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The Holtzman Inkblot Technique as a Measure of Interpersonal Relationships

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Abstract

We examined the ability of the Holtzman Inkblot Technique (HIT) to assess different aspects of interpersonal relationships through the study of the association of six original HIT variables and 13 new HIT variables with the Rorschach Comprehensive System and the Personality Assessment Inventory. The three tests were administered to a sample of 136 subjects (61 male and 76 female) with an age range between 18 and 60 years. Four HIT variables (Human Content, Anxiety, Hostility, and Barrier) and four new HIT variables showed several significant correlations, which ranged from a minimum of .18 to a maximum of .28. Some of the results confirmed our hypotheses and therefore provide new support for the convergent validity of old and new HIT variables. Those the significant correlations of the new HIT variables have an important implication for both clinicians and researchers. However, these HIT variables did not show discriminant validity due to their low but significant correlations with some RCS measures of cognitive functions. These results are discussed in the context of the literature.

Keywords: Holtzman Inkblot Technique (HIT); Rorschach Comprehensive System; Personality Assessment Inventory; correlation; validity.

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Introduction

Without any doubt, interpersonal relationships (defined as the capacity to establish intimate, empathetic, and stable relations and to perceive the other as a whole and in a realistic manner) are a main focus for the assessment of personality for clinical and forensic purposes. For this reason, both the *Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition* (DSM-5; APA, 2013) and the *Psychodynamic Diagnostic Manual- Second Edition* (PDM-2; Lingardi & McWilliams, 2018) consider interpersonal relationships as one of the key domains to be evaluated during the diagnostic process. In the alternative model for personality assessment in the DSM-5 this interpersonal relationships domain helps define the level of personality functioning, and it is divided into Empathy and Intimacy. Empathy is described as “*Comprehension and appreciation of others’ experiences and motivations; tolerance of differing perspectives; understanding the effects of one’s own behavior on others.*” (p. 762). Intimacy is described as “*Depth and duration of connection with others; desire and capacity for closeness; mutuality of regard reflected in interpersonal behavior.*” (p. 762). In the PDM-2 this intimacy aspect is included in the M axis and defined as the “*Capacity for Relationship and Intimacy*” (p. 95). Because interpersonal relationships are so important for a complete and useful assessment, specific tests have been built for its measurement. For example, Westen (1991) developed the Social Cognition and Object Relation Scale (SCORS) for coding the Thematic Apperception Test (TAT) protocols in order to assess interpersonal relationships. Horowitz et al. (1988) instead developed the Inventory of Interpersonal Problems (IIP), a self-report for the evaluation of problematic areas in interpersonal functioning. Moreover, most multiscale personality tests include this domain. For example, the *Minnesota Multiphasic Personality Inventory -2 – Restructured Form* (MMPI-2-RF; Ben-Porath, 2012) has several scales that evaluate interpersonal relationships; the *Personality Assessment Inventory* (Morey, 2007) has two interpersonal scales, Dominance and Warmth; the *Rorschach Comprehensive System* (Exner, 2003) has the Interpersonal Perception area with 14 indices that give a wide range of information about test takers’ interpersonal perception and behavior. What about the *Holtzman Inkblot Technique* (HIT; Holtzman et al., 1961)? How does the HIT, which has a lot in common with the Rorschach, assess interpersonal relationships?

The HIT was designed to overcome some of the (mostly psychometric) criticisms of the Rorschach inkblot test during the 1940s and 1950s. To achieve this goal, Holtzman decided to develop two new parallel sets of 45 inkblot stimuli (Form A and Form B) with the requirement of one answer for each stimulus blot. All responses were coded according to 22 variables, which Holtzman developed using the most widely used Rorschach scoring system at the time. But unlike the Rorschach, the HIT scoring system is quantitative with different weights for every variable. Indeed, the total score for each HIT variable is obtained by summarizing its scores across the 45 inkblot cards. Despite the initial enthusiasm, the HIT has not been used in the recent decades and publications using the HIT have decreased. There appear to be three main reasons for this situation: first, as it was for the Rorschach, the

validity of the HIT has been questioned and this still an open controversy (for a comprehensive review, see Darolia, 2016); second, as it is been noted from different authors (Dana, 1973; Gamble, 1972; Zubin, 1972), the interpretative system of the HIT focuses mainly on the contents of the responses and not on the underlying processes (plus, adequate interpretative guidelines have never been provided for the HIT); third, the HIT existence was justified by the criticisms that were directed to the Rorschach during the 1940s and 1950s, most of which were overcome with the publication of the Comprehensive System in 1974 and the research that followed. Still, the HIT possesses two major advantages: it can be group administered and it has a number of responses that is relative stable across protocols. Both qualities that make the HIT a suitable technique for research purposes and for all those situations in which group administration is needed, like personnel selection. In those contexts, most often only self-reports are used, since individually administering performance-based technique would be time consuming. So, the HIT could represent a new source of information that would help psychologists during their decision-making process. Moreover, since both administration and scoring procedures are standardized, it is easy to learn how to use the HIT.

