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Citation for published version:

Cariola, LA 2014, 'Assessing the alternate form reliability of interview-based and web-based Rorschach responses measuring body boundary imagery and regressive imagery', *Rorschachiana*, vol. 35, no. 1, pp. 42-65. <https://doi.org/10.1027/1192-5604/a000048>

Digital Object Identifier (DOI):

[10.1027/1192-5604/a000048](https://doi.org/10.1027/1192-5604/a000048)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

Rorschachiana

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**Assessing the alternate form reliability of interview-
based and web-based Rorschach responses
measuring body boundary imagery and regressive
imagery**

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Cariola, L. A. (2014). Assessing the alternate form reliability of interview-based and web-based Rorschach responses measuring body boundary imagery and regressive imagery. *Rorschachiana*, 35, 42-65.

Abstract

This study assesses the alternate form reliability of the Body Type Dictionary (BTD) for measuring body boundary imagery and primordial thought language in interview-based and web-based Rorschach responses. The intraclass correlation coefficient demonstrated fair to good agreement for barrier imagery, .72, and penetration imagery, .55, which indicates that the web-based administration of the Rorschach inkblot test represents an acceptable alternative to the traditional Rorschach interview assessment for measuring body boundary imagery. Primordial thought language had a fair level of agreement, .43, whereas conceptual thought language had poor agreement, .36. The results are discussed by relating empirical research outlining the mode-specific implications of psychometric test administration to the Rorschach inkblot test and its implications for body boundary awareness and regressive cognitive functioning, as well as by outlining the methodological and clinical limitations of web-based Rorschach application that could be addressed in future research.

ALTERNATE FORM RELIABILITY OF INTERVIEW- AND WEB-BASED 2
RORSCHACH RESPONSES

Introduction

The World Wide Web appears to be an ideal platform that can be exploited to support psychological research and psychometric assessments of personality (Buchanan, 2000). Web-based surveys, however, require the administration of reliable and valid measurements to obtain meaningful data. Thus, this study aims to assess the alternate form reliability of lexical frequencies (i.e., body boundary imagery and regressive language) between interview-based and web-based Rorschach responses as measured using the Body Type Dictionary (Wilson, 2006), which is conceptually based on Fisher and Cleveland's (1956, 1958) manual scoring system of body boundary imagery, whereas Martindale's (1975, 1990) Regressive Imagery Dictionary gauged lexis classified as primordial and conceptual thought language. Alternate reliability refers to the degree of consistency between results obtained using different forms of the same test (Rosenthal & Rosnow, 1984).

Face-to-face versus web-based survey administration

One of the major advantages of web-based surveys is the time-effective and low-cost administration of questionnaires compared with time-consuming face-to-face testing in laboratory settings (Buchanan & Smith, 1999), in addition to the straightforward processing of digital data for computerised coding and statistical analysis (Hardé et al., 2007). Web-based questionnaires might also increase the participants' perceived anonymity, which might reduce the participants' social desirability bias and enhance their tendency to engage in higher levels of social disinhibition and self-disclosure and therefore to respond more authentically to questions related to autobiographical history, personality dispositions, and current moods and feeling states (Barak & Hen, 2008; Bowling, 2005; Buchanan, 2000; Joinson, 1999; Rhodes et al., 2003; Masling, 1992). Face-to-face interviews also have a greater survey completion rate and lengthier responses, whereas web-based questionnaires might increase task-specific difficulties, such as misunderstanding of the instructions or problems in expressing oneself in writing, which would result in erroneous responses (Barak & Hen, 2008; Bowling, 2005; Buchanan, 2000; Kongsved, et al., 2007; Rhodes et al., 2003).

Consistent with the increased popularity of web-based psychological self-help groups and services in recent years, empirical research has focused on exploring the validity of web-based questionnaires. As noted by Buchanan (2002), the greatest difficulty in validating online assessment tools is related to the lack of control over testing situations, including the presence of extraneous (e.g., environmental distractions and differences in computer equipment) and temporary distractions (e.g., low motivation, fatigue and the influence of alcohol or drugs), which may influence the participants' responses. In this sense, the researchers' lack of control in on-line assessment does not allow for verification of the accuracy of questionnaire responses, which highlights the underlying differences in the recruitment of participants between web-based and traditional modes of assessments (Hertel et al., 2002).

