Cognitive deficits and Rorschach task

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Abstract: The aim of this study is to explore the cognitive functions and processes through, also related to deficits, on the Rorschach test. The Rorschach is a projective method can be a valid predictor tool to identify neuropsychological levels, also many cognitive deficits. According to literature, the Rorschach test is most important in clinical practice, to improve the knowledge of patient’s personality, but also neuropsychological aspects, for assessing on perceptual and visuospatial abilities, verbal output skills, memory impairment, emotional control and impulses. In addition, the literature suggested the utility of the projective methods, in the study of brain lesions. In conclusion, the Rorschach task proves to be a valuable instrument including in clinical setting and assessment field of cognitive psychopathology. The method, usually considered in personality disease and mental health setting, improves understanding of the subject's cognitive level and can be used on psychological diagnosis and assessment in neuropsychological field.

Subjects: Chronic Diseases; Mental Health; Community Health

Keywords: cognitive functions; neurocognitive signs; rorschach test

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PUBLIC INTEREST STATEMENT

The topic of this research is to describe the cognitive functions in the Rorschach test, in particular in presence of cognitive deficits. The Rorschach test can be considered valuable for the identification of mental changes that characterize cognitive functions such as memory impairment, emotional control and impulses. The Rorschach proves to be a valuable instrument for the field of psychopathology and an important auxiliary method for the formulation of clinical diagnoses, enabling a deeper understanding of the subject’s level of psychic functioning.

The phases of the response process the Rorschach technique allow the transition from the coding of the stimulus field to the articulation of the response through the subject’s projection.

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1. Introduction

In the methodological field, the Rorschach test can be considered a valuable instrument for the identification of mental changes that characterize cognitive functions such as for assessing perceptual and visuospatial abilities, memory impairment, verbal output skills, problem solving, emotional control and impulses (Schott, 2014; Settineri et al., 2017). Rorschach (1921) valued this test for perceptual examination when examining the responses among subjects with mental retardation and organic impairment. Piotrowski (1937) studied a group of patients with cortical and subcortical lesions, and introduced 10 signs to help diagnose organic impairment.

In forming responses to the Rorschach test (Rorschach, 1921), respondents select among a variety of distinct perceptual features suggested by the inkblot stimuli. Such features are called determinants, and help to identify or determine the specific representation or imagery in the response. They include form (contour) of the blot, color, and shading. All these features are pulled directly from the actual characteristics of the stimuli that indeed have different ambiguous shapes and are pictured with various colors and achromatic nuances. Since the publication of Rorschach’s (1921) monograph, human movement (M) responses to the test have been almost unanimously considered as one of the best sources of information about personality dynamics. This process is consistent with main theoretical concepts, and models in the field of psychological functioning, as the psychodynamic mechanism of identification (Gabbard, 2005). Also, the human capacity to pre-rationally make sense of the actions, emotions, and sensations of others depends on embodied simulation, a functional mechanism through which the actions, emotions, or sensations we see activate our own internal representations of the body states that are associated with these social stimuli, as if we were engaged in a similar action or experiencing a similar emotion or sensation (Freedberg & Gallese, 2007).

Hermann Rorschach (1921) was the first to examine the responses of elderly and organically impaired individuals to his now-famous inkblots. He stated that, after a further period of development it should be possible in almost every case to come to a definite conclusion as to whether the subject is normal, neurotic, schizophrenic, or has “organic brain disease”. His results showed that these patients were not able to synthesize important details in specific percepts and that their responses were often characterized by repetitions, thus concluding that, in the end, these patients had become “ego-centric extroverts” (Alexy, 2018).

Various authors (Ebitz & Hayden, 2016) have argued that the Rorschach test may be best described as an abstract problem-solving test requiring the integration of numerous cognitive functions. From this problem-solving perspective, the “Rorschach task” is to organize a stimulus field that has abstract, as well as clearly defined, images and to communicate what the individual perceives to the examiner. The phenomenology of technique and projective method uses the protocol and, integrates it with clinical data and history of clinical case (Mento, 2017).

Within this frame of reference, the Rorschach test can be easily approached from a neuropsychological point of view and can be used to assess information processing, scanning and visual-spatial abilities, complex concept formation, and verbal and communicative skills.