In past years, the literature has shown the HIT’s clinical validity (Darolia, 2016; Leichsenring, 1990, 1991; Megargee & Valez-Diaz, 1971), sensitivity to developmental changes across the lifespan (Darolia, 2016; Swartz et al., 1967; Thorpe & Swartz, 1965, 1966), and some relationship with performance-based measures (Dawe et al., 2021; Holtzman et al. 1961). However, the evidence of the HIT’s agreement with self-report tests has not been so encouraging, showing little convergent validity (Darolia, 2016, Gamble, 1972). Still, the research literature reveals some interesting correlational studies for the possibility of evaluating interpersonal relationships using the HIT. Using a sample of 60 college students, Fernald and Linden (1966) found a relationship between Human Content (H) responses and social interest assessed with the *Strong Vocational Interest Test* (SVIT; Strong, 1938). This study showed that subjects lacking in social interest tended to give fewer H responses than subjects with strong social interest. Moreover, Cole et al. (1967) reported that a group of 18 individuals who were socially isolated for 10 days showed a decrease of Human Content responses from before to after isolation compared with the controls. The results were interpreted in terms of a decrease in identification with and sensitivity to others, supporting the interpretation of H responses as a measure of empathy.

Megargee and Swartz (1968), with a sample of 89 subjects, correlated the 22 variables of the HIT with the two Extraversion-Introversion (E) and Neuroticism (N) scales of the *Maudsley Personality Inventory* (MPI; Eysenck, 1959). They found no correlation with the E scale but a few low correlations between the N scale and some HIT measures, such as Rejection (R), Form Appropriateness (FA), Movement (M), Pathognomic Verbalization (V), Anxiety (Ax) and Hostility (Hs). More recently, Kumar (2018), with a sample of 300 males adults, identified some low but significant correlations of HIT variables with three NEO-PI-R factors: Extroversion (E) positively correlated with Reaction Time (RT), Color (C), Human Content (H), and Popular (P); Openness (O)

showed positive correlations with Space (S), Form Definiteness (FD), and Form Appropriateness (FA); and Agreeableness (A) correlated positively with Human Content (H) and negatively with Pathognomic Verbalization (V) and Anxiety (Ax).

Of some interest are the findings of Hill (1971), on a sample of 22 college students, who found a significant correlation between HIT variables and four scales of the *16 Personality Factor Questionnaire* (16PF; Cattell, 1962). In particular, the Warmth scale of the 16PF was positively correlated with Form Definiteness (FD), Abstract Content (Ab), Balance (B), and Popular (P) and negatively correlated with Movement (M) and Human Content (H); Liveliness was positively correlated with Form Appropriateness (FA) and Animal Content (A); Social Boldness was positively correlated with Sex Content (Sx), Anxiety (Ax), and Animal Content (A); and Vigilance was positively correlated with Human Content (H) and Abstract Content (Ab). These findings, while offering a new interpretation of HIT variables, cast doubt on the meaning of the Human Content (H) variable, which is generally associated with empathy, as Hill states in his 1972 manual, although this interpretation of H was mainly based on the old Rorschach literature. In the Dawe et al. (2021) study, conducted on a sample of 139 subjects, a significant correlation was found between the sum of HIT score 2 on Human Content (H) and Pure H of the Comprehensive System, which is a measure of the ability to have a whole, reality-based perception of the other. The complexity of the interpretation of this HIT variable could be due to the way it is coded. In fact, the total score does not differentiate between whole humans and human details, and whether these are real or fantastic.

Few studies have been conducted on the relationship of HIT variables with behavioral indices of interpersonal relationships. Frede, Gautney, and Baxter (1968) found, on a sample of 32 male students, that subjects with a high score on Barrier (Br) tended to show a form of interaction defined as prosocial and to communicate more, in comparison to subjects with a low score on Barrier (Br), who tended to be less communicative and to focus on physical distances between social participants. Interesting too is the Moerk (1972) study on the relationship between HIT variables and group-process variables recorded during eight group interaction sessions (called trials 1 to 8). The results showed that the more talkative individuals had low scores on Anxiety (Ax) during trial 1, more Movement (M) answers on trial 7, and a high score on Barrier (Br) in trial 8. Following these results, Lefcourt et al. (1972) found that psychiatric patients with high scores on movement (M) had more frequent eye contact but were less capable of maintaining it during test interaction.

The studies described so far have shown some evidence for an association between some HIT variables and the domain of interpersonal relationships. However, there are some noteworthy limitations. First, sample sizes were small in most studies or specific sub-populations were sampled (e.g., only men), so these findings were hardly generalizable. Second, the external criteria used were inadequate to evaluate different aspects of the interpersonal relationship that might validate HIT variables. Third, most studies were not designed to study the ability of HIT variables to assess interpersonal aspects. To overcome these limitations, the present

exploratory study aimed to validate the HIT interpersonal variables using a larger and representative sample of the general population and two different tests as external criteria, the *Rorschach Comprehensive System* (RCS, Exner, 2003) and the *Personality Assessment Inventory* (PAI, Morey, 2007). We have chosen these measures for two reasons: 1) PAI scales and RCS indices of interpersonal relationship cover different aspects of this domain; 2) PAI scales provide an objective measure of interpersonal relationships, although the trend for low or nonsignificant correlations between self-report and performance based measures in general (Archer & Krishnamurthy, 1993a, 1993b; Bornstein, 2002; Morey & McCredie, 2019), and with the HIT in particular (Darolia, 2016; Gamble, 1972), is well known.

