Validity indices of the Rorschach test and Personality Assessment Inventory: a comparison in pathological and healthy subjects.

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Abstract: The debate about the validity of the Rorschach test, compared with psychometric inventories, is particularly relevant in the forensic evaluation.

The aim of the study is to present an overview on the control indices proposed in Rorschach (e.g. R, F%, Lambda Index) and in a personality inventory (Personality Assessment Inventory: e.g., openness, desirability, inconsistency, infrequency, negative and positive impression, malingering and defensiveness, treatment rejection) and to cross-correlate these indices.

The sample consisted of 50 adult inpatients with diagnosis of severe depression or psychosis, and a control group of healthy subjects, matched by gender, age and educational level.
The results show that the analytic style, as opposed to the global one, is related to greater openness to psychological assessment, less social desirability and defensive tendency.
The Rorschach Lambda index demonstrates good validity in detecting tendency to defensiveness, social desirability and dissimulation, both in normal and pathological protocols.

Keywords: Rorschach Test, Personality Assessment Inventory, Pathology, Validity.

Introduction

In recent years the debate on the different methods of psychometric testing for clinical and forensic practice has increased (Gacono, 2002). Many psychological tools have been proposed and used, with different theoretical and methodological bases: e.g., inventories, and more or less structured 'projective' test. The criticism about the psychometric characteristics of reliability and validity of the latter category of instruments (e.g., Lilienfeld, Wood & Garb, 2000; Wood, Nezworski, Lilienfeld, Garb, & Howard, 2003) makes them less suitable for use in forensic evaluations. Other Authors, based on the review of empirical studies, come to different conclusions (Meyer, 2004; Gacono & Barton Evans, 2008; McGrath, 2008; Bornstein, 2012).
What is the reliability of the projective tests, compared with personality inventories?
We will present a brief review of the studies on the psychometric characteristics of the Rorschach Inkblot test, to compare them with those of an Inventory popular in forensic practice: a comparison that will be the subject of empirical research presented in the second part of the article.

The Inkblot Test: reliability and validity studies.

Several experimental studies have shown that the relatively low reliability of different quantitative indices of the Rorschach test is not so apparent if appropriate psychometric benchmarks are used. Also inter-rater reliability is satisfactory, although it varies depending on the different types of indexes and assessment systems used (Meyer, 1997a; Meyer, Mihura, & Smith, 2005).

The problem is to find standardized methods of scoring indices that can assure their reliability. The aims pursued by Exner (1974, 2003) in building the 'Comprehensive System' was to select, from the different Rorschach scoring systems, the indicè.es that received the best empirical validation: i.e., maintaining only variables with high inter-scorers reliability (> .80), to ensure as much as possible the scoring objectivity.

Satisfactory data on the reliability (mean 0.83, to 0.90 with specifically trained scorers) were already reported in the study of Kleinmuntz (1982) and in Parker's (1983) meta-analysis; Acklin, McDowell and Orndoff (1992) reported an increase in power of the studies after the adoption of the Comprehensive System. Further confirmation came from the studies conducted by Parker, Hanson and Hunsley (1988) and Hiller, Rosenthal, Bornstein, Berry, and Brunell-Neuleib (1999): according to these Authors, the overall reliability and stability of Rorschach indicators is similar to that of classics psychometric tests such as WAIS and MMPI. In particular, for the Exner system, the reliability between evaluators is higher than 0.90 for Location, Popular, Pairs and Z points, and only slightly lower for the content categories and the Formal Quality.

Besides agreement between evaluators, also the reliability internal to the same evaluator is increased in Rorschach protocols evaluated with standardized systems (Acklin, McDowell, & Verschell, 2000).

The test-retest reliability ranges from 0.70 to 0.80 in periods of time from 7 days to 3 years (Exner & Weiner, 1995). The highest stability values are recorded at 3 months, especially for variables related to personality, cognitive style and representation of self (Sultan, Andronikof, Reveillere, & Lemmel 2007). A high consistency over time and satisfactory robustness in the possibility of application to various ethnic groups has been reported by Viglione (1999).

Exner (1999), summarizing the psychometric characteristics of the Rorschach, has argued that the problem is not whether it the test is valid as a

whole, but rather if single or composite indicators derived from it have good validity in practical use. Certainly, the reduced reliability of some indices can depend on methodological problems not adequately taken into account: for example, not weighting the total number of responses of the Protocol (Lipgar, 1992; Meyer, 1992).