However, in order for the Rorschach test to move from being a psychological assessment test and become a neuropsychological instrument, some theoretical basis must be provided (Alexy, 2018). The Rorschach method can be considered a useful instrument to detect alterations connected to psychic functions, in particular, the alterations of the psychic functions that have been studied in this paper are related to memory deficits, decreased or reduced emotional containment, impulse control, linguistic errors, and perseveration (Alexy, 2018; Kumazaki, 2016; Mothersill et al., 2016; Sanvicente-Vieira et al., 2017).

Some authors suggested the utility of the Rorschach in the study of brain lesions that can induce characteristic alterations, and in the neuropsychological study of the response process (Ebitz & Hayden, 2016). The Rorschach can evaluate four areas: accuracy of percept; ability to integrate and
process multiple stimuli simultaneously; reliability of the response; use of reaction time. Two concepts are commonly treated in reference to Rorschach’s function: one is the notion of apperception (the process by which a new experience is assimilated and converted within the residues of the subject’s previous experiences, combining itself with the latter, thereby forming a new set), the other is the notion of projection (from psychodynamic theories).

Projection mechanism, essentially in imaginative mental operation, was conceived as a defense mechanism (Schott, 2014) but it also plays a role in many other psychic activities (social relationships, art, etc.), and refers to the process of shifting one’s feelings or characteristics, or parts of the self, to other objects or people. The subject perceives the environment and responds to it according to subjective interests, skills, habits, enduring or transient affective states, hopes, desires, etc.

In Rorschach method of assessment, the analysis of unconscious presentations emerges from contact with an unstructured image (Mento & Settineri, 2016). In fact, projective techniques such as the Rorschach require the subject to be in the presence of unstructured situations or ambiguous stimuli, thereby allowing the examiner to evaluate parts of patients’ organizational system of behavior and emotions and their character traits (Mento et al., 2019). Such as, Fonagy et al. (2002) referred to the construct of mentalization as the individual ability to make and use symbolic representations of one’s own and the other’s mental states. Given the importance of these constructs in clinical practice and psychological treatment (Allen et al., 2008), the association of M to mirroring activity might shed new light on Rorschach clinical interpretation. Clinically, the M variable defines: reasoning, imagination, slow neuronal discharge rate (secondary process), deliberate ideation, creativity and interpersonal relations (Schott, 2014).

In the analysis of a group of patients with cortical and subcortical lesions, Piotrowski (1937) studied and introduced 10 signs that would aid in the diagnosis of organic conditions, and specifies that these indices are not applicable to children under the age of 12 years old and must always be considered in the context of a general framework; emphasized that the 18 cases on which his findings were based represented a mix of subcortical and cortical involvement (Passi Tognazzo, 1994).

In particular, in patients with impaired cognitive function, the poor memory fixation is expressed through the repetition of the same answer to the same card because the patient does not remember having already given it. Furthermore, the inability to contain emotions is conveyed through the extratensive intimate resonance type (TRI; Erlebnistypus) with color responses (CF and C) that, together with low F +% and G +% values and the absence of M, confirms poor affective control (Passi Tognazzo, 1994). This aspect is important for the relevance on cognitive functions and in clinical setting using the Rorschach. Also, the Rorschah test was used especially in personality disease, the recent literature highlights the importance of the projective method in the neuropsychological field, of clinical psychology (i.e. neurological and neurosurgery settings) in the assessment of cognitive functions.

2. Methods

Data for this systematic review were collected in accordance with the Preferred Reporting Items for Systematic reviews and MetaAnalyses (PRISMA, Moher et al., 2009). The PRISMA consists of a checklist intended to facilitate preparation and reporting review/meta-analysis studies by identifying, selecting, and critically appraising relevant research, and collecting and analyzing data from the studies that are included in the review.

2.1. Search strategy and study selection

A comprehensive literature search was conducted in PubMed database, with the final search updated in July 2020. The initial search conducted used the keywords “Cognitive Functions” AND “Rorschach Test”. We using key terms related to the processes connected to the cognitive processes through the use of the Rorschach test.
Figure 1 summarizes the flowchart of articles selected for the review. The search of PubMed database provided a total of 283 citations; no additional studies meeting inclusion criteria were identified by checking the reference list of the selected papers.

