitted for publication.
- Nestor, P., Shenton, M., Wible, C., Hokama, H., O'Donnell, B., Law, S., & McCarley, R. (1998). A neuropsychological analysis of schizophrenic thought disorder. *Schizophrenia Research*, 29, 217-225.
- O'Connell, M., Cooper, S., Perry, C., & Hoke, L. (1989). The relationship between thought disorder and psychotic symptoms in borderline personality disorder. *The Journal of Nervous and Mental Disease*, 177(5), 273-278.
- Parker, K. (1983). A meta-analysis of the reliability and validity of the Rorschach. *Journal of Personality Assessment*, 47, 227-231.

- Parker, K., Hanson, R., & Hunsley, J. (1988). MMPI, Rorschach, and WAIS: A meta-analytic comparison of reliability, stability, and validity. *Psychological Bulletin*, *103*, 367-373.
- Parker, K., Hunsley, J., & Hanson, R. (1999). Old wine from old skins sometimes tastes like vinegar: A response to Garb, Florio, and Grove. *Psychological Science*, *10*(3), 291-292.
- Pinkerman, J., Haynes, J., & Keiser, T. (1993). Characteristics of psychological practice in juvenile courts. *American Journal of Forensic Psychology*, *11*, 3-12.
- Rossi, J. S. (1990). Statistical power of psychological research: What have we gained in 20 years? *Journal of Consulting and Clinical Psychology*, *58*, 646-656.
- Sedlmeier, P., & Gigerenzer, G. (1989). Do studies of statistical power have an effect on the power of studies? *Psychological Bulletin*, *105*, 309-316.
- Shenton, M. E., Ballinger, R., Marcy, B., Faux, S., Cane, M., Lemay, M., Cassen, G., Coleman, M., Duffy, F., & McCarley, R. (1989). Two syndromes of schizophrenic psychopathology associated with left vs. right temporal deficits in P300 amplitude. *The Journal of Nervous and Mental Disease*, *177*(4), 219-225.
- Shenton, M. E., Faux, S., McCarley, R., Ballinger, R., Coleman, M., & Duffy, F. (1989). Clinical correlations of auditory P200 topography and left-temporo-central deficits in schizophrenia: A preliminary study. *Journal of Psychiatric Research*, *23*(1), 13-34.
- Shenton, M. E., Faux, S., McCarley, R., Ballinger, R., Coleman, M., Torello, M., & Duffy, F. (1989). Correlations between abnormal auditory P300 topography and positive symptoms in schizophrenia: A preliminary report. *Biological Psychiatry*, *25*, 710-716.
- Shenton, M. E., Kikinis, R., Jolesz, F., Pollak, S., LeMay, M., Wible, C., Hokama, H., Martin, J., Metcalf, D., Coleman, M., & McCarley, R. (1992). Abnormalities of the left temporal lobe and thought disorder in schizophrenia: A quantitative magnetic resonance imaging study. *The New England Journal of Medicine*, *327*(9), 604-612.
- Shenton, M. E., Solovay, M., & Holzman, P. S. (1987). Comparative studies of thought disorder: II. Schizoaffective disorder. *Archives of General Psychiatry*, *44*, 21-30.
- Shenton, M. E., Solovay, M., Holzman, P., Coleman, M., & Gale, H. (1989). Thought disorder in the relatives of psychotic patients. *Archives of General Psychiatry*, *46*, 897-901.
- Skelton, M., Boik, R., & Madero, J. (1995). Thought disorder on the WAIS-R relative to the Rorschach: Assessing identity-disordered adolescents. *Journal of Personality Assessment*, *65*(3), 533-549.
- Solomon, C. M., Holzman, P., Levin, S., & Gale, H. (1987). The association between eye-tracking dysfunctions and thought disorder in psychosis. *Archives of General Psychiatry*, *44*, 31-35.
- Solovay, M., Shenton, M., Gasperetti, C., Coleman, M., Daniels, E., Carpenter, J., & Holzman, P. (1986). Scoring manual for the Thought Disorder Index. *Schizophrenia Bulletin*, *12*(3), 483-496.
- Solovay, M., Shenton, M. E., & Holzman, P. S. (1987). Comparative studies of thought disorder. I. Mania and schizophrenia. *Archives of General Psychiatry*, *44*, 13-20.
- Spitzer, R., Cohen, J., Fleiss, J., & Endicott, J. (1967). Quantification of agreement in psychiatric diagnosis: A new approach. *Archives of General Psychiatry*, *17*, 83-87.
- Suen, H., & Ary, D. (1989). *Analyzing quantitative behavioral observation data*. Hillsdale, NJ: Erlbaum.
- Weiner, I. B. (1995). Methodological considerations in Rorschach research. *Psychological Assessment*, *7*(3), 330-337.
- Weiner, I. (1996). Some observations on the validity of the Rorschach Inkblot Method. *Psychological Assessment*, *8*(2), 206-213.