Reliability and validity of the Rorschach inkblot test

The Rorschach test was originally developed by Herman Rorschach (1921), who asserted that it should not be perceived as a psychological test but as a systematic method for exploring differences in perception. From this context, Exner (2003, pp. 3-5) outlines that the Rorschach test primarily seeks to explore the psychological functioning and organisation that are reflected in decision-making processes but that might not be directly observable in the external behaviours of everyday life. These decision-making processes are assumed to be in operation during the process of interpreting the inkblots. The Rorschach test emphasises the understanding of the psychological structure and personality of a person who moderates his or her behavioural tendencies as opposed to focusing on the behaviour of the person exclusively. The indirect measure of the Rorschach test is therefore less useful for exploring the presence of psychopathology and symptomatic behaviour but instead may be used to identify the psychological causes of behaviour that are unique to a person.

The use of the Rorschach in psychological assessment has been widely criticised, and problems regarding its reliability and validity remain a contentious issue. One of the earliest criticisms indicated that the Rorschach would produce different

results depending on the researchers' scientific or clinical focus (Levy & Orr, 1959). This concern led to scrutiny of the credibility of the Rorschach test within the scientific community, which continues today. As discussed by Exner (2003), contemporary criticisms suggest that the inter-rater reliability and validity values of some scoring indexes may not be adequate and that the comprehensive system would be based on unpublished data (Nezworski & Wood, 1995; Wood et al., 1996). Conversely, other researchers have suggested that the scientific criteria of the studies that were critical to the Rorschach were unreasonable and lacked objectivity, which resulted in a bias against the Rorschach (Meyer et al., 2002; Weiner, 2001; Viglione & Hilsenroth, 2001). Based on the premise that the previous meta-analysis had methodological limitations that resulted in erroneous biases against the Rorschach (Garb et al., 1998), subsequent meta-analyses and various other research studies have reported that the correlation coefficients were not reliably different between the Rorschach and the Minnesota Multiphasic Personality Inventory (MMPI) (Ganellen, 1996; Hiller et al., 1999; Meyer & Archer, 2001; Meyer et al., 2001; Rosenthal et al., 2001). Considerable criticism has been focussed specifically on the clinical limitations of the Comprehensive System, which has led to confusion between the scoring method and the test itself (Exner, 2003; Masling & Bornstein, 2005). Recent meta-analytic studies have identified high validity for the Rorschach in predicting outcome (Meyer & Handler, 1997), emphasising the more nuanced and inclusive validity of individual variables of the Comprehensive System (Mihuar et al., 2013).

Although some researchers argue that the Rorschach test has no scientific or clinical basis and should be therefore abolished from clinical practice (Garb, 1999; Hunsely & Bailey, 1999; Jensen, 1965), empirical research has continuously demonstrated that the Rorschach represents a useful tool in clinical, forensic and educational applications for providing a better and more complex understanding of an individual's personality, especially when it is combined with other sources of information (Stricker & Gold, 1999; Viglione 1999).

Fisher and Cleveland's manual scoring system

Based on the assumption that people differ in their body boundary awareness, Fisher and Cleveland's (1956, 1958) body boundary concept system represents a Rorschach scoring system that measures barrier and penetration imagery. Barrier imagery responses generally refer to the protective, enclosing, decorative, or concealing qualities of surfaces, whereas penetration imagery responses relate to the lack of such protective and enclosing boundaries by emphasising the fragility, permeability, openness and destruction of boundaries. According to this scoring system, high frequencies of boundary imagery indicate a High Barrier personality, and low frequencies of barrier imagery relate to a Low Barrier personality. Barrier imagery has also been widely investigated and explored in empirical research (see O'Neill, 2005). However, the function of penetration imagery has not been entirely clarified, although it has been associated with contextual variables within the testing situation as opposed to representing a stable personality trait (Fisher, 1970).