2.2. Eligibility criteria
Articles were included in the review according to the following inclusion criteria: English language, publication in peer-reviewed journals, and year of publication at least 2010. Articles were excluded by title, abstract, or full text for the processes connected to the cognitive processes through the use of the Rorschach test, and for irrelevance to the topic in question. Further exclusion criteria were review articles, editorial comments, and book. Furthermore, we arbitrarily decided to start our research from 2010 to give an ample, and recent view of “the cognitive functions, and processes through the use of the Rorschach test” findings.

After adjusting for duplicates, 60 records were screened. Of these, 56 studies were excluded according to inclusion and exclusion criteria. After the screening, a total of four studies assessing the processes connected to the cognitive processes through the use of the Rorschach test, met the inclusion criteria and were included in the systematic review (Table 2). The selected studies demonstrated that the Rorschach method is a useful instrument to detect cognitive alterations.
connected to psychic functions. Articles have been selected by title and abstract; the entire article was read if title/abstract was related to the specific issue the cognitive functions, and processes through the use of the Rorschach test, and if the article potentially met the inclusion criteria. References of the selected articles were also examined in order to identify additional studies meeting the inclusion criteria. Details are reported in Tables 1 and 2.

### 2.3. Risk of bias across studies

Across the included studies in this review, a potential database bias should be considered. Only articles within databases in English language were used, which might have compromised access to articles published in other languages.

### 3. Results

After screening 283 articles, we selected 4 papers met the criteria for our review. Most of the research analyzed is focused on the theory aspects of the use of Rorschach test to explore many information about personality organization and cognitive functioning, and this is a limit for our study. A recent study by Giromini and colleagues (2019) explored human Movement Responses to the Rorschach and Mirroring Activity. The authors proposed that the human movement in Rorschach responses might be associated with an embodied simulation mechanism mediated by the mirror neuron system (MNS). Moore et al. (2013) examined the role of thought disorder, psychological complexity, and interpersonal representations, as measured by the Rorschach. Porcelli et al. (2013) studied the mirroring activity in the brain and movement determinant in the Rorschach Test. Yakamoto et al. (2010) evaluated comprehensive psychological functions and processes in Japanese chronic pain patients.

### 4. Discussion and conclusion

This study highlights the implications of using the Rorschach task in clinical practice, in particular for assessing the cognitive functions, regarding this, Moore et al. (2013) examined the role of functions cognitive, in patient with schizophrenia, the authors studied the person’s cognitive capacity for problem-solving, by the Rorschach.

This study suggests that the Rorschach test has been used to measure the cognitive functions. Several authors showed that the Rorschach test was of strength in measuring cognitive structures (Exner, 1993, 2003; Perry & Viglione Jr., 1991; Stricker & Gold, 1999). In the study, Yamamoto (2010) evaluated comprehensive psychological functions, and processes in Japanese chronic pain patients, by Rorschach Comprehensive System. Such as, the patients with chronic pain exhibited high levels of emotional distress with a sense of helplessness and psychological pain, and cognitive functions were compromised (Mento et al., 2020).

The Rorschach test (Acklin & Wu-Holt, 1996; Rorschach, 1921) has been used in psychological and clinical practice and selection procedures (Bockner, 1945; Del Giudice, 2010): this is a test of perception arising from the specific cognitive processes, sensation, memory and associations (Smith, 2007). The interpretation of the answers given to the test items can identify any problematic issues of the