According to the meaning that the literature has ascribed to HIT variables, we hypothesized the following relationships:

- 1) In the HIT literature Movement (M) has been associated with ideational activity, creativity, and empathy (Hill, 1972; Moran et al., 1984; Taylor et al., 1969). In the Rorschach Comprehensive System Movement assumes different meanings (higher mental activity, empathy, creativity, mentalization) and ends up in three clusters: Ideation, Controls and Situational Stress, and Interpersonal Relationship. In the latter, it is included in three variables: the Active-Passive Ratio (a:p), Cooperative Movement (COP), and Aggressive Movement (AG). It is possible that HIT M may also be related to interpersonal relationship aspects. Therefore, HIT M is expected to show positive correlations with COP and with the WRM scale of the PAI; at the same time, M will show a negative correlation with the Dominance (DOM) scale of the PAI;
- 2) HIT Human Content (H) has been associated with degree of interest in others and the tendency to get involved in relationships in a positive manner (Hill, 1972; Kumar, 2018; Taylor et al., 1969). Therefore, H is expected to show positive correlations with the COP, GHR, and Whole Realistic Human (Pure H) indices of RCS, and with the WRM scale of the PAI; on the contrary, H will show a negative correlation with the DOM scale of the PAI;
- 3) HIT Animal Content (A) has been associated with the ability to use intellectual resources spontaneously (Hill, 1972). However, it could also be negatively associated with the ability to establish positive, cooperative and warm relationships (Kumar, 2018). Thus, A is expected to show negative correlations with the COP and Pure H indices of RCS, and with the WRM scale of the PAI;
- 4) HIT Anxiety (Ax) has been considered as a measure of anxiety, which could negatively influence the quality of relationships (Moerk, 1972). So, we expected Ax to show negative correlations with the COP, Pure H, and GHR indices of the RCS, and with the DOM scale of the PAI;
- 5) HIT Hostility (Hs) has been associated with verbal hostility (Fehr, 1976), a deep desire to be competitive or to be aggressive (Hill, 1972) and with a predisposition toward hostility (Rosenstiel, 1973). High level of hostility could have a negative impact on relationships, so we predicted that Hs would show a negative correlation with the COP and GHR indices of the RCS, and a positive correlation with the DOM scale of the PAI;

6) HIT Barrier (Br) has been considered as a measure of body-image boundary definiteness, and high scores have been associated with prosocial interaction, increased communication with others, and with the tendency to deal with others on a more proximal basis in social settings (Frede et al., 1968). Br is also related to interpersonal spatial behavior (Sanders, 1976). It seems that body-image boundary definiteness plays a role in the way we relate to others. Therefore, we expected Br to show a positive correlation with the COP and Pure H indices of the RCS, and with the DOM scale of the PAI.

Moreover, we hypothesize that, in the same way as in the Rorschach, the single levels of each of the nine HIT variables considered could be informative of personality characteristics. Following Leichsenring (1990; 1991; 1999), we decided to break down the nine HIT core variables included in the study into their single scores, creating 13 new variables. In his research, Leichsenring has successfully discriminated between people who did not meet the criteria for any diagnosis and groups with different diagnoses by using four new indices for the HIT. These indices were developed from the four scores of Pathognomic Verbalization (V). In the HIT scoring system, most variables are assigned scores representing different levels of classification for each variable, summed to yield a total score for that variable. This total score for a given HIT variable is assumed to measure one latent trait. Because Fischer and Spada (1973) consider the assumption underling this procedure (one-dimensionality, additivity, interval scale) questionable, Leichsenring decided to treat each level of Pathognomic Verbalization (V) separately, creating a scoring with new sub-classifications. This variable is rated on a 5 point scale, from 0 to 4 (see Table 1). From these values, Leichsenring obtained four new variables V1, V2, V3, and V4, which receive 1 point when V is rated on the corresponding score (see Table 1).

Tab. 1. Example of scoring of the variable Pathognomic Verbalization (V) and the new variable V1, V2, V3, and V4

Inkblot	Pathognomic Verbalization (V)	V1	V2	V3	V4
1	0	0	0	0	0
2	1	1	0	0	0
3	3	0	0	1	0
4	2	0	1	0	0
...
45	4	0	0	0	1
TOT	33	3	5	4	2

As shown in Table 2, we decided to follow the same procedure for the nine HIT variables. All analyses were carried out on the nine HIT core variables and the 13 new variables. The second goal of the present study was to evaluate if the single score versions of the HIT can add new information leading to new interpretations as in the Rorschach. Therefore, we hypothesized that the new variables would correlate on the same RCS and PAI scales of the HIT original variables. Finally,

in order to test the discriminant validity of these HIT variables, we selected four RCS variables related to cognitive aspects, with the assumption that these cognitive RCS variables would not show any significant correlations with our HIT variables, with only one exception. HIT Movement (M) is well known in the Rorschach literature to assume multiple conceptual meanings (Porcelli & Kleiger, 2016). Therefore, we could expect some significant positive correlations of M with the RCS cognitive measures. The four RCS cognitive variables are: Synthesized Response (DQ+), Organizational Frequency (Zf), Form Quality Score: Distorted (X-%), and the Perceptual-Thinking Index (PTI). The findings could have important consequences for both clinicians and researchers who want to use this HIT technique.

Method

Participants

The present study was conducted on a sample of 136 subjects (61 male and 76 female) with ages ranging from 18 to 60 years, with a mean age of 38.11 years ($sd = 12.10$). Educational levels ranged from primary school (5 years) to a university degree (18 years), with a mean of 13.55 years of education ($sd = 3.71$). The sample was collected between 2018 and 2019 from different regions of Italy. All students were recruited from classes and participated on a voluntary base. All non-university subjects were recruited among the acquaintances (excluding family members and close friends) of the five test administrators and by word of mouth; they also in this case participated voluntarily. All subjects were not screened for psychopathology or intelligence level. The Ethical Committee of the Department of Dynamic and Clinical Psychology, University of Rome "Sapienza" approved all aspects of this study.

Instruments

Holtzman Inkblot Technique. The 45 inkblots, plus two practice blots, from the Holtzman Inkblot Technique – Form A (HIT; Holtzman et al., 1961) were individually administered. Each participant was asked to provide only one response for each inkblot stimulus and each response was followed by a short and standardized inquiry. The responses were coded according to six fundamental variables (see Table 2) following the guidelines of the Holtzman Manual (Holtzman et al., 1961). The total score for each variable was obtained by summing their scores across the 45 cards.