This assumption has been supported by empirical evidence indicating that the frequencies of responses associated with penetration imagery might be related to regressive cognitive functioning. For example, studies on extra-sensory perception have shown that individuals who scored high on extra-sensory perception (ESP) had lower body boundary definiteness (i.e., higher penetration and lower barrier imagery scores) than did individuals with low ESP scores (Schmeidler & LeShan, 1970) and that hypnotised individuals had higher penetration scores than did individuals in an ordinary state of consciousness (Saraceni et al., 1980). Buck and Barden (1971) also suggested that narratives of depersonalisation experiences and dreams were associated with higher frequencies of penetration imagery than were narratives of autobiographical experiences and daydreams, indicating that frequencies of penetration imagery increase in the expected direction of conceptual to primordial thought functioning. Theoretical models similar to Fisher and Cleveland's high and low barrier personality categories have been proposed, including skin ego (Anzieu, 1985), amoebic self-theory (Burriss & Rempel, 2004), secondary skin formation (Bick, 1968; Ogden, 1989), and crustacean and

amoeboid self-protection in infants with autism (Tustin, 1981), among other theories.

Body Type Dictionary

The Body Type Dictionary (Wilson, 2006) represents a valid and reliable computerised scoring system that measures the lexical frequencies of barrier and penetration imagery as outlined by Fisher and Cleveland's manual body boundary scoring system (Cariola, 2013). The BTM contains 599 barrier imagery words, 252 penetration imagery words, and 70 exception words, which prevent the erroneous matching of ambiguous word stems assigned to 12 semantic categories. In contrast to Fisher and Cleveland's context-sensitive manual coding of body boundary lexes and phrases, the BTM uses computer-assisted scoring of context-independent coding of individual barrier and penetration lexes. The lexical categorisation of the BTM also excludes polysemous lexical items that cannot be unambiguously classified as barrier or penetration imagery—for example, *well* (adverb versus reservoir for water)—and expressions that contain barrier and penetration imagery because of conventional language use, such as shelled sea animals (given their relation to seafood dishes that do not contain the shell of the crustaceans, for example, *lobster bisque*).

Given the theoretical relationship that relates an inflation of penetration imagery to higher levels of primordial thought functioning, empirical research has shown that the frequencies of penetration imagery correlate positively with primordial thought language in various types of religious texts (Cariola, 2012a,b; Wilson, 2009). Empirical research has demonstrated that both penetration and barrier imagery increase with the level of regressive cognition, which indicates that barrier and penetration imagery reflect the different psychological functions of phenomena related to regressive cognition (Cariola, 2013). Primordial thought language has been measured using the Regressive Imagery Dictionary (RID) (Martindale, 1975, 1990), which gauges the frequency of lexical items classified as primordial thought language and conceptual thought language. Primordial and conceptual thought relate to the Freudian (Freud, 1900) psychoanalytic concept that differentiates between two modes of cognitive functioning: the primary process

(primordial thought) and the secondary process (conceptual thought). As outlined by Martindale (1990), the primary process is concrete, irrational, free-associative, unrelated to logic or spatio-temporal constraints, and free from social conventions. This process also represents the predominant form of cognitive functioning in young children and in altered states of consciousness, such as dreaming and meditating, as well as in mystical and drug-induced states. In contrast, the secondary process adheres to the abstract principles of grammar as well as to the constraints of logic time and space and of social conventions. It also represents the cognitive functioning of everyday consciousness in adults and older children.

Hypothesis

Although empirical research has explored the differences between face-to-face and web-based survey administration and one study has demonstrated that traditional versus online-based administration of the Rorschach inkblot test would not be significantly different except in location and time scores and when measured using the standard Klopfer psychogram scores (Miller, 1986), it has not been assessed whether interview versus web-based administration of the Rorschach inkblot test would yield comparable frequencies of body boundary imagery and regressive imagery, thus indicating alternate form reliability. Reflecting this view, this study was based on the hypothesis that barrier and penetration imagery as well as primordial thought and conceptual thought language based on interview-based Rorschach responses would be significantly positively correlated with the same linguistic variables as measured in web-based Rorschach responses.

