SAPIENZA
UNIVERSITÀ EDITRICE

Psychology Hub (2021)
XXXVIII, 3, 61-70

The Holtzman Inkblot Technique: proposal for a new brief version

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Article info

Submitted: 03 July 2021
Accepted: 29 November 2021
DOI: 10.131332724-294317502

Abstract

The present study focuses on the selection process of the inkblots for a new brief version of the Holtzman Inkblot Technique capable to overcome two criticisms that were addressed to the test: the excessive time of the administration (and scoring) and the limitation of one response to each inkblot. The selection of the blots from Form A was based on empirical data and the literature from both HIT and Rorschach. The work focused on the distal features of the blots and their contribution to diagnosis. Four criteria were selected for the evaluation of each inkblot: their symmetry/asymmetry quality, their frequency of Popular (P) responses, their structural ambiguity, and their ability to discriminate non-clinical subjects from clinical patients. A total of 13 inkblots were selected to which future psychologists/researchers can ask for two responses each. The implication of this new brief version of the test for both clinicians and researchers and suggestions for futures research are discussed.

Keywords: Holtzman Inkblot Technique; new brief version; Rorschach; performance-based technique.

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Introduction

The Holtzman Inkblot Technique (Holtzman et al., 1961) was created in 1961 in response to the many criticisms that were addressed to the Rorschach method during the '40s and the '50s of the last century, mainly directed to its poor psychometric basis (Cronbach, 1949; Hertz, 1959; Zubin, 1954). In the past few years, most of these criticisms were overcome, mostly thanks to the work of John Exner in his creation of the Rorschach Comprehensive System (RCS, Exner, 2002). However, there is one point that is still controversial: the response frequency (R). This controversy was well-reviewed by Kinder (1992), who pointed out that when the Rorschach is used as a clinical tool, R is a useful variable for the interpretation of the individual record. Nevertheless, when the Rorschach is used as a research tool, things become more complicated because differences in R have an impact on the statistical analysis and on the possibility to compare subjects to each other. Another problem related to the total number of responses (productivity) is its impact on RCS scores and their validity (Lilienfeld et al., 2000). For example, clients with longer protocols have more chances to receive higher scores on Rorschach indices of psychopathology (Sultan & Meyer, 2009). Moreover, productivity has an impact on score stability as demonstrated by Exner (1988) and by Sultan and Meyer (2009). All these issues seem to be overcome by the new administration method of the Rorschach Performance Assessment System (R-PAS, Meyer et al., 2011). The new R-optimized administration has demonstrated, in comparison with the previous CS, two main consequences with respect to productivity. First, the number of brief protocols (R<14) and excessively long protocols (R>28) has decreased, with most records falling between 17 and 26 responses, which represents the optimal range for a valid and reliable interpretation. Second, the new R-PAS procedure decreases the variability of R (Hosseininasab et al., 2019; Meyer et al., 2011; Reese et al., 2014) and consequently also its negative impact on other scores (Hosseininasab et al., 2019).

In this scenario, a valid alternative to the problem of R may be represented by the HIT. The authors of the HIT intended to create a projective technique with a good psychometric basis and suitable for research use. For these purposes, they created a new set of 45 inkblots (symmetrical and asymmetrical) with the limitation of one answer for each stimulus inkblot. This solution made the technique more suitable for statistical analysis (Darolia, 2016; Dawe et al., 2021; Gamble, 1972; Kobler & Doiron, 1968; Rosegrant, 1982); however, it opened up new problems and criticisms, which may explain why their effort was largely ignored by clinicians despite its good empirical evidence (Lilienfeld et al., 2000) and may explain why this technique had good success with researchers but not with the clinicians.

The first criticism concerns the excessive time for the administration of the test. Many researchers complain that despite its good reliability and validity, the excessive time of administration makes the test less suitable for the clinical practice, especially with some samples like elders and inpatients (Fehr, 1976; Hanssen, 1967; Iacino & Cook, 1974; Kobler & Doiron, 1968; Panek et al., 1983; Zuckerman et al., 1967). Due to this issue, researchers often utilized one of the standardized brief versions of the test or a brief version created on their own (Rosegrant, 1982; Vikki, 1987). The first brief version of the test was proposed by Herron in 1963, with the goal to make the group administration of it more suitable for the duration of a class lesson (about 50 minutes). He reduced the number of inkblots from 45 to the first 30. This version showed statistics similar to the standard version, with the brief version showing means, standard deviations, and reliability coefficients slightly below the standard HIT. For this reason, Herron recommended caution when the 30 version is used. A second study further investigates the 30-inkblot version of the HIT. Darolia and Joshi (2004), on a sample of 231 subjects, obtained good test-retest and split-half reliability coefficients, and a factor structure similar to the original of Holtzman et al. (1961). This solution solves the first criticism to the HIT but not to the one that follows.