Rorschach. The Rorschach was administered following Exner's Comprehensive System guidelines (RCS; Abbate & Porcelli, 2017; Exner, 2003). The Rorschach consists of a set of 10 symmetrical inkblots: five black and white, two black and white but with red parts, and three completely colorful. The administration was divided into two phases: first, collection of the responses to all 10 inkblots, second, inquiry about those responses. All protocols were coded using an online program

Tab. 2. Description of the seven HIT variables

HIT core variable	Description	Score	HIT new variables	Description	Score
Movement (M)	Amount of energy ascribed in the response	0-4	Movement Score 1 (M1)	Indicates static potential for movement	1
			Movement Score 2 (M2)	Casual and passive movements	1
			Movement Score 3 (M3)	Dynamic movement	1
			Movement Score 4 (M4)	Violent movement	1
Human Content (H)	Presence of human elements or whole humane figure	0-2	Human Content Score 1 (H1)	It is scored for human details, distorted human bodies, and mythological anthropomorphic figures.	1
			Human Content Score 2 (H2)	It is scored for whole human figures, extremely elaborate faces, and when the subject sees only some part of the human figure because the rest is hidden.	1
Animal Content (A)	Presence of animal elements or whole animal figure	0-2	Animal Content Score 1 (A1)	Is scored for animal parts, insects and mythological animals	1
			Animal Content Score 2 (A2)	Is scored for whole animal figures or major parts of the animal and the subject assume that the rest is hidden	1
Anxiety (Ax)	Represent the degree of anxious content inside the percept. Is scored on the degree of anxiety projected on the blot. To each score correspond one of the new variables	0-2	Anxiety Score 1 (Ax1)	Is scored for an implicit and indirect sign of anxiety in the response.	1
			Anxiety Score 2 (Ax2)	When the signs of anxiety are distinctive and evident.	1
Hostility (Hs)	Is scored when signs of hostility appear in the answer. Is scored on the degree of hostility projected on the blot. To each score correspond one of the new variables	0-3	Hostility Score 1 (Hs1)	Is scored for indirect and symbolic referent to hostility.	1
			Hostility Score 2 (Hs2)	Is scored for aggressive contents but with a low level of violence	1
			Hostility Score 3 (Hs3)	It is scored for a high level of hostility and violence directive projected on animals or humans saw it the middle of the action.	1
Barrier (Br)	Presence of contents that are refermented to the body boundaries	0-1			

Note. All new variables received a score of 0 when they are not scored.

available on the Virtual Psychology site: Rorschach Assistance Program (ver. 3). For the Rorschach Comprehensive System (RCS) indices, we decided to include only those measures of the Interpersonal Perception Area that have been considered valid by the Mihura et al. (2013) meta-analysis: GHR, Pure H, COP, DQ+, Zf, X-%, and PTI. As in Holtzman et al. (1961) and Dawe et al. (20121) studies, and following the suggestion of Kinder (1992), we decided to transform the RCS scores, except for X-%, in order to control for the effect of the Number of Responses (R), by dividing the RCS index for R and multiplying by 100. The new RCS indices are distinguished from the traditional ones by the symbol %. We decided to keep both versions of the RCS indices for a comparison.

Personality Assessment Inventory. The Personality Assessment Inventory (PAI; Morey, 2014; Zennaro, et al., 2017) is comprised of 364 items with answers given on a 4-point Likert scale (from “Not at all true” to “Very true”). Although the PAI yields 22 scales, we have considered only the four validity scales (Inconsistency, Infrequency, Positive Impression and Negative Impression) and the two interpersonal scales: Dominance (DOM), which assesses the degree to which a person exercises control and tends to be independent within interpersonal

relationships, and Warmth (WRM), which assesses the degree of interest in a supportive and empathic relationship. All participants were screened for an invalid PAI protocol using the four validity scales and then invalid cases were removed from the analysis. Twenty-seven protocols out of 139 were found to be invalid on at least one of the four validity scales and were thus eliminated from the analysis.

Procedure

The three instruments were administered to research participants by five psychologists who were trained in the administration and coding procedure by one of the authors. The training was divided into two parts: the training in the administration of all tests and the training about the coding of the HIT and Rorschach protocols. The first part consisted of two phases: first, participants were supervised during two administrations of all tests by the first author, second, they were supervised during three or four administrations of all tests (the first author assisting in all administrations). The five psychologists were in contact and in charge of finding the subjects. For this purpose,

they followed two criteria: each of them had to collect the same number of protocols from men and women (to avoid any bias due to a sample with unbalanced gender); all subjects had to be in the 18-60 year age group. Participants were not reimbursed for their participation. A number of protocols were coded by the first author and the data collector. After 90% agreement was reached on the totals of each scored variable, subsequent protocols were coded by the data collector only.

Data Analysis

To evaluate the extent to which HIT variables measured the domain of interpersonal relationships, Pearson correlations were carried out between the HIT and Rorschach and PAI variables, and the null hypotheses were tested with a two-tailed significance test for the six core variables and a two-tailed significance test for the new 13 HIT variables. Pearson correlations were interpreted according to Cohen's (1988) guidelines (i.e., a correlation coefficient of .10 is thought to represent a weak or small association; a correlation coefficient of .30 is considered a moderate correlation; and a correlation coefficient of .50 or larger is thought to represent a strong or large correlation).