Method

Participants

A total of 58 participants (23 male and 35 female) with a mean age of 19.38 years (range 18–29, SD = 1.84) participated in the interview-based Rorschach test condition. Fifteen participants (25.86%) did not participate in the web-based condition, and their responses were excluded from further analysis. Therefore, the

responses of 43 participants (15 male and 27 female) with a mean age of 19.42 (range 18–29, SD = 1.98) were used for further analysis in this study.

Stimuli

The Rorschach inkblot test was used in this study (Rorschach, 1921). The Rorschach represents one of the most common projective tests. The Rorschach test is based on ten same-sized and numbered inkblots. Each inkblot features a unique distinctive design, of which five are in black-and-white, two are in black and red, and three are in colour.

Procedure

The participants were recruited through an e-mail that was sent to the undergraduate students at the Faculty of Arts and Social Sciences, Lancaster University. The participants contacted the researcher of this study to arrange a convenient time for the one-on-one face-to-face Rorschach interview. At the interview, the researcher established a positive rapport with the participant by inquiring about previous experiences participating in research experiments. Subsequently, the researcher discussed the experimental procedure of this study and then introduced the Rorschach test (Rorschach, 1921). It was then explained to the participants that the Rorschach test is an assessment tool that is based on a series of ten inkblot pictures. The participants were instructed to interpret these pictures in the form of verbal responses. As a means to obtaining an adequate quantity of responses, the research involved some encouragement in which the participants were informed that because of the ambiguous visual stimuli, there would be no right or wrong interpretations of the inkblots and that it might be possible to see one or several things in each inkblot (Rose et al., 2001). The participants were instructed to provide a minimum of one response to each presented inkblot. The participants were also informed that the research study had a linguistic focus and that the responses would not be used to conduct psychiatric diagnoses. Because the aim of this study was to compare interview-based with web-based Rorschach responses, it appeared plausible to provide equivalent response procedures. Given the restrictions on the web-based procedure for

engaging with the participants to discuss their inkblot interpretations in more detail, it appeared plausible to omit from the face-to-face Rorschach interview procedure the inquiry phase in which participants would normally clarify their previous responses. All of the verbal responses were recorded, and all of the participants were notified that any information that could be attributed to their identities would not be transcribed.

Two weeks after the face-to-face interviews, the participants received an e-mail with a web link to access a web questionnaire. In this web survey, the participants were presented with the Rorschach pictures and asked to provide written interpretations for each inkblot in the provided open-ended response boxes. The completion of the experiment was not timed. At the end of the experiment, the participants were thanked one more time and presented with a debriefing that explained the purpose of the study. The study obtained full ethical approval by the Ethics Committee at Lancaster University.

Data

This study is based on 43 face-to-face interview-based and web-based Rorschach responses. The interview-based Rorschach responses had a total text length of 21,731 words with a mean of 50.54 words per response ($SD = 38.40$), and the web-based Rorschach responses had a total text length of 6,717 words with a mean length of 15.62 words ($SD = 11.88$). Regarding the total word count, the interview-based Rorschach responses used 6,177 different words with a mean of 14.37 different words per response ($SD = 6.43$), and the web-based Rorschach responses used only 3,617 different words with a mean of 8.41 different words per response ($SD = 4.66$).

Content analysis

The BTM and RID were applied to the interview- and web-based Rorschach responses using PROTAN computerised content-analysis software (Hogenraad, Daubies, Bestgen, & Mahau, 2003) measure the frequencies of the lexical items in the dictionary categories. A lemmatisation process reduced the words to their base

forms. For example, *agrees*, *agreed*, and *agreeing* were all reduced to *agree*. Subsequently, the lexical content of the responses was matched against the predefined lexical categories of the BTID and RID.