A second criticism of the HIT concerns the limit of one answer for each inkblot, denying the possibility to offer two or more answers to the same inkblot and bringing a loss of information (Dana, 1973; Hayslip & Darbes, 1974; Holtzman, 1988). This limitation may also penalize subjects who tend to give whole responses based on solely the form as the first reaction, denying the possibility to react to other features of the blot, which also may be present (Neiger & Quirk, 1965). Holtzman and his colleagues were well aware of this risk; this is the reason why they chose to select the 45 inkblots with the most "pulling power" for specific features of the blot. However, some years later, Hayslip and Darbes (1974) studied the quality of additional responses to HIT inkblots. They administered the test to 50 college students asking for 5 answers for each inkblot. The results supported the hypothesis that only one answer for each inkblot is misleading and more responses may be needed in order to obtain a more accurate, reliable, and representative picture of the subjects' percepts. The results also showed that the usefulness of each new answer decreases after the second or third response. In order to overcome this issue, Holtzman (1988) presented a new brief version of the test (the first 25 inkblots) asking for two responses per blot. The results showed that this version of the HIT has a good capacity to discriminate non-clinical subjects from schizophrenic subjects and the first and the second answer can be treated as independent, justifying their usage for computing the total scores for HIT variables as if it were a 50-response test. However, this solution increases, even more, the time of administration.

Recently a new brief version of the test was proposed. The work of Hawkins et al. (2019) focused on the ability of a six-inkblot version of the test with three parallel forms (Form M, Form K, and Form L) and two responses to each inkblot. Form M is composed of six new inkblots created by Holtzman after the publication of the HIT, while Form K and Form L are composed of inkblots from the original Form A and B. Their goal was to create a test that could predict psychotherapy outcome. Preliminary results are encouraging.

In the past years, all efforts were focused on solving the first or the second issue, but not at the same time (except for the Hawkins et al., 2019, brief version). Moreover, all brief versions of the test (both canonical and not) are based on the statement contained in the HIT manual (Holtzman et al., 1961) that the first 25 inkblots were the best in terms of contribution to

the reliability of the variables and the ability to discriminate non-clinical subjects from clinical subjects. What they did not consider are the physical characteristics of the blots. Unlike Rorschach, who personally created each of the 10 inkblots in order to have specific characteristics (in terms of form, colors, and composition) (Abbate & Porcelli, 2017), HIT stimuli are truly casual inkblots, which were, after that thousands of them were created, selected trough empirical process rather than on a priori theory. Therefore, if the characteristics of the blots were considered, would the first 25 cards still be the best? Moreover, how can the quality of physical characteristics of the blot be evaluated, and what is their impact on personality assessment?

One way to study the physical features of a blot is to use the concepts of structural ambiguity, which concerns the physical characteristics of a blot, and interpretative ambiguity, which represents the variability in the interpretation of a blot. In the past years, several studies have considered the physical characteristics of HIT blots and the possible implications. Derogatis et al. (1968) were the first to study the relationship between structural ambiguity and interpretative ambiguity of HIT stimuli. Structural ambiguity was studied by asking the participants in the different samples to rate each inkblot on a 5-point scale, from "very low ambiguity" to "very high ambiguity". Participants based their evaluations on how easily they could form a percept. Two main results emerged from this study: first, structural ambiguity is a culture free concept while interpretative ambiguity is not; second, these two concepts are, in the HIT, inversely related, which means that a low degree of structural ambiguity leads to a high degree of interpretative ambiguity. In other words, people need a certain degree of structure to see something. In a confrontation between Rorschach inkblots and HIT stimuli, Leichsenring and Hager (1992) found that HIT blots are more ambiguous than Rorschach's; therefore, following Derogatis et al.'s (1968) results, it is easier to see something in Rorschach cards than in HITs. However, this would be of less importance if it had not an impact on personality assessment. But this is not the case. First, with the increase of structural ambiguity the tendency to avoid or reduce the ambiguity increases, and this is true for non-clinical subjects, patients with neurotic disorders, borderline patients, and acute schizophrenics, but not for chronic schizophrenics (Leichsenring & Meyer, 1994). Second, high structural ambiguity cards elicit fewer emotions in non-clinical subjects, patients with neurotic disorders, and borderline patients (Leichsenring, 2004). Third, low structural ambiguity blots seem to be more diagnostically productive (Leichsenring, 2004). Past research seems to question the assumption that the first 25 HIT cards are the "best".