Since the protocols were collected by five different psychologists, 80 random protocols were re-coded by the first author in order to compute inter-rater reliability. Coefficients are interpreted following Nunnally and Bernstein (1994) rules. Values above .90 are considered very high, between .90 and .80 high, between .80 and .70 moderate, between .70 and .60 low, and below .60 inadequate.

Results

Table 3 reports the inter-rater reliability coefficients for the six HIT original variables. All values fall above .90, showing very high reliability.

Tab. 3. Inter-rater reliability for the seven HIT variables

HIT variables	Inter-rater reliability
M	.933
H	.907
A	.987
Ax	.965
Hs	.985
Br	.950

All correlations between the six HIT variables, the three RCS indices, and the two PAI scales, along with their significance levels, are reported in Table 4. Results show that four core HIT variables and four new HIT variables showed significant correlations with Rorschach Comprehensive System indices. For the HIT variables' association with the PAI scales, only one low significant correlation was found.

Tab. 4. Correlations of HIT variables with 3 indices of the Rorschach Comprehensive System and the 2 interpersonal scales of the PAI

HIT	RCS			PAI	
	Cooperative Movement (COP%)	Good Human Representation (GHR%)	Whole Realistic Human (PureH%)	Dominance (DOM)	Warmth (WRM)
M	.147			.049	.034
M1	.093			.055	.193*
M2	.069			-.042	-.012
M3	.119			.063	.016
M4	.114			.060	.019
H	.215*	.182*	.287***	.001	.024
H1	-.015	.100	.167	.052	-.025
H2	.244**	.163	.254**	-.018	.037
A	-.022		.067		-.059
A1	.113		.002		.008
A2	-.094		.070		-.067
Ax	.219*	.092	.081	-.001	
Ax1	.041	.114	.010	-.038	
Ax2	.258**	.040	.096	.020	
Hs	.216*	.086		-.111	
Hs1	.134	.076		-.165	
Hs2	.163	.064		-.064	
Hs3	.259**	.041		.079	
Br	.205*		.136	-.078	

Note. *p < .05; **p < .01; ***p < .001.

Human Content (H) showed a significant positive correlation with Cooperative Movement (COP%), Whole Realistic Human (Pure H%) and Good Human Representation (GHR%) indices of the RCS. This relationship suggests that a higher number of responses including Human Content corresponds to an increase in those COP%, Pure H%, and GHR% Rorschach indices that assess the capacity for cooperative, well adapted, and effective interpersonal behavior, the degree of interest toward other people, and the ability to see the other in a well-organized and realistic manner.

Anxiety (Ax), Hostility (Hs), and Barrier (Br) showed a significant positive correlation with Cooperative Movement (COP%) index of the RCS. This association suggests that a higher scores on those three HIT variables corresponds to an increase in COP% Rorschach index that assess the tendency to perceive positive interpersonal interactions.

For the new HIT sub-variables, Human Score 2 (H2) was positively correlated with COP% and Pure H%. This means that a high number of H2 responses is associated with capacity

for cooperative attitude towards others (COP%) and having a more realistic and integrated perception of people (Pure H%).

Movement Score 1 (M1) showed a low positive correlation with the Warmth (WRM) scale of the PAI. This relationship suggests that a higher number of responses with low degree of movement involved corresponds to an increase in the PAI scale that assess the interest in supportive and empathic personal relationships.

Anxiety Score 2 (Ax2) and Hostility Score 3 (Hs3) showed a positive correlation with the Cooperative Movement (COP%) index of Rorschach. So, increases in Ax2 and Hs3 correspond to a high number of COP% responses, which means a good representation of human relationships and an interest to be involved with others.

Discussion and Conclusion

The results of the present study showed some low and moderate correlations between four core Holtzman Inkblot Technique (HIT) variables (Human Content, Anxiety, Hostility, and Barrier) and four new HIT variables (Movement Score 1, Human Content Score 2, Anxiety Score 2, and Hostility Score 3) with three Rorschach Comprehensive System (RCS) indices of Interpersonal Perception (Cooperative Movement, Whole Realistic Human, and Good Human Representation) and the Warmth Scale of the PAI. These findings provide some convergent validity for these HIT variables and open a new perspective. Not only do these results suggest the possibility of using HIT variables to assess different aspects of interpersonal relationships (which by itself is a novelty), but also they highlight the overlap between Human Content (H) in the HIT and Pure H% of Rorschach. Moreover, with this study we can see that some of the single sub-scores of HIT variables can be more informative than the total scores, and this can suggest new validity studies and the development of new and more complex HIT indices.

Our hypothesis regarding the HIT Movement (M) scale was not supported by the findings. This could be due to the nature of M. Indeed, this original HIT variable included all types of movement regardless the content. Instead, the RCS variable COP% included most of the time human movement. Probably better results could be obtained if the movement is differentiated according to its quality and content. It would be interesting, for further research, to study the case in which the quality of the movement is the same as in Cooperative Movement, through the creation of a new HIT variable. Unlike this original HIT variable, Movement Score 1 (M1) confirmed our hypothesis showing a positive correlation with the PAI scale Warmth, suggesting that this new HIT variable could be indicative of the degree of interest in supportive and empathetic personal relationships.

Concerning Human Content (H), the results confirmed our hypothesis regarding the positive correlation of H with Pure H%, in line with the Rorschach tradition, highlighting an overlap suggesting that this Rorschach variable and Human Content (H) could assess the same construct. As we expected, Human Content (H) showed a positive correlation

with Cooperative Movement (COP%) and Good Human Representation (GHR%). This HIT variable has been considered descriptive of participants that have the capacity for warm, empathetic relationships and are interested in and sensitive to the feelings of others (Darolia, 2016; Hill, 1971, 1972; Mueller & Abeles, 1964), and it correlates positively with the Extraversion (E), Agreeableness (A), and Consciousness (C) scales of the NEO-FFI (Kumar, 2018). Our findings seems to support this interpretation of Human Content.