The assumption that the Rorschach may be used in psychiatric and forensic settings for nosographic diagnoses related to behavioral variables, like as those derived from 'objectives' inventories, is misleading (Bornstein, 2012). The psychometric uses of the instrument, i.e. the reference to nomothetic criteria, are limited to some specific variables, while other indicators refer to idiographic criteria useful not so much for a judicial appraisal, but rather for planning a therapy or a rehabilitation treatment, and only then for evaluating its effects (Exner & Erdberg, 2005).

Personality Assessment Inventory.

Besides the MMPI-2, used since its origin in the 1950's for clinical and forensic evaluations, some alternative instruments have been introduced in recent decades to meet the juridical criteria more appropriately, and with more recent theoretical foundations.

The Personality Assessment Inventory (PAI: Morey, 1991, 2007; Zennaro, Di Nuovo, Lis, Mazzeschi, & Fulcheri, 2005) is a self-report of adult personality, made up of 344 items, divided into 22 partially overlapping scales.

Eleven clinical scales assess somatic problems, anxiety and related disorders, depression, mania, paranoia, schizophrenia, borderline and antisocial aspects, problems of alcoholism and drugs.

Other supplementary scales, including Refusal of treatment (RXR) and Treatment Process Index (TPI), are added, together with some validity scales:

INC - Inconsistency: indicates that the person has not responded in congruent way to similar items.

INF - Infrequency: suggests the tendency to respond inappropriately to the content of the items.

NIM - Negative Impression: Indicates the attempt to provide an exaggerated and unfavourable impression of themselves or the presence of malingering.
PIM - Positive Impression: attempting to present themselves in a favorable way, or reluctance to admit common defects.
Further additional indices were added for evaluating aspects of reliability and validity of the test:
MAL - Malingering Index: simulation of mental disorders;
DEF - Defensiveness Index Function: tendency to respond defensively, to hide unpleasant aspects of personality;
CDF - Cashel Discriminant Function: attempt to present in the way in which the respondent wishes to appear, indicating social desirability.
The instrument has been developed and standardized in the United States on a large sample of individuals aged between 18 years and adulthood, and is routinely used in legal-forensic evaluation (Douglas, Hart, & Kropp 2001; Edens, Cruise, & Buffington-Vollum, 2001; Morey & Quigley, 2002).
While numerous studies exist regarding the relation between Rorschach and MMPI (e.g., Weiner, 1993, Meyer, 1997b, Meyer and Archer, 2001), to which a 'special series' in the Journal of Psychological Assessment (n. 67, 1996) has been devoted, few studies have compared the PAI with the Rorschach test. Klonsky (2004) reported a modest correlation between schizophrenia indices of the two instruments in a sample of inpatients of a public psychiatric hospital. In addition, PAI and Rorschach were used to evaluate differences between the patients who dropped the psychotherapeutic treatment and those who have continued it. In the first group a high score in Treatment Rejection Scale (RXR) was reported, while limited differences were found in other PAI scales and Rorschach (Charnas, Hilsenroth, Zodan, & Blais, 2010).

The problem of the simulation and control scales.

For all the range of available psychological instruments it is important, especially for the purpose of judicial diagnostic evaluations, to evaluate the possibility of simulation: i.e., showing non-existing symptoms or exaggerating those that exist, in order to gain advantages in certain forensic procedures; or conversely, to hide the disease and pretend normality, to avoid negative measures such as interdiction or incapacitation, or loss of parental authority.

As mentioned, in the PAI (like as in the MMPI-2) there are different validity scales and control indices, offering the required reliability in the legal assessment (Rogers, Jackson, & Kaminski, 2005; Boccaccini, Murrie, & Duncan, 2006; Kucharski, Toomey, Row, & Duncan, 2007; Mullen & Edens, 2008).

Also for the Rorschach some simulation indicators were identified, e.g., a very low production, with many 'refusals' to give responses in specific tables – in presumably normal subjects - or a too high number of responses with many bizarre or strange answers; carefully constructed confabulations; serious inconsistencies or disparities in the performance (Albert, Fox, & Kahn 1980; Perry & Inder, 1992; Netter & Viglione, 1994; Gacono & Evans, 2008).

Used together with the MMPI, the Rorschach was found useful for detecting the deliberate simulation of psychosis (Ganellen, Wasyliw, Haywood, & Grossman, 1996); the test, unlike others instruments, does not easily allow a voluntary distortion of the answers (Schretlen, 1997).