The present study represents an attempt to overcome the two criticisms addressed to the HIT by creating a new brief version, by selecting the blots based on empirical data and on the literature on both HIT and Rorschach. The work focused on the distal features of the blots and their contribution to diagnosis. Four criteria were selected for the evaluation of each inkblot: their symmetry/asymmetry quality, their frequency of Popular (P) responses, their structural ambiguity, and their ability to discriminate non-clinical from clinical subjects. The first three criteria aimed to select those inkblots with a relatively simple and definite form, and adequate composition. In this way, the final brief form should contain the most suggestive inkblots. For this purpose, the application of the first criterion consists of the elimination of all asymmetrical inkblots. As Rorschach stated:

"From the method of preparation, it will be apparent that the figures will be symmetrical, with very little difference between the two halves. Asymmetrical figures are rejected by many subjects; symmetry supplies part of the necessary artistic composition. It has a disadvantage in that it tends to make the answers somewhat stereotyped. On the other hand, symmetry makes conditions the same for right- and left-handed subjects; furthermore, it facilitates interpretation in certain inhibited and blocked subjects. Finally, symmetry makes possible the interpretation of whole" (Rorschach, 1942, p. 15).

The second and third criteria help to identify those inkblots which are sufficiently structured to make it easier to give a response. Moreover, selecting the inkblots with the highest percentage of Popular (P) responses allows one to establish an idea of normality for the test respondent.

The fourth criterion helps to identify which inkblot is more useful for diagnosis purposes. To assess this aspect, one must take into account how many of the 22 HIT variables for each inkblot discriminate a sample of non-clinical subjects from a sample of patients with schizophrenia. In the end, after eliminating asymmetrical blots and those with 0% Popular (P) responses, three classifications are obtained: the first displays the blots from the most popular to the less popular; the second presents the blots from those with less structural ambiguity to those with the most structural ambiguity; the third shows the blots from those with the most capacity to discriminate between the two samples to those that have the least capability to discriminate. Blots ranked higher in at least two of these three classifications were included in the final form. However, how many blots should be considered "in the higher ranked position"? How many cards should be included in the final version? No indication can be found in the literature on the HIT. All we know is that two responses per blot should be enough (Hayslip & Darbes 1974; Holtzman, 1988). Thus, the answer to these questions has to be searched in the Rorschach literature. In the Rorschach manuals it is reported that the optimal range for a valid and reliable interpretation is between 17 and 26 responses (Abbate & Porcelli, 2017; Exner, 2002; Meyer et al., 2011). In order to obtain the same number of responses with the new brief version of the HIT with two answers for each inkblot, 13 inkblots should be used. This means that the cards in the top 13 in at least two classifications should be included. In case there are more than 13 cards, priority should be given to the frequency of popular responses.

Finally, for descriptive purposes, four independent judges classified the 45 inkblots according to their chromatic characteristics into three groups: monochromatic, bi-chromatic, and multicolored. This information, although not used for the selection of the stimuli, will give us useful indications for choosing the order of administration, following the example of Rorschach (1942), for example, starting with a black and white inkblot and then moving on to a black and white blot with red, or ending with an all-colored blot. Two of four judges were the first and third author. The first author is a 30-year-old psychology with 6 years of experiences in research with the

HIT and 4 with the Rorschach Comprehensive System. The third author is a 59-year-old female psychotherapist, researcher, and professor, with more than 30 years of experiences with psychological tests. The other two judges were respectively: a 66-year-old male psychotherapist, researcher, and professor with over 30 years of experiences in the field of the personality assessment with the Rorschach Comprehensive System, and a 27-year-old female psychologist with tree years of experiences with HIT (she was trained and supervised by the first author in the assessment of personality with the HIT).