To control for text lengths, the PROTAN content-analysis software computes two counts of lexical occurrences, i.e., the density rate and the frequency rate. The density rate indicates the frequency with which distinct lexical items—i.e., types—match each dictionary category, whereas the frequency count shows how many lexical items in total—i.e., tokens—match the lexical categories (Wilson, 2008). For the purpose of this study, the density rate was used to control for verbosity and repetitive mentioning of descriptive content in the spoken Rorschach responses. The density rates for the interview-based and web-based Rorschach responses were calculated based on the following formula:

$$\text{Density rate} = \text{SQRT}[(\text{density count} / \text{number of token in segment}) \times 1000]$$

Statistical analysis

All statistical calculations were performed using the statistical language and software from R (R Development Core Team, 2011) in combination with the R:commander {Rcmdr} package (Fox, 2005) and the Intraclass Correlation Coefficient package {ICC} (Wolak, 2012). A paired t-test was applied to the data to compare the mean frequencies of body boundary imagery and regressive language between the experimental conditions. Subsequently, a series of intraclass correlation coefficients (ICC) assessed the levels of equivalence of the linguistic variables between the experimental conditions (i.e., interview-based vs. web-based Rorschach responses). ICC reliability values below 0.4 indicate poor agreement, values between 0.40 and 0.59 indicate fair agreement, values between 0.60 and 0.74 indicate good agreement, values between 0.74 and 0.80 indicate excellent agreement, and values above 0.80 indicate nearly perfect agreement (Cicchetti & Sparrow, 1981; Fleiss, 1981). It has also been noted that values between .75 and .40 are acceptable for scientific research, whereas clinical

research requires strong agreement levels above .75 (Cicchetti, 1994; Streiner & Norman, 1995).

Results

The descriptive statistics indicated that total text lengths, $t(42) = 6.616, p < .001$, and variety in the vocabulary, $t(42) = 6.815, p < .001$, were significantly higher in the interview-based Rorschach responses compared with the web-based responses. In relation to the linguistic variables, primordial and conceptual thought language, barrier imagery and penetration imagery were higher in the web-based Rorschach responses compared with the interview-based Rorschach responses (see Table 1). A paired t-test showed that the frequencies of primordial thought language, $t(42) = -15.589, p < .001$, barrier imagery, $t(42) = -4.834, p < .001$, and penetration imagery, $t(42) = -3.546, p < .001$, were significantly higher in the web-based Rorschach responses compared with the interview-based Rorschach responses, but conceptual thought language, $t(42) = 3.038, p < .01$, was higher in the interview-based Rorschach responses.

[Table 1 insert near here]

The ICCs for the interview-based and web-based results for body boundary imagery and regressive language ranged between .36 and .72 (see Table 2). Consistent with the first hypothesis (H1), barrier and penetration imagery showed fair to good reliability. Primordial thought language showed fair reliability, but the reliability for conceptual thought language was poor, and thus, the second hypothesis (H2) was partly maintained.

[Table 2 insert near here]

Discussion

This study compared the consistency of lexical frequencies—i.e., body boundary imagery and regressive language—between interview-based and web-based

Rorschach responses. The obtained effect size of the ICCs indicated acceptable alternate form reliability for barrier imagery and penetration imagery between interview-based and web-based Rorschach responses. In this sense, the web-based administration of the Rorschach inkblot test represents an acceptable alternative for measuring body boundary imagery to the traditional Rorschach interview assessment. In contrast, primordial thought language indicated fair agreement, but conceptual thought language had poor agreement between the experimental conditions. Although the reliability coefficients were below .75 and thus not acceptable for clinical administration, the linguistic variables with coefficients indicating fair to good reliability levels—i.e., barrier and penetration imagery and primordial thought language—demonstrated that the web-based version of the Rorschach inkblot test did not compromise the Rorschach measurement within scientific settings. Consistent with the contentious problems of reliability and validity associated with a projective test, the identified interpretative consistency between the interview-based and web-based conditions could be a reflection of the participants' working memories, considering that they were exposed to the same sets of Rorschach stimuli in the interview-based and web-based test conditions. However, this consistency in interpretative responses might also be indicative of the stability of a barrier personality. In this sense, the results would provide some evidence of the stability of a barrier personality (Fisher & Cleveland, 1956, 1858).