Typical indicators of the Rorschach reliability are considered the total number of responses (which testifies to the ability and willingness of the respondent to engage in the execution of the required task), the ratio of global responses and details (the latter requires a clear commitment for articulating the perceptions), and the proportion of 'pure' Forms, that is, without perception of Movements, or Shade, or Colour, that also require greater efforts to overcome the simple perception of the contour, considering the other aspects of the inkblot.

In line with these directions, Exner in the 'Comprehensive System' suggests verifying the reliability using the index 'Lambda' consisting in the ratio of 'pure' forms (F) by the total number of responses (R), throughout the Protocol. The formula is $[F / (R-F)]$, the average ratio is equal to about 0.50 in normal adult subjects, while it increases significantly in subjects with various types of disease: 2.7 in anti-social, 3.1 in psychotic, 3.5 in depressed inpatients (Di Nuovo, 1989). The index will significantly change after psychotherapeutic interventions in children (La Barbera & Cornsweet, 1985; Gerstle, Geary, Himelstein, & Reller-Geary, 1988), adult prisoners (Gacono, 1988) and patients (Exner, 2001).

The Lambda index is an indicator of a tendency to simplification of the complexity, economization of cognitive effort, predominantly giving the responses that require less processing activity with reduced focusing of

attention. Already Beck (1933) and Klopfer and Davidson (1962) had interpreted the use of pure Forms responses as a 'delay of affect', as all the most complex properties of the stimulus, such as colour, shade, kinetic potential, are avoided. For this reason, a high lambda (> 1.5) in presence of a low number of responses (<13 in normal subjects) indicates that the performance was carried out with economy of resources, and therefore probably below the actual capacity of the subject, thus suggesting the possibility of the test's poor reliability. On the contrary, when the Lambda index is low, even in the presence of relatively few answers, the test can be considered reliable (Exner, 1988).

Aims of the research.
The objective of this research was to investigate the effectiveness of the validity scales present in the Rorschach projective test and in the Personality Assessment Inventory, and the relationship between the indices of validity and other variables in the two instruments.
In a first part of the study we focused on the analysis on subjects free from overt disease, while in a second phase healthy and pathological persons have been compared, to test if the presence of pathological aspects can have a different incidence.

Method

Sample

The sample of the study consists of 86 healthy adult persons, 34 males and 52 females, aged between 20 and 50 years (Mean age=29.73, Standard deviation=8.35), and a group of pathological subjects, 15 males and 7 females, aged between 27 and 60 years (Mean age=41.36, Standard deviation=9.80), diagnosed with schizophrenia (n=14) or depression (n=8).
To compare the pathological group with healthy controls, in a second part of the study, a subgroup from the sample without psychic disease was extracted, accurately paired by gender and age with pathological group: 14 males and 8 females, mean age 41.14, standard deviation 9.03.

Instruments

The instruments used are the Rorschach test, assessed in accordance with the Comprehensive System of Exner (2003) and the Personality Assessment Inventory (PAI).

With regard to the Rorschach test, the following variables were considered:

- Total answers (R);

- Percentage of answers with negative form (X-%);

- Locations: Global (W%), details (D%), rare details (Dd%), white space (DS);

- Determinants: Shape (F%), Human Movements (M), Weighted sum of Colors (SC = 0.5 FC + 1 CF + 1.5 C);

- Quality of the form: F-%, index of the failure in adapting the response to the stimulus features (for the evaluation, the appropriate tables of the manual were used);

- Contents: Animal (A%), Human (H%);

- Egocentrism Index: the weighted ratio of 'reflex' responses, 'Pairs' and the total number of responses: [3r + (2) / R], indicating tendency to self-centring (Exner 2003);

- Lambda index [F / (R-F)], which as mentioned in Comprehensive System an essential indicator of reliability of the protocol.

Moreover, we considered the number of adaptive defences such as rationalization, intellectualization, minimization (Lerner, 1991; Di Nuovo and Cuffaro, 2004).

From PAI the indices of validity and control (already described in the theoretical section) were extracted, adding two relevant supplementary scales scores: Refusal of treatment (RXR) and Treatment Process Index (TPI).

Analyses.

The data of the indices derived from the two instruments have been analysed using the *Systat* statistical software. Zero-order Pearson correlations, multiple regressions, and Student *t-test* for the comparison between the pathological group and healthy controls, were performed.