Method

Participants

This research was conducted on different samples.
1. The total sample (excluding clinical subjects), which comprised 1796 subjects (882 males and 914 females) that was used to calculate Popular (P) response frequency, had an age range of 18 to 60 years, with a mean of 29.02 and a standard deviation of 8.81. The level of education varied from primary school (5 years) to university degree (18 years), with a mean of 12.92 years of education and a standard deviation of 2.79 years. See table 1 for the distribution of the subject for each Italian region.

Tab. 1. Frequency of the sample for each Italian region

	N	F%
Abruzzo	95	6
Apulia	210	13.2
Basilicata	27	1.7
Calabria	133	8.3
Campania	110	6.9
Emilia-Romagna	5	.3
Lazio	940	58.9
Liguria	2	.1
Lombardy	11	.7
Marche	2	.1
Molise	5	.3
Piedmont	3	.2
Sardinia	13	.8
Sicily	21	1.3
Tuscany	7	.4
Umbria	10	.6
Veneto	2	.1
Total	1596	100

2. In addition, to investigate the ability of the HIT variables to differentiate between non-clinical and clinical subjects for each inkblot, a sample of 32 schizophrenics (22 males and 10 females) from different Italian regions was used, with an age range of 22 to 46 years, with a mean of 32.91 years and a standard deviation 5.73 years. In contrast, educational attainment for this clinical sample ranged from a low of 8 years (middle school) to a high of 18 years (university degree) with a mean of 10.50 years and standard deviation of 2.84 years.
3. For comparison, a sample of equal size was derived from the total sample of 1796 subjects having the same demographic characteristics as the clinical sample, thus matched for age, gender, and level of education.

All students were recruited from classes and participated voluntarily. All non-university subjects were recruited among the acquaintances of test administrators and by word of mouth; they also in this case participated voluntarily. The study was approved by the university institutional review board (prot. n. 0000062) and each subject sign up for the informer consent form.

Instrument

The 45 inkblots, plus two example blots, from Form A of the Holtzman Inkblot Technique (HIT; Holtzman et al., 1961) were individually administered following the guidelines in the manual (Holtzman et al., 1961). These guidelines call for only one response per blot, followed by a brief standardized inquiry each time. Each response was coded according to the 22 traditional variables, which were developed by Holtzman from the most widely used Rorschach codes of the time. But unlike the latter, the HIT variables involve a series of scores, which are summed for each variable independently across all 45 blots.

Data analysis

The symmetry/asymmetry quality of the inkblots was studied by computing the percentage of agreement among four independent judges. Any disagreements between judges were discussed until a unanimous decision was reached. The structural ambiguity of the inkblots was computed by averaging the ratings given by the six samples used in the Derogatis et al. (1968) research. The frequency of Popular (P) responses for each inkblot was calculated by computing the percentage of responses which were scored as the HIT variable Popular (P). Inkblots found to be asymmetrical were then eliminated and the remainder were placed in order of frequency of Popular (P) responses.

In order to study the ability of the 22 HIT variables to differentiate between a clinical sample and a group of subjects belonging to the general population, the samples were paired for the variables age, gender, and education, and Analyses of Variance (ANOVA) were conducted for each inkblot.

Results

Table 2 shows the ratings of the four independent judges regarding the symmetry (S) or asymmetry (AS) of each inkblot

on the vertical axis. In addition, the percentages of agreement and the final ranking are reported after any disagreements between the judges were resolved. As can be seen, only inkblots 8 and 20 showed a 75% agreement rate, with only one of the judges classifying these blots differently. For the remaining inkblots, the agreement was 100%. In the last column is the final classification of the blots.

Table 3 shows the inkblots with the corresponding percentage of Popular (P) responses calculated from a sample of 1796 subjects, the final classification into symmetric or asymmetric inkblots, the number of variables that showed an ability to differentiate between a group of non-clinical subjects and a sample of schizophrenics, the average structural ambiguity ratings from Derogatis et al. (1968) research, and finally, the chromatic characteristics.