Apart from the reliability assessment, the results of this study were consistent with research outlining the influence of the mode of questionnaire administration on the quality of participants' responses. For example, the interview-based Rorschach responses had significantly higher text lengths than did the web-based responses. This increased text length might have been related to differences in the cognitive and social demands associated with the experimental conditions. For example, Rorschach responses with greater text lengths might be perceived as more acceptable compared with those with shorter responses in relation to quasi-conversational interview settings (Bowling, 2005). Verbal Rorschach responses also reflect a different discourse structure that appears to include the interviewer in the participants' underlying thought processes related to the inkblot interpretations. When comparing verbal with written Rorschach responses, it becomes apparent that verbal responses tend to include an initial interpretative and

exploration phase of the presented inkblot in which the stimuli are related to real-life objects or events, followed by a more detailed description and interpretation of the stimuli and a final statement that provides a general synopsis of the interpretation or an emphasis on a particular interpretation. In particular, we recorded the repetition of words between the spoken and written Rorschach responses. The interview responses had a lexical diversity of 28.42%, whereas the web-based responses had up to 53.84% lexical diversity in relation to the overall word count. The written responses also included linguistic features associated with spoken language, such as the fillers and discursive hedges that do not typically occur in written responses—e.g., [interview-based response to inkblot No. I – Participant No. 56]

“Some kind of bug. It looks like...it has got big wings and little hands like this. I would say, yeah, like a bug.”

Written interpretations of the web-based Rorschach responses, on the other hand, tended to focus predominately on the interpretation phase without an extensive exploration of the stimuli—e.g., [web-based response to inkblot No. I – Participant No. 56]

“A bug with little pincers and big wings.”

In addition, the results showed that the web-based Rorschach responses had higher frequencies of body boundary imagery and primordial thought language but lower frequencies of conceptual thought language compared with the interview-based responses. Previous empirical research has shown that the frequencies of barrier and penetration imagery increase with the levels of primordial regression. Based on this finding, it can be deduced that the frequencies of primordial thought language and body boundary are context-dependent. The web-based Rorschach condition had a higher level of regression compared with the interview-based condition. Drawing on Freudian psychoanalytic theory (1900, 1926), experiences of external and internal frustration typically increase a sense of repression—so-

called anti-cathexis—that maintains a higher level of conceptual thought and simultaneously prevents an increase in primordial regression. The reduced frequency of primordial thought within the interview-based Rorschach condition might have been related to two causes. Firstly, the use of the Internet has been associated with an increase in regressive functioning to the extent that the computer might have a functioning transference that mirrors early parent-child relations and wishful thinking as well as the tendency to resort to familiar sense-impressions when confronted with ambiguous visual cues (Laszlo et al., 1999). The Internet might lower an individual's unconscious defence mechanisms, resulting in higher levels of self-disclosure (Uecker, 1997). Interview-based assessments, on the other hand, might imply an increased sense of discomfort and anxiety, which could impede the ability to freely associate in relation to the presented inkblot compared with the web-based administration of the Rorschach test. In this sense, the testing situation is sensitive to the interpersonal dynamics, such as transference, that exist between the interviewer's and the participant's personalities and needs that inevitably influence the context of the testing situation (Masling, 1992), such as the social desirability bias in which participants might be inclined to make a good impression in the testing situation by providing socially acceptable responses (Barak & Hen, 2008; Bowling, 2005; Joinson, 1999; Rhodes et al., 2003). Thus, participants might be inclined to censor their spontaneous inkblot interpretations and produce responses that are perceived to be socially acceptable instead (Masling, 1992). The administration of a psychiatric assessment tool, in particular, might imply an interviewer bias, and the participants might feel concerned about their interpretations being judged and “psychoanalysed” by the interviewer. This would increase the participants' anxiety and vulnerability and thus negatively impact their engagement with the task as well as the articulation and disclosure of the inkblot interpretations. In such instances, the participants may try to produce responses that are perceived as normative and conservative rather than creative and freely associated responses (Masling, 1992).