Results

The tab. 1 shows the results of the correlations between the PAI control scales and the quantitative variables of the Rorschach test.

Tab. 1 - Correlations between the PAI control scales and Rorschach indexes in healthy group (n=86). **In bold, significant coefficients: * p<.05   ** p<.01**

PAI	R	X-%	W%	D%	Dd%	DS	Pop%	F%	F-%	M	SC	A%	H%	Egoc.	Lambda	Def.
																Rorschach Indices
Inconsistency	.05	.19	-.19	.20	.12	.03	.00	.07	.28	-.19	.07	-.14	-.12	-.03	.03	.07
Infrequency	-.05	.06	-.04	-.04	.09	.07	-.08	-.04	-.02	-.14	-.01	-.11	-.17	-.09	-.02	-.01
Negative Impression	.10	.03	-.13	.12	.10	.11	.04	.16	.19	-.07	.07	.08	-.05	-.10	.12	**.37****
Positive Impression	-.09	.14	.14	-.10	-.14	.07	-.07	-.16	.08	-.11	.08	-.11	.01	.13	-.17	**-.27***
Malingering	-.10	-.11	-.01	.05	-.13	.04	.16	.15	-.01	-.08	-.07	.12	-.11	-.05	**.22***	**.26***
Defensiveness	-.20	.02	**.28****	**-.23***	-.17	.04	.10	-.14	-.04	-.19	.03	**.21***	-.10	**.21***	.19	**-.42****
Cashel Discrim.Funct.	.05	.03	.08	-.04	.18	-.09	-.03	-.15	.05	.04	.07	.06	.00	-.12	-.12	.10

The results presented in Table 1 show that high and significant correlations are found, obviously in reverse direction between them, for the proportion of global perceptions or details in the Rorschach vs defensiveness in the PAI. This variable has significantly high association with the perception of the whole in interpreting the inkblots.

Defensiveness in the Inventory positively correlates also with high percentage of Animal-Content responses (easier to give without engaging in more complex contents and Egocentrism Index, characterized by centring on the self. Moreover, the PAI defensiveness index, which has a negative valence, is inversely correlated with the adaptive defences in the Rorschach, confirming the validity of both these indices.

Defences in the Rorschach test correlate also significantly with the tendency to malingering and to give negative impression; and obviously, inversely with positive impression.

The Lambda index correlates significantly and positively with the PAI Malingering index.

No significant correlation with the PAI indices of validity was found for the total number of responses and their formal quality, and even for determinants such Movements and Colours, or for the answers to Human Content. It can be assumed that these variables of the Rorschach test are less prone to greater or lesser validity in performing the test.

As regards the index Lambda (indicating, if high, poor reliability in the response to Rorschach) a multiple regression was calculated considering the index as the dependent variable and the PAI control indices as predictors. The regression equation (with $R2 = .48$) is:

LAMBDA = .69 RXR* + .52 DEF* + .51 MAL* + .20 INC (-.19) INFR + (-.27) TPI + (-.32) PIM + .02 NIM + .01 CDF

Where (*p<.05): RXR - Refusal of treatment, DEF - Defensiveness, MAL - Malingering, INC - Inconsistency, INF - Infrequency, TPI - Index of the treatment process, PIM – Positive impression, NIM - Negative impression, CDF – Cashel Discriminant Function

The main PAI predictors of the Lambda score are the unfavourable attitudes towards the psychological treatment, the defensiveness, the tendency to simulation; consequently - in negative direction - the propensity towards the

treatment and the tendency to give a positive impression. These variables of the PAI, if high, correspond to a decrease of Lambda, which means greater reliability of the Rorschach protocol.

These data confirm the validity of the Lambda score, as proportion of pure Forms in the Rorschach protocol, implying a lower engagement in the required task; the index is prognostic of availability to a possible treatment.

If a Lambda high score is associated with the tendency towards defensiveness and simulation, it will be negatively predisposed to psychological treatments. These results were found in the healthy participants. In the second part of the study we compared the pathological group with healthy controls, extracting from the sample without psychic disease a subgroup paired by gender and age, as exposed in the Method section.

Significant differences (t-test, d.f.=42, p<.05) were found in PAI scales (fig. 1): more Inconsistence, Infrequency, Negative impression, Malingering, Treatment Process Index, and less Positive impression, Defensiveness and Treatment rejection were showed in the clinical subsample. Only social desirability showed no significant difference between the two groups.