As can be seen, 35 inkblots were rated symmetrical and 10 asymmetrical. Concerning the frequency of Popular (P) responses, 20 inkblots had a frequency of 0% since there was no Popular (P) response for these. As for the remaining inkblots, their frequency of Popular (P) responses ranged from 71.6% (inkblot 19) to 5.1% (inkblot 28). Concerning the Structural Ambiguity, the average ratings ranged from a minimum of

Tab. 2. Ratings of Four independent judges on the symmetrical/asymmetrical features of the inkblots, percentage of agreement and final classification

	1st judge		2nd judge		3rd judge		4th judge		% agreement between 4 judges	Final classification
Inkblot	S	AS	S	AS	S	AS	S	AS		
1	X		X		X		X		100	S
2	X		X		X		X		100	S
3	X		X		X		X		100	S
4	X		X		X		X		100	S
5		X		X		X		X	100	AS
6	X		X		X		X		100	S
7	X		X		X		X		100	S
8	X			X		X		X	75	AS
9	X		X		X		X		100	S
10		X		X		X		X	100	AS
11	X		X		X		X		100	S
12	X		X		X		X		100	S
13		X		X		X		X	100	AS
14	X		X		X		X		100	S
15	X		X		X		X		100	S
16	X		X		X		X		100	S
17	X		X		X		X		100	S
18	X		X		X		X		100	S
19	X		X		X		X		100	S
20	X			X		X		X	75	AS
21	X		X		X		X		100	S
22	X		X		X		X		100	S
23	X		X		X		X		100	S
24		X		X		X		X	100	AS
25	X		X		X		X		100	S
26	X		X		X		X		100	S
27	X		X		X		X		100	S
28		X		X		X		X	100	AS
29	X		X		X		X		100	S
30		X		X		X		X	100	AS
31	X		X		X		X		100	S
32	X		X		X		X		100	S
33		X		X		X		X	100	AS
34	X		X		X		X		100	S
35	X		X		X		X		100	S
36	X		X		X		X		100	S
37	X		X		X		X		100	S
38	X		X		X		X		100	S
39	X		X		X		X		100	S
40	X		X		X		X		100	S
41	X		X		X		X		100	S
42	X		X		X		X		100	S
43		X		X		X		X	100	AS
44	X		X		X		X		100	S
45	X		X		X		X		100	S

Note. S = Symmetrical; AS = Asymmetrical.

Tab. 3. Inkblot features

Inkblot	Symmetry/ asymmetry	P%	Structural Ambiguity*	Clinical	Chromatic characteristics
1	S	23.1	2.29	7	MO
2	S	60	1.375	4	MO
3	S	0	3.5	4	BI
4	S	34.1	1.74	3	MU
5	AS	28	4.49	7	MO
6	S	0	3.465	2	BI
7	S	0	2.84	5	BI
8	AS	0	3	2	MU
9	S	0	3.29	6	BI
10	AS	29.3	3.315	5	BI
11	S	17.2	2.875	3	BI
12	S	53.7	1.515	7	MU
13	AS	20.8	4.59	6	MU
14	S	30	3.25	2	BI
15	S	0	3.1	2	MU
16	S	0	3.465	6	MU
17	S	11.6	3.125	6	MU
18	S	0	3.365	4	MO
19	S	71.6	1.325	4	BI
20	AS	0	3.475	9	BI
21	S	44.6	2.69	7	BI
22	S	0	3.065	3	MO
23	S	0	3.715	4	BI
24	AS	24.3	4.39	4	MO
25	S	49.4	1.25	9	MU
26	S	0	3.665	3	BI
27	S	40	2.29	7	MU
28	AS	5.1	4.115	7	MU
29	S	0	3.6	4	MO
30	AS	34.3	3.54	4	BI
31	S	0	3.49	7	BI
32	S	0	3.45	6	MO
33	AS	23.3	3.625	3	MU
34	S	68.7	1.775	6	BI
35	S	0	3.765	6	BI
36	S	0	3.125	4	MO
37	S	0	3.315	4	BI
38	S	0	3.865	2	MO
39	S	0	2.84	5	BI
40	S	21.7	3.2	6	MO
41	S	16.9	2.24	9	BI
42	S	45.6	2.875	4	MU
43	AS	28.3	3.825	4	MO
44	S	45.4	3.44	5	MU
45	S	48.1	2.69	3	BI

Note. * Average structural ambiguity ratings from Derogatis et al. (1968) research. S = symmetrical inkblot; AS = asymmetrical inkblot; MO = monocromatic inkblot; BI = bi-cromatic inkblot; MU = multi-cromatic inkblot.