Our hypothesis regarding Anxiety (Ax) and Hostility (Hs), not only was not confirmed, but also Ax and Hs were positively correlated with Cooperative Movement (COP%). These results could be understood if we consider that all three variables are based on movement, especially on the higher scores (Ax2 and Hs3), which might explain the association. This hypothesis seems to be confirmed by the correlations between Anxiety Score 2 (Ax2) and Hostility Score 3 (Hs3) with COP% and by the absence of significant correlations of Anxiety Score 1 (Ax1) and Hostility Score 1 (Hs1) with this RCS index. In all these cases movement plays a minor role in regards to Anxiety Score 2 (Ax2) and Hostility Score 3 (Hs3). Ax2 is scored when the sign of anxiety is direct and explicit (e.g., "a girl escaping"), and, except for symbolic contents, most times (but not always) it involves movement between two or more objects. Instead, Hs3 is scored when violent and destructive actions are described, and this always implies movement and the presence of two or more objects (e.g., "two humans fighting each other, there is blood everywhere").

Quite interesting is the association between Barrier (Br) and COP%, which confirmed our hypothesis that body-image boundary definiteness plays a role in the way we relate to others (Frede et al., 1968; Sanders, 1976). This result suggests that people with high scores on Br have the tendency to have a positive interest in relationships and are describes by others as sociable.

Concerning Animal Content (A), the results failed to support our hypotheses regarding this HIT variable.

In the present study, only one HIT variable correlated with the PAI scales. Before interpreting the absence of significant correlations with the PAI as a lack of convergent validity, we decided to compute correlations between the Rorschach indices and PAI scales. As can be seen in Table 5, no significant correlations were found. This result was not surprising for two reasons: first, the literature on the correlations between HIT and self-reports has yielded substantially negative results (Darolia, 2016; Gamble, 1972; Holtzman et al., 1961); second, in general, a trend has been reported by different studies of finding low or nonsignificant correlations between performance-based tests and self-report measures (Archer & Krishnamurthy, 1993a, 1993b; Bornstein, 2002; Morey & McCredie, 2019). Holtzman et al. (1961) suggested that inkblot scores measure the same constructs as self-reports but "at a fantasy level which is not necessarily related in any simple, direct way to overt behavior" (Holtzman et al., 1961, p. 181). This statement is further supported by the absence of significant correlations between the Rorschach indices and the PAI scales observed in the present study. Moreover, according to Bornstein (2002), not only a low correlation between self-reports and performance-based measures is to

be expected, but also this low agreement would be desirable because independent information obtained from different types of personality assessment can be integrated to provide comprehensive diagnostic information in a clinical context. However, it would be interesting to further study this problem. Toward this end, the absence of significant correlations cannot be attributed to administrator bias since we used five different psychologists.

Tab. 5. Correlations of Rorschach Comprehensive System indices with PAI scales

	DOM	WRM
COP%	.034	-.076
Pure H%	.042	-.005
GHR%	-.063	-.087

The results of the present study support the convergent validity of some core and new HIT sub-variables as a measure of the domain of interpersonal relationships as measured by the Rorschach. However, as can be noted by the results displayed in Table 6, this conclusion must be qualified because the HIT did not show discriminant validity due to low but significant correlations between the HIT core and new variables with the four RCS scores of cognitive functions. Although this was expected for Movement (M), it was surprising for the other HIT variables. These results shed light on the complex nature of performance-based measures, where the interpretation of a variable is influenced by the context of all other scores (Exner, 2003, 2013). For example, if it is true that H-HIT, as PureH, represents the ability to perceive the other in a wholistic and realistic manner, it is possible that some capacity to synthesize concepts (DQ+) and the ability to sustain cognitive effort (Zf) are needed.

Tab. 6. Correlations of HIT variables with four cognitive indices of the Rorschach Comprehensive System

HIT	RCS			
	DQ+%	Zf%	X-%	PTI%
M	.374***	.288***	-.132	-.174*
M1	.271**	.206*	.072	.087
M2	.389***	.334***	.015	-.047
M3	.203*	.161	-.173*	-.222*
M4	.237*	.098	-.093	-.005
H	.257**	.202*	.008	.017
H1	.176*	.040	.035	-.006
H2	.221*	.221*	-.003	.021
A	.145	.079	-.170*	-.221*
A1	-.001	.014	.061	.035

HIT	RCS			
	DQ+%	Zf%	X-%	PTI%
A2	.156	.077	-.218*	-.256**
Ax	.174*	.252**	.001	-.010
Ax1	.181*	.190*	-.270**	-.311***
Ax2	.094	.187*	.185*	.202*
Hs	.207*	.205*	-.011	-.051
Hs1	.195*	.142	-.082	-.098
Hs2	.146	.168	-.015	-.041
Hs3	.091	.167	.215*	.131
Br	.190*	.112	-.102	-.150

Note. *p < .05; **p < .01; ***p < .001.

Negative results were obtained regarding the convergent validity of the HIT variables with the interpersonal scales of the PAI. Previous correlational studies with self-report measures have had similar findings or, at best, have yielded only weak correlations (Cook et al., 1973; Fehr, 1976; Holtzman, 1961; Kumar, 2018; Megargee & Swartz, 1968; Zuckerman et al., 1967). Concerning the PAI, this trend was thus expected and was confirmed in our study. But, it is worth noting that when the HIT was related to another performance-based instrument (the Rorschach) significant correlations emerged. It would be interesting in the future to develop new studies that use performance-based techniques to assess the validity of HIT variables.