| Table 1. List of search terms entered into the PubMed, search engines for identification the studies for this systematic review |
|---|---|
| Number | Search term |
| 1 | Cognitive Functions [all fields] |
| 2 | Rorschach Test [all fields] |
| 3 | 1 AND 2 |
| 4 | English (Language) |
| 5 | 2010/01/01 to 2020/07/01 [publication date] |
| Author(s)             | Study aim                                                                 | Sample and context                                      | Study design and data collection method                             | Key findings                                                                                                                                 |
|----------------------|---------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Giromini et al. (2019) | The aim of this study was to study the human Movement Responses to the Rorschach and Mirroring Activity. | 26 healthy adult volunteers.                             | The Rorschach was administered during fMRI                         | The Rorschach test is most important in clinical practice for to improve the knowledge of patient’s personality, and mirror neurons.          |
| Moore et al. (2013)   | This study examined the role of thought disorder, psychological complexity, and interpersonal representations, as measured by the Rorschach. | 72 middle-aged and older outpatients with schizophrenia (mean age = 51.2). | - The Rorschach test  
- The Social Skills Performance Assessment (SSPA).  
- The Ego Impairment Index-2 (EII-2).  
- The R-PAS manual.  
- R-PAS Inter-Rater Reliability.  
- The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS).  
- The Positive and Negative Symptoms (PANSS).  
- The Calgary Depression Scale for Schizophrenia (CDSS). | These data suggest that psychological complexity plays a significant role in the functional limitations seen in schizophrenia, above and beyond the contributions of neurocognitive impairment and negative symptoms. |
| Porcelli et al. (2013) | The aim of this study was to explore two specific hypotheses of providing clinicians with a stronger empirical basis for the clinical interpretation of human movement to the Rorschach test. | 24 undergraduate students (17 women and 7 men). | The experimental condition consisted of asking the participants to look at the 10 Rorschach stimuli. | Given the importance of these constructs in clinical practice and psychological treatment.                                                  |
| Yakamato et al. (2010) | This study aimed to evaluate comprehensive psychological functions and processes in Japanese chronic pain patients. | One hundred and three (103) patients with chronic pain. | The Rorschach Comprehensive System.                                | The Rorschach test suggested psychological approaches to support chronic pain patients that are likely to be highly beneficial, and we thus recommend their incorporation into the course of current pain treatments. |
subject, and according to Passi Tognazzo (1994) the Rorschach method can be considered a useful instrument to detect alterations connected to psychic, and cognitive functions (Passi Tognazzo, 1994).

In the past Rorschach (1921) examined the responses of elderly and organically deteriorated patients, and showed that these patients were unable to synthesize perceptual details, or the organization of complex forms of representation.

According to scientific literature, the Rorschach's test can be used in the neuropsychological field to assess information processing, visuo-spatial skills, complex concept formation, verbal and communication skills (Kimoto et al., 2017; Lezak, 1995). The Rorschach Technique, conceived of a complex process involving the brain, included visual attention and perception, object recognition, associative memory, executive functioning and language production.

Historically, Insùa and Loza (1986; 1988) studied the Rorschach responses of two groups of elderly subjects, one normal and the other in the early stages of suspected dementia.

In cognitive deficits, changes regarding executive functioning and perseveration error categories are taken into consideration by Ebitz and Hayden (2016). In particular, this study findings thus enable the identification of specific types of errors in neurological patients, rather than simply demonstrating that the latter present a comprehensively poorer performance on the Rorschach test. In particular, deficits in the visual discrimination and the visual counting tasks were more severe in patients with cognitive deficits. Poor performance on the visual discrimination tasks suggests impairment in visual form perception or constructive function in these patients.

The preservation, in particular, in all of its various forms, is related to deficits in executive functioning mediated by the frontal cortex, thus causing an increase in preservations in each cognitive domain and behavior (Girmoni, 2019).

In patients with impaired cognitive function, poverty in fixation capacity in memory is expressed through the repetition of the same answer to the same table because the patient does not remember that she already knew. Furthermore, the inability to contain emotions is made from the TRI (Erlebnistypus) extratensive with color responses (CF and C), which together with value of F % and G % lower and absence of M confirm the poor control of affectivity (Settineri et al., 2015).

The present study considering the Rorschach test in terms of contemporary cognitive psychological models and provides a conceptual foundation for empiric research in psychopathological functioning of perception (Meyer et al., 2011; Viglione et al., 2012). In many cases, a strategy proving that projective approaches are important from a clinimetric approach can provide clinicians with an understanding of individual functioning, also cognitive and personality, redefining diagnosis and treatment (Mento et al., 2019).

These results support the view of the Rorschach as a multidimensional performance based on behavioral problem-solving task, which can provide valuable information regarding a patient’s cognitive functioning, motivation, perception and visuo-spatial functions. Data obtained from the Rorschach, including in a psychological assessment in medical settings, can provide meaningful contributions to clinicians in helping to identify cognitive deficits.

4.1. Limitation
A limitation to the current study that should be acknowledged, such as the poor literature, in particular, there are many books and theoretical papers, but the scientific papers or original article are few, further research may benefit from using longitudinal designs to measure how changes in cognitive functions and predict changes in functional capacity.
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