1.25 for inkblot 25 to a maximum of 4.59 for inkblot 13. The number of variables for each inkblot that showed statistically significant differences in their means between the two groups (32 non-clinical subjects and 32 schizophrenics) being compared ranged from a maximum of 9 for inkblots 20, 25, and 41, to a minimum of 2 for inkblots 6, 8, 14, 15, and 38. Finally, 12 inkblots were evaluated as monochromatic, 20 bi-chromatic, and 13 multicolor.

Applying the first selection criterion, the asymmetrical inkblots, i.e., 5, 8, 10, 13, 20, 24, 28, 30, 33, and 43, were excluded from the subsequent selection stages. In addition, the inkblots with 0% of Popular (P) responses were excluded. After this first step, only 17 inkblots remained for the final selection.

Table 4 shows the three rankings in which the inkblots are first put in order of percentage of Popular (P) responses, then in order of Structural Ambiguity mean rating, and, finally, in order of the number of variables that showed the ability to differentiate a group of non-clinical subjects from a clinical sample. For example, inkblot number 19 was first with 71.6% of Popular (P) responses in the first ranking, was second, with

Tab. 4. Inkblots ranked for the percentage of Popular (P), Structural Ambiguity, and for the number of HIT variables that differentiated a sample of non-clinical subjects from schizophrenics

Rank	Inkblot	P%	Inkblot	Structural Ambiguity*	Inkblot	Number of HIT clinical discriminant variables	Rank
1	19	71.6	25	1.25	25	9	1
2	34	68.7	19	1.325	41	9	2
3	2	60.0	2	1.375	12	7	3
4	12	53.7	12	1.515	27	7	4
5	25	49.4	4	1.74	1	7	5
6	45	48.1	34	1.775	21	7	6
7	42	45.6	41	2.24	34	6	7
8	44	45.4	27	2.29	17	6	8
9	21	44.6	1	2.29	40	6	9
10	27	40.0	45	2.69	44	5	10
11	4	34.1	21	2.69	19	4	11
12	14	30.0	42	2.875	2	4	12
13	1	23.1	11	2.875	42	4	13
14	40	21.7	17	3.125	4	3	14
15	11	17.2	40	3.2	45	3	15
16	41	16.9	14	3.25	11	3	16
17	17	11.6	44	3.44	14	2	17

Note. * Average structural ambiguity ratings from Derogatis et al. (1968) research.

Tab. 5. Features of the 13 inkblots included in the final form

Inkblot	P%	Structural Ambiguity*	Clinical	Chromatic features
1	23.1	2.29	7	MO
2	60	1.375	4	MO
4	34.1	1.74	3	MU
12	53.7	1.515	7	MU
19	71.6	1.325	4	BI
21	44.6	2.69	7	BI
25	49.4	1.25	9	MU
27	40	2.29	7	MU
34	68.7	1.775	6	BI
41	16.9	2.24	9	BI
42	45.6	2.875	4	MU
44	45.4	3.44	5	MU
45	48.1	2.69	3	BI

Note. * Average structural ambiguity ratings from Derogatis et al. (1968) research. P% = % of popular answers; MO = monocromatic inkblot; BI = bi-cromatic inkblot; MU = multi-cromatic inkblot.

a 1.25 Structural Ambiguity rating, in the second ranking, and in the third-ranking, was eleventh with four variables found to be significant in the ANOVA.

As is shown in Table 5, the inkblots that satisfied all three criteria within the 14th rank numbered 10 (inkblots 1, 2, 4, 12, 19, 21, 25, 27, 34, and 42). In brief, only 13 inkblots figured in at least two classifications in the first 14 ranks. In Table 5 are reported all the 13 inkblots (1, 2, 4, 12, 19, 21, 25, 27, 34, 41, 42, 44, and 45) included in the final form with their features.