Several limitations of this study must be acknowledged: 1) the sample size was small, so some relationships could not emerge due to low power; 2) the effect of having five different psychologists collecting the protocols and coding them, even if they were trained by a single psychologist with repeated collective training sessions, may have introduced unreliability into our study; 3) the absence of a behavioral measure of interpersonal relationships calls for caution in the interpretation of the results; 4) the lack of inter-rater reliability for the RCS variables could have introduced some unreliability in the study which could have led to a lack of significant results.

The HIT was created as a substitute for the Rorschach when the latter was in crisis. After the success of the Comprehensive System, the HIT can no longer be thought of as an alternative to the RCS, but instead as a technique that finds a place in all those settings where a performance-based measure is needed that is easy to learn how to administer, thanks to standardized procedures, and score and can be group administered. So, notwithstanding our study's limitations, it is the first to investigate the relationships between the HIT core variables and the Rorschach Comprehensive System indices. Also, besides Leichsenring (1990; 1991; 1999), no previous research has used the single scores of the HIT variables to create new ones. This should encourage new research on the development of new scoring methods for the HIT.

Author Contributions

The authors contributed equally to this manuscript.

Compliance with Ethical Standards

Conflict of interest

The authors declare that they have no competing interests.

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Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

References

- Abbate, L., & Percelli, P. (2017). *Rorschach Comprehensive System. Manuale di siglatura e interpretazione*. Raffaello Cortina Editore.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.
- Archer, R. P., & Krishnamurthy, R. (1993). Combining the Rorschach and the MMPI in the assessment of adolescents. *Journal of Personality Assessment*, *60*, 132–140. Doi: 10.1207/s15327752jpa6001_10
- Ben-Porath, Y. S. (2012). *Interpreting the MMPI-2-RF*. Minneapolis: University of Minnesota Press.
- Bornstein, R. F. (2002). A process dissociation approach to objective-projective test score interrelationships. *Journal of Personality Assessment*, *78*(1), 47–68. Doi: 10.1207/S15327752JPA7801_04
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Mahwah, NJ: Erlbaum.
- Cole, J. D., Machir, D., Altman, I., Haythorn, W. W., & Wagner, C. M. (1967). Perceptual changes in social isolation and confinement. *Journal of Clinical Psychology*, *23*(3), 330–333.
- Cook, P. E., Iacino, L. W., Murray, J., & Auerbach, S. M. (1973). Holtzman Inkblot anxiety and shading scores related to state and trait anxiety. *Journal of Personality Assessment*, *37*(4), 337–339. Doi: 10.1080/00223891.1973.10119881
- Dana, R. (1973). Psychologized inkblots. *Contemporary Psychology*, *18*(7), 346.
- Darolia, C. R. (2016). *Holtzman Inkblot Technique and personality assessment*. In U. Kumar (Ed.), *The Wiley handbook of personality assessment* (p. 268–284). Wiley Blackwell. Doi: 10.1002/9781119173489.ch20
- Dawe, J., Hawkins, R. C. II., Lauriola, M., Leichsenring, F., Pezutti, L. (2021). The validity of the Holtzman Inkblot Technique: New indices. *Frontiers in Psychology*, *12*. Doi: 10.3389/fpsyg.2021.621669
- Exner, J.E. (2003). *The Rorschach: A comprehensive system. Vol. 1, 4th Edition, Basic Foundations*. Wiley.
- Exner Jr, J. E. (2013). *Issues and methods in Rorschach research*. Routledge.
- Fehr, L. A. (1976). Construct validity of the Holtzman Inkblot anxiety and hostility scores. *Journal of Personality Assessment*, *40*(5), 483–486. Doi: 10.1207/s15327752jpa4005_6
- Fernald, P. S., & Linden, J. D. (1966). The human content response in the Holtzman Inkblot Technique. *Journal of Projective Techniques and Personality Assessment*, *30*, 441–446.
- Frede, M. C., Gautney, D. B., & Baxter, J. C. (1968). Relationships between body image boundary and interaction patterns on the MAPS test. *Journal of Consulting and Clinical Psychology*, *32*(5, Pt.1), 575–578. Doi: 10.1037/h0026398
- Fischer G. H., Spada H. F. (1973) *Die psychometrischen Grundlagen des Rorschachtests und der Holtzman Inkblot Technique*. Hans Huber.
- Gamble, K. R. (1972). The Holtzman Inkblot Technique: A review. *Psychological Bulletin*. *77*(3), 172–194. Doi:10.1037/h0032332
- Hill, D. O. (1971). *Extraversion-introversion: An investigation of typological theory* (Doctoral dissertation). <https://ttuir.tdl.org/bitstream/handle/2346/9959/31295001148062.pdf?sequence=1>
- Hill, E. F. (1972). *The Holtzman Inkblot Technique: A handbook for clinical application*. Jossey-Bass Inc Pub.
- Holtzman, W. H., Thorpe, J. S., Swartz, J. D., & Herron, E. W. (1961). *Inkblot perception and personality*. University of Texas Press.
- Horowitz, L. M., Rosenberg, S. E., Baer, B. A., Ureño, G., & Villaseñor, V. S. (1988). Inventory of interpersonal problems: Psychometric properties and clinical applications. *Journal of Consulting and Clinical Psychology*, *56*(6), 885–892. Doi: org/10.1037/0022-006X.56.6.885
- Kumar, P. (2018). On the relationship between Holtzman Inkblot variables and Big Five Personality Factors. *Indian Journal of Health and Wellbeing*, *9*(2), 324–328.
- Lefcourt, H. M., Telegdi, M. S., Willows, D., Buckspan, B. (1972). Eye contact and the human movement inkblot response. *Journal of Social Psychology*. *88*(2), 303–304. Doi: 10.1080/00224545.1972.9918690
- Leichsenring, F. (1990). Discriminating borderline from neurotic patients. *Psychopathology*, *23*(1), 21–26. Doi: 10.1159/000284633
- Leichsenring, F. (1991). Discriminating schizophrenics from borderline patients: Study with the Holtzman Inkblot Technique. *Psychopathology*, *24*(4), 225–231. Doi: 10.1159/000284718
- Leichsenring, F. (1999). Verinnerlichte Objektbeziehungen bei Schizophrenen [Internalized object relations in schizophrenics]. *Psychotherapie Psychosomatik Medizinische Psychologie*. *49*(7), 241–248.
- Lingiardi, V., & McWilliams, N. (Eds.). (2017). *Psychodynamic diagnostic manual: PDM-2* (2nd ed.). Guilford Press.
- Megargee, E. I., & Swartz, J. D. (1968). Extraversion, neuroticism, and scores on the Holtzman Inkblot Technique. *Journal of Projective Techniques and Personality Assessment*, *32*(3), 262–265. Doi: 10.1080/0091651X.1968.10120481.

