Editorial

Inkblots and Neurons

Correlating Typical Cognitive Performance With Brain Structure and Function

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The idea that the Rorschach can be used to study brain-behavior relationships dates back to Hermann Rorschach’s seminal work, in which a quarter of the clinical cases presented were neurological (Rorschach, 1921). At the time, the distinction between “organic” and “nonorganic” mental disorders had not been clearly drawn. Psychiatric facilities, such as the one Rorschach practiced and gathered his data in, typically diagnosed and treated a wide range of both mental and neurological disorders, including epilepsy, mental retardation, brain tumors, traumatic brain injuries, dementia, and other conditions.

Following Rorschach’s death in 1922, the suggestion that the Rorschach could be used as a neuropsychological tool was more explicitly articulated by Piotrowski (1936), one of the great pioneers of the Rorschach, who developed a list of ten empirically-based “organic signs.” These signs are, to this day, considered a useful tool for identifying patients with neurocognitive disorders, and for describing some of the neuropsychological characteristics commonly observed in such patients. Piotrowski observed that patients suffering from organic disorders of the brain typically: (1) give a lower number of responses on the Rorschach, (2) need more time to produce responses, (3) give less responses with human movement, (4) tend to name colors, instead of using them as determinants in their responses, (5) give less responses that fit the formal characteristics of the blots, (6) give a lower number of popular responses (responses occurring at least in every third protocol administered), (7) give numerous perseverative responses, (8) have trouble correcting responses they perceive to be of poor quality or inadequate (“impotence”), (9) express perplexity throughout the task and tend to repeatedly seek reassurance from the examiner, and (10) tend to use repetitive “pet-expressions” throughout the task (e.g., “This is a work of art... This is a beautiful work of art... This is a nice piece of work...”, etc.). Piotrowski’s idea was that it is the accumulation of these signs in a Rorschach protocol which increases the probability of
an organic disorder of the brain. Subsequent empirical studies have confirmed the
diagnostic validity and clinical utility of these signs when five or more are present
in a protocol (e.g., Chaudhury, John, Bhatoe, & Rohatgi, 1999; Mattlar, Knuts, &
Alanen, 1986).

In 1999, 417 published studies using the Rorschach for the study of a broad
range of neurological populations were reviewed. Approximately 45% of these
studies were published in the 1940s and 1950s and concerned, for example,
patients with epilepsy, Parkinson’s disease, mental retardation, head injury (notably
during World War II), and patients having undergone therapeutic lobotomy
(Caputo, 1999). From the 1960s, however, with the advent of specific neuropsy-
chological methods and neuroimaging techniques came the increasing criticism
of the use of the Rorschach within a neuropsychological framework. This was in
part due to the confusing multiplicity of systems of administration, coding, and
interpretation available for the Rorschach at that time.

With the development of Exner’s Rorschach Comprehensive System (RCS) and
it’s perceptual-cognitive problem-solving paradigm in the 1970s and 1980s, as
well as it’s growing empirical database and popularity among clinicians and
researchers worldwide (Exner, 2003), a renewed interest in the method from a
neuropsychological perspective was seen in the 1990s (Acklin & Wu-Holt, 1996;
Zillmer & Perry, 1996). This historical development made it possible to conceptu-
alize the Rorschach, not only as a method of personality assessment, but as a
method capable of bridging the artificial gap that still exists between neuropsy-
chology and personality psychology (Muzio, 2004). The more recent Rorschach
Performance Assessment System (R-PAS) also follows this trend with its interpre-
tive emphasis on perceptual-cognitive aspects of the response process and on the
Rorschach as a performance-based method. For example, R-PAS has put
increased emphasis on the importance of taking into account the overall level
of perceptual-cognitive processing complexity when interpreting individual vari-
ables (Meyer, Viglione, Mihura, Erard, & Erdberg, 2011).

Like commonly used neurocognitive measures, the Rorschach is based on the
person’s performance in a standardized problem-solving task. However, it differs
from traditional neurocognitive tests in a key respect. While neurocognitive tests
are best described as tests of maximal cognitive performance (i.e., tests that mea-
sure how well the person does when asked to do his/her best on a task with expli-
cit requirements), the Rorschach is best conceived as a test of typical cognitive
performance (i.e., a test that measures what the person typically does in more
open-ended situations). This difference is related to the difference between having
the ability to do something and the disposition to do so. For example, a person
might be intelligent and cognitively sophisticated (maximal performance), yet
not be disposed to put these abilities to good use (e.g., towards academic,
occupational, or social/relational achievements), because of emotional or personality issues (typical performance). Although real life circumstances and performance measures are best conceived as being on a continuum between these two conditions, the maximal-typical dichotomy is a useful heuristic for thinking about the match between different types of performance tasks and real world contexts. This distinction, first introduced by Cronbach (1990), was later referred to in the literature in relation to questions of construct validity and case validity in assessment (Teglasi, Nebbergall, & Newman, 2012).