Discussion and Conclusion

The Holtzman Inkblot Technique (HIT) has often been criticized for two aspects: the excessively long administration time (Fehr, 1976; Hanssen, 1967; Iacino & Cook, 1974; Kobler & Dorion, 1968; Panek et al., 1983; Zuckerman et al., 1967;) and the inability to compare multiple responses given to the same inkblot (Dana, 1972; Hayslip & Darbes, 1974; Holtzman, 1988). The first limitation has important repercussions on both clinical practice and research, making it difficult (if not impossible) to administer the test to certain groups of people (e.g., elderly and clinical subjects) and limiting its usefulness (i.e., in less time the same or more information can be obtained from other tests). The second

criticism instead has repercussions on interpretative level, removing the possibility of obtaining useful information from the comparison of multiple responses to the same inkblot and limiting the emergence of some coding variables. Attempts have been made in the past to overcome these criticisms but by treating them separately. For example, Herron (1963) developed a 30-inkblot version with only one response to each blot, and Holtzman (1988) proposed a short version consisting of the first 25 inkblots with two responses to each blot.

The present work represents an attempt to overcome these criticisms through a careful process of inkblot selection that takes into account the idea of lowering administration time while still including two responses per inkblot. This solution would meet the needs of researchers, who in past years have often used their own version of the HIT to reduce administration time, and clinicians, providing a valid alternative to the Rorschach, which has the advantage of being easy to learn, able to be group administrated, and representing a performance-based technique suitable for the statistical analysis.

The goal of the present study was to develop a brief form of the Holtzman Inkblot Technique (HIT) through a careful process of selection of its inkblots. Using the HIT and Rorschach literature, four selection criteria were identified: the symmetrical/asymmetrical features of the inkblots, including only the ones that are symmetrical with respect to the vertical axis; the frequency of the Popular (P) responses, in that they determine a reference norm, since these are the responses, in the reference sample, that are most frequent (i.e., provided by 1/7 of the subjects included in the original sample of Holtzman et al., 1961); the mean ratings of inkblot Structural Ambiguity from the work of Derogatis et al. (1968); and the number of HIT variables able to discriminate a group of schizophrenic subjects from a group of matched non-clinical subjects. The first three criteria allow the selection of inkblots that respect those formal qualities that make the inkblots more evocative (Exner, 2002; Rorschach, 1942; Sergent & Binik, 1979) and also more suitable for clinical samples (Leichsenring, 2004; Rorschach, 1942). Finally, the fourth criterion identify those inkblots that contribute most to the clinical utility of the HIT.

The selection process led to the identification of 13 inkblots to be included in the new brief form, which presents the highest percentage of common responses (or popular "P"), the lowest Structural Ambiguity rating, and the highest number of variables capable of differentiating a group of schizophrenic subjects from a group of non-clinical subjects. Of the 13 inkblots included, two are monochromatic, five are bi-chromatic and five are multi-chromatic. Even if this distribution of the colors of the inkblots is different from that of the Rorschach (where 6 blots are monochromatic, 2 are bi-chromatic and 3 are completely colored), the presence of such a high number of colored inkblots allows compensation for the darker appearance of the HIT stimuli. It is advisable to administer these inkblots in the order given by the frequency of Popular (P) responses, as this may also represent the difficulty with which a person can formulate a percept from the stimulus. In this way the blots would be ordered from easiest to most difficult, therefore facilitating the approach to the technique. A further suggestion, in line with the Rorschach tradition, is to administer inkblot 2 first, because it is monochromatic.

Limiting the number of responses to two per inkblot will result in a protocol consisting of 26 responses, thus falling within the indications of Exner (2002) and Meyer et al. (2011). It must be noted that Holtzman et al. (1961) considered the first 25 stimuli of the HIT to be the best, both psychometrically and evocatively. In the present work, 7 of the 13 inkblots included in the final form (more than half), fall within the top 25. This would suggest how Holtzman et al.'s (1961) assumption may not be entirely correct. But further studies are needed to evaluate the psychometric properties of the new brief version.

However, the present study has an important limitation: the impossibility of judging the outcome of this careful process of inkblot selection on other clinical groups. The testing of the new version is still a work in progress and this limits any conclusions. The absence of empirical justification prevents, for the moment, its use in clinical practice and in research that is not strictly related to the study of its characteristics of validity and reliability. It is to be hoped that future studies will succeed in filling this important gap as this new version not only succeeds in overcoming two major limitations of the HIT but could even lead to an improvement in the psychometric properties of the test and increase its usefulness. However, this represents only the first step towards developing a new and updated version of this technique which will include a modification of the coding variables and the interpretive system.

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.

Funding
The author(s) received no financial support for the research, authorship, and/or publication of this article.

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.

Data availability statement (DAS)
The data that support the findings of this study are available from the corresponding author, J. D., upon reasonable request.

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