Fig. 1 - PAI reliability scales: clinical sample vs controls
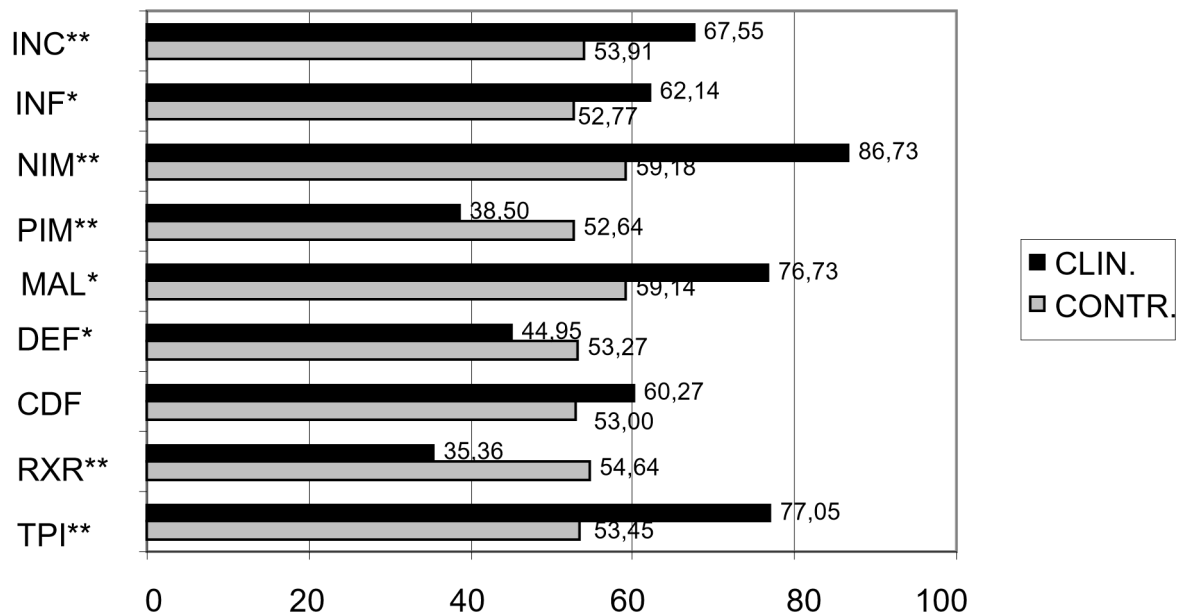
Legend: INC: Inconsistency - INF: Infrequency – NIM: Negative Impression – PIM: Positive Impression – MAL: Malingering – DEF: Defensiveness - CDF - Cashel Discriminant Function (social desirability) – RXR: Refusal of treatment – TPI: Treatment Process Index
* p<.05 ** p<.01 d.f.=42 (Bonferroni adjusted p-values)

As expected, Rorschach Lambda was higher in the clinical group (Mean=2.35, s.d.=2.26) than in control group (Mean=0.97, s.d.=0.59, t=2.76, d.f.=42, p<.01), while Egocentrism Index was lower (clinical group: Mean=0.13, s.d.=0.11; control group: Mean=0.34, s.d.=0.11, t=3.11, d.f.=42, p<.01).

The replication in the clinical group of the correlational analyses between PAI control scales and Rorschach indices gave the results showed in table 2.

Malingering is inversely correlated with percentage of poor responses and poor form quality

Also the interpretation of white spaces is negatively correlated with malingering, and with the tendency to give a negative impression and to show social desirability.

More responses of Human Movements correspond to a lower tendency to give negative impression.

The Lambda index results significantly but inversely associated with the Cashel Discriminant Function, i.e. an index of social desirability: if the patients are less interested in presenting themselves as they wish to appear, the tendency to give pure Form responses, without engaging in more complex performance, increases.

Adaptive defensiveness in the Rorschach correlates negatively with defensiveness index derived from PAI, as in healthy subjects, but the correlation does not reach the level of significance due to the small dimension of the sample.