Although the social desirability and interviewer biases would be considerably reduced in the on-line administration of the Rorschach, empirical research has shown that the absence of the researcher could increase the frequency of responses featuring sad content themes (Masling, 1992). This negative influence on the

participants' affect could then interact with those who are feeling depressed. In this sense, the web-based administration of the Rorschach would require ethical and clinical guidelines. In particular, an increase in responses related to body boundary and primordial regression in the web-based Rorschach responses echoes the implications associated with the advantage of on-line assessment. Thus, empirical research has identified elevated web-based questionnaire scores compared with offline questionnaires scores, which alludes to the question of whether Internet-mediated assessment might more accurately reflect the personalities and dispositions of participants compared with offline tests (Barak & Hen, 2008; Buchanan, 2003). To address this question, more research needs to be conducted. In particular, the results of this study are limited to the extent that there are no established norms of body boundary imagery or regressive imagery in Rorschach responses with which the scores obtained in this study could be compared. Given that participants attended the face-to-face Rorschach interviews before responding to the web-based Rorschach tests, future research should provide a counterbalanced research design to control for a possible carry-over effect between the experimental conditions.

The web-based application of the Rorschach inkblot test represents possible advantages, such as its employment in quantitative empirical research to reach a wide and varied general population and to gather data for cross-cultural research purposes, as well as the possibility of compiling an extensive database of Rorschach responses for research and training purposes; however, there are several methodological and clinical limitations of a web-based application. In contrast to research-based face-to-face interviews that make use of Rorschach inkblot test with the primary aim of producing quantifiable knowledge, such as the frequency of body boundary responses, clinical interviews that assume an ideographic framework focus on gathering knowledge that will inform the emotional relationship between the patient and the clinician. In this clinician-patient relationship, the patient is assumed to project early attachments and feelings towards a primary caregiver upon the therapist, referred to as transference, that represent the basis for uncovering unmet needs and trauma as well as other painful experiences of losses and helplessness that inform dysfunctional forms of self and other relating (Kvale & Brinkman, 2009, p. 43). In these therapeutic situations, the

clinician is able to provide reassurance to the individual performing the task in addition to responding empathically to the patient's free associations and memories that might have been triggered by the exposure to the Rorschach inkblot cards. These reassuring and empathic responses are assumed to help individuals to regulate their affective functioning (Deschenaux et al., 2012) and to facilitate transformative processes, thus representing healing elements in the patient-clinician interaction (Finn, 2009; Lerner, 2005). In this sense, the Rorschach inkblot test does not represent an assessment tool only but equally represents a therapeutic intervention. Because of the mechanical and non-human interface of the Internet, individuals conducting a web-based Rorschach test could not be reassured that they were following the test instructions correctly, for which individuals with difficulties in functionally regulating their affective responses might experience increased anxieties and frustration (Deschenaux et al., 2010). Similarly, web-based administration of the Rorschach inkblot test would not facilitate offering the patient immediate emotional support and empathic responses to hurtful associations and traumatic memories, as would a clinician in a traditional Rorschach interview setting. In these events, individuals would feel lonely and helpless as well as experience heightened feelings of anxiety, which could trigger regressions to emotional states reminiscent of earlier traumatic experiences. Specifically, web-based Rorschach administration would also imply the replacement of the clinician as an emotionally responsive and comforting secure base with an online interface application that might generate in the patient feelings of rejection, hurt and anger (Faber & Metzger, 2009). Conversely, it has been shown that interactive online psychotherapy would produce strong therapeutic relationships as well as demonstrate effective outcomes in relation to a wide range of psychiatric disorders, such as depression, eating disorders, anxiety disorders and post-traumatic stress disorder, to mention a few (Knaevelsrud & Maercker, 2006; Knaevelsrud & Maercker, 2007). Given these positive outcomes, the administration of a web-based Rorschach inkblot test could be used within the framework of telemedicine by combining face-to-face psychotherapy sessions with an online-based service. Such a service would be useful for patients that have access to the Internet and feel comfortable to participate in e-therapy; however, as pointed out by Wade (2010), patients with literacy problems and insecurities would be excluded from an online-based mental health service. The Rorschach