The RCS has been used in a number of studies on neurological populations. This has allowed researchers to accumulate information on both the validity of Rorschach variables and the characteristics of typical performance in these populations. For example, the RCS has been used to study the psychological characteristics of patients with closed head injury (Exner, Colligan, Boll, Stischer, & Hillman, 1996; Sinacori, 2000), Asperger’s disorder (e.g., Holaday, Moak, & Shipley, 2001), attention deficit/hyperactivity disorder (e.g., Cotugno, 1995), dementia (Muzio & Luperto, 1999), dementia of the Alzheimer’s type (Muzio, Andronikof, David, & Di Menza, 2001; Perry, Potterat, Auslander, Kaplan, & Jeste, 1996), or patients with polycystic lipomembranous osteodysplasia with sclerosing leukoencephalopathy (Ilonen, Hakola, Vanhanen, & Tiitonen, 2012).

More recently, a number of studies correlating Rorschach performance to structural (e.g., voxel-based morphometry) and functional neuroimaging (e.g., functional magnetic resonance imaging of the brain: fMRI) or electroencephalography (EEG) findings have been conducted, shedding light on the relationships between typical cognitive performance and personality on the one hand and brain structure and function on the other. These have explored, for example, the relationships between perceptual accuracy and the structure and function of key areas of the limbic system, such as the amygdala, using structural and functional neuroimaging (Asari et al., 2010a, 2010b). Other such studies have explored the relationship between the human movement response – related to cognitive sophistication, creativity and empathy – and mirroring activity in the brain, using EEG (Porcelli, Giromini, Parolin, Pineda, & Viglione, 2013).

In this special section, five articles representing current and international neuroscientific research both on and with the Rorschach are presented. The first two studies present further evidence of the numerous correlations which exist between performance on the Rorschach and performance on neurocognitive tests. In the first study, conducted in the United States, a number of variables of the RCS and R-PAS are shown to correlate with neurocognitive variables in children (Meyer, 2016). In the second study, conducted in Finland, the Coping Deficit Index (CDI) of the RCS is shown to correlate with a number of neurocognitive variables in two samples of subjects with severe psychiatric disorders and a sample
of healthy adults. In this same study, a correlation is found between two components of the CDI – human movement and the weighted sum of color responses (EA and WSumC) – and relative temporal grey matter volume of the brain (Ilonen, Salokangas, & Turku Study Group, 2016).

The third study, conducted in Japan, examines brain hemodynamics using fMRI when responding to chromatic versus achromatic cards of the Rorschach (Ishibashi et al., 2016). This study largely confirms the neuropsychological underpinnings of the Rorschach response process as previously described in the literature (Acklin & Wu-Holt, 1996).

The last two studies present new neuroscientific research designs which should allow researchers to investigate the neurological substrates of Rorschach performance while avoiding costly or methodologically problematic brain imaging techniques in the future. The first one, conducted in Italy, is a pilot study which looks at how neurological priming can be used to study the neurological correlates of the Rorschach (Giromini, Viglione, Brusadelli, Zennaro, Di Girolamo, & Porcelli, 2016). This study uses varying degrees of neurological priming of the Mirror Neuron System (MNS) to examine its impact on the production of responses of human movement (M). The second study, also conducted in Italy, presents a critical review of the Rorschach literature using fMRI and a new technique for examining the neurological correlates of personality functioning through the Rorschach using resting state fMRI (Cristofanelli, Pignolo, Ferro, Ando, & Zennaro, 2016).

Given the Rorschach’s impressive empirical research database in the field of both personality assessment and neuropsychological assessment, it can now be considered a useful tool for both personality assessment and neuropsychological assessment. Awareness of the neurological and neurocognitive correlates of Rorschach variables enables psychologists working in personality assessment to better integrate this knowledge into their assessment practice, thus broadening their understanding of a wide range of psychological phenomena and behavior. It can also be of great use to neuropsychologists interested in conducting more comprehensive forms of neuropsychological assessment; that is, neuropsychological assessment that includes not only measures of maximal cognitive performance and self-report, but also evidence-based measures of typical cognitive performance and personality functioning.

References


Rorschachiana (2016), 37(1), 1–6 © 2016 Hogrefe Publishing


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