Tab. 2 - Correlations between the PAI control scales and Rorschach indexes in pathological group (n=22). In bold, * p<.05 ** p<.01

PAI	R	X-%	W%	D%	Dd%	DS	Pop%	F%	F-%	M	SC	A%	H%	Egoc.	Lambda	Def.
Inconsistency	-.08	-.05	.19	-.15	-.17	.21	.20	-.14	.19	.18	-.10	.24	.32	-.14	.00	.11
Infrequency	-.33	-.08	.02	-.03	.05	.10	.14	-.08	-.05	-.12	-.07	-.12	.36	.19	-.13	-.38
Negative Impression	-.39	-.25	.22	-.19	-.16	**-.58****	.10	.28	-.35	**-.47***	-.21	.38	-.24	-.22	-.05	.02
Positive Impression	.11	.23	.03	.01	-.17	.26	-.05	.19	.35	.01	.19	.12	.07	.21	-.07	.03
Malingering	-.29	**-.42***	.02	.05	-.30	**-.48***	.27	.26	**-.40***	-.14	-.12	.31	-.06	-.14	-.17	-.01
Defensiveness	.00	-.06	.32	-.26	-.28	.05	.02	-.01	.13	.06	-.10	.21	.24	.06	-.35	-.23
Cashel Discrim.Funct.	-.19	-.24	.36	-.34	-.14	**-.47***	.24	-.12	-.31	.00	.25	.12	.07	-.06	**-.49****	-.07

As in the healthy group, also in the pathological group a multiple regression was computed considering the Lambda index as the

dependent variable and the PAI control indices as predictors. The regression equation in this group (R2 = .64) is:

LAMBDA = (-.76) DEF* + (-.64) CDF* + (-.69) PIM* + .65 NIM* + .20 INFR + (-.13) INC + (-.08) MAL + .03 RXR + .02 TPI

Where (* p<.05): DEF - Defensiveness, CDF − Cashel Discriminant Function, PIM − Positive impression, NIM - Negative impression, INF - Infrequency, INC - Inconsistency, MAL - Malingering, RXR - Refusal of treatment, TPI - Index of the treatment process

Compared with the same regression model in healthy participants, a very different pattern is showed: defensiveness, social desirability, and attempts to give a positive impression, predict inversely the Lambda score: this result confirms that the more the person with pathology is defensive and tends to be socially acceptable, the more he or she avoids interpreting only the contour and the simplest features of the proposed stimulus, i.e., giving prevalently pure Form responses. The tendency to malingering and the attitude toward treatment are less influencing the Lambda scores in this group than in the persons without psychical pathologies.

Discussion and conclusions.

The Rorschach test has often been considered as an instrument investigating prevalently latent dimensions of personality; now literature agrees in recognizing that most of the answers to the test, and then the resulting scores, reflect a combination of implicit processes (motivation, needs, perceptual styles and modalities of cognitive and emotional organization) and moderating factors such as conscious strategies that persons use to respond in relation to specific purposes and situations (Exner & Erdberg, 2005; Bornstein, 2012).
We therefore expected that the aspects evaluated by a 'projective' test are partly divergent and partly converging to instruments that investigate only explicit aspects of cognition, such as personality inventories.
Another relevant issue is that the Rorschach test draws simultaneously, albeit through different indices, structural (perceptual, cognitive) aspects

and contents of the personality: clinical and forensic evaluations require evaluations of both these aspects (Hilsenroth & Stricker, 2004), and therefore both must be taken into account in the test validation studies.

The results of our study, targeted in particular to deepen the validity indices comparing Rorschach and a personality inventory in pathological and healthy subjects, have confirmed that this relationship is complex and articulated.

While the productivity to the Rorschach test does not appear connected to aspects of validity, the analytical style, as opposed to the global one, seems to correlate with a greater openness to the psychological assessment, and to exposure to a negative evaluation, with minor social desirability and less defensive trend.

The defensiveness appears also linked to an increase of responses with Animal Contents and in the index of self-absorption. Adaptive defences expressed in the Rorschach are related, mainly in healthy subjects, to the tendency to malingering and to give a negative impression; a negative correlation with the PAI defensiveness index is confirmed.

We have found that the Lambda index, as foreseen in the Exner's Comprehensive System, is valid in highlighting a tendency towards defensiveness, social desirability and dissimulation. Moreover, the PAI malingering index is significantly associated with the Lambda, but only in the normal sample.

Our data do not support the hypothesis sustained by Meyer, Viglione, and Exner (2001) that the percentage of pure forms (most suitable for studies using parametric statistics) would be sufficient as an index of reliability.

In conclusion, the reliability of the control variables from Rorschach and PAI were confirmed in our study, both in healthy subjects and also in patients with a diagnosis of psychic pathology. The use of both these instruments in the legal field allows obtaining useful criteria of reliability, and should be integrated to make a more effective clinical and forensic assessment.

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