inkblot test has been also employed to assess changes following psychotherapy (Campo, 2009; Grønnerød, 2004) and such a follow-up application could be, for example, applied as an on-going assessment in relation to individuals attending alternative psychotherapy forms to explore changes in body boundary awareness (Quartier, Antonietti, Frank, & Iglesias, 2013), or as an optional supportive assessment tool for patients who are reintegrating into their social community.

Given the vast availability of information related to the Rorschach inkblot test that can be accessed easily and effortlessly, including the inkblot cards on the online encyclopaedia Wikipedia (Nashat, 2010; Schultz & Loving, 2012), it has to be taken into consideration that web-based administration of the Rorschach inkblot test might increase the possibility of malingering and providing fake responses. For example, a patient taking the Rorschach inkblot test at home on a personal computer could request the help of a friend or family member to provide responses, and there is also the risk of sourcing responses that are classified as 'normal'. Although there are disputes regarding whether computer software would be able to detect such fake responses (Cohen, 1990; Kahn, Fox, & Rhode, 1988), web-based administration of the Rorschach inkblot test that facilitates the straightforward processing of data into a statistical software program would most certainly enable comparing repeated responses provided by the same patient in web-based test administration to detect unusual protocols, as well as compared with the responses that were provided in initial face-to-face interviews. Taking specifically into consideration that this study did not make use of an inquiry phase that would have allowed participants to produce localised responses, the employment of customised web-based Rorschach administration software that includes a comment box or a grid superimposed upon the inkblot cards would also enable patients to provide localised and detailed responses that provide more information about the formal quality compared to generalised whole or vague responses. Such localized responses might also relate to greater regression along the primordial thought continuum and thus to provide an insight into repressed tendencies that inform the defence mechanisms (Schafer, 1954). The exploration of localized responses and the formal quality would also enable researchers and clinicians to be aware of an individual's personality tendencies and cognitive processes that have been in previous research associated with the specific types of

responses (Exner, 2003). Furthermore, based on empirical evidence that has demonstrated that the inclusion of details and specific information that require increased cognitive effort, and thus increase the chance of self-contradiction, in verbal behaviour has been typically associated with truthfulness (Hancock et al., 2008, p. 8; see also Porter & Yuille, 1996), the occurrence of contradictory localised and detailed responses, could be then interpreted as a sign of deception and faking. Given the importance to reaction time of providing a response upon the exposure to a card, in particular, customised Rorschach web-based administration software could also include an application to record response time as an additional feature to measure patients' cognitive processing effort in addition to identifying the defence mechanisms associated with short or delayed reaction times; this software could thus provide a testing situation that assumes some equivalence to the advantages that are only accessible to the clinician in face-to-face Rorschach interviews.

With regard to this study, however, these initial and tentative results were satisfactory within the constraints of its limitations, indicating an acceptable level of equivalence between barrier and, to a limited extent, penetration imagery and primordial thought language among the web-based and interview-based Rorschach inkblot responses.

Summary

This study assessed the alternate form reliability of the Body Type Dictionary (BTD) for measuring body boundary imagery and primordial thought language in interview-based and web-based Rorschach responses. The intraclass correlation coefficient demonstrated fair to good agreement for barrier imagery, .72, and penetration imagery, .55, thus indicating that the web-based administration of the Rorschach inkblot test represents an acceptable alternative for measuring body boundary imagery to the traditional Rorschach interview assessment. Primordial thought language had a fair level of agreement, .43, whereas conceptual thought language had poor agreement, .36. The results are discussed by relating empirical research outlining mode-specific implications of psychometric test administrations to the Rorschach inkblot test and its implications for body boundary awareness and regressive cognitive functioning, as well as outlining the methodological and clinical limitations of web-based Rorschach administration that could be addressed in future research.

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