- Megargee, E. I., & Velez-Diaz, A. (1971). A profile sheet for the clinical interpretation of the Holtzman Inkblot Technique. *Journal of Personality Assessment*, 35(6), 545-560. DOI: 10.1080/00223891.1971.10119712
- Mihura, J. L., Meyer, G. J., Dumitrascu, N., & Bombel, G. (2013). The validity of individual Rorschach variables: Systematic reviews and meta-analyses of the comprehensive system. *Psychological Bulletin*, 139, 548-605. Doi: 10.1037/a0029406
- Moerk, E. L. (1972). Effects of personality structure on individual activities in a group and on group processes. *Human Relations*, 25(6), 505-513. Doi: 10.1177/001872677202500603
- Moran, J. D., Sawyers, J. K., Fu, V. R., & Milgram, R. M. (1984). Predicting imaginative play in preschool children. *Gifted Child Quarterly*, 28(2), 92-94. Doi: 10.1177/001698628402800209
- Morey, L. C. (2007). *Personality Assessment Inventory professional manual* (2nd ed.). Psychological Assessment Resources.
- Morey, L. C., & McCredie, M. N. (2019). Convergence between Rorschach and self-report: A new look at some old questions. *Journal of Clinical Psychology*, 75(1), 202-220. Doi: 10.1002/jclp.22701
- Mueller, W. J., & Abeles, N. (1964). Components of empathy and their relationship to the projection of human movement responses. *Journal of Projective Techniques & Personality Assessment*, 28(3), 322-330.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill
- Porcelli, P., & Kleiger, J. H. (2016). The "Feeling of Movement": Notes on the Rorschach human movement Response. *Journal of Personality Assessment*, 98(2), 124-134. Doi: org/10.1080/00223891.2015.1102146
- Richter, R. H., & Winter, W. D. (1966). Holtzman Inkblot correlates of creative potential. *Journal of Projective Techniques and Personality Assessment*, 30(1), 62-67. Doi: 10.1080/0091651X.1966.10120266
- Rosenstiel, L. V. (1973). Increase of hostility responses in the HIT after frustration. *Journal of Personality Assessment*, 37(1), 22-24.
- Sanders, J. L. (1976). Aggression and autonomy as correlates of the space response on Holtzman Inkblot Technique. *Perceptual and Motor Skills*, 42(3), 1049-1050. Doi: org/10.2466/pms.1976.42.3c.1049
- Swartz, J. D., Tapia, L., & Thorpe, J. S. (1967). Perceptual development of Mexican school children as measured by responses to The Holtzman Inkblot Technique. *Revista Interamericana De Psicología*, 1(4), 289-295. Doi: 10.30849/rip/ijp.v1i4.456
- Taylor, D. A., Altman, I., Wheeler, L., & Kushner, E. N. (1969). Personality factors related to response to social isolation and confinement. *Journal of Consulting and Clinical Psychology*, 33(4), 411-419. Doi.org/10.1037/h0027805
- Thorpe, J. S., & Swartz, J. D. (1965). Level of perceptual development as reflected in responses to the Holtzman Inkblot Technique. *Journal of Projective Techniques and Personality Assessment*, 29(3), 380-386. Doi: 10.1080/0091651X.1965.10120224
- Thorpe, J. S., & Swartz, J. D. (1966). Perceptual organization: a developmental analysis by means of the Holtzman Inkblot Technique. *Journal of Projective Techniques and Personality Assessment*, 30(5), 447-451.
- Westen, D. (1991). Clinical assessment of object relations using the TAT. *Journal of Personality Assessment*, 56(1), 56-74.
- Zennaro, A., Di Nuovo, S., Fulcheri, M., Lis, A., & Mazzeschi, C. (2017). *Personality Assessment Inventory*. Hogrefe.
- Zubin, J. (1972). Discussion of symposium on newer approaches to personality assessment. *Journal of Personality Assessment*, 36(5), 427-434.
- Zuckerman, M., Persky, H., Eckman, K. M., & Hopkins, T. R. (1967). A multitrait multimethod measurement approach to the traits (or states) of anxiety, depression, and hostility. *Journal of Projective Techniques and Personality Assessment*, 31(2), 39-48. Doi: 10.1080/0091651X.1967.1012035