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RESEARCH ARTICLE

Construct Validity Of Rorschach Space Responses

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Abstract:

Background:

The diagnostic meaning of the Space response, a Rorschach variable, is far from established. Previous studies on Rorschach Space responses suggested that different figure-ground relationships, shown in the three subtypes of Space responses (Integration, Reversal, and Fusion), could indicate different psychological processes.

Objective:

The aim of the current study was to investigate the construct validity of Space responses in a nonclinical sample by exploring the association of the three different types of Space responses with (a) the observer-rated motor, emotional, and cognitive components of aggression; and (b) the direction and emotional regulation of aggression in socially frustrating situations.

Methods:

The Rorschach Inkblot Method and the Rosenzweig Picture-Frustration Study were administered to 151 volunteers from a nonclinical community sample. The Aggression Questionnaire was administered as an observer-rated version to the participants' mothers. Correlation analyses were performed to investigate the associations between the three different Space responses, the scores reported on the Rosenzweig Picture-Frustration Study, and the observer-reported scores on the Aggression Questionnaire.

Conclusion:

This study offers support for differentiating the three types of mutually exclusive Space responses. Space reversal responses were found to be indicative of a propensity to direct aggression outward in the context of frustrating interpersonal situations, whereas Space fusion responses positively correlated with a greater amount of anger feelings and hostile thoughts associated with a deficit in anger and emotional regulation that may contribute to impair reality testing. As with previous studies, no association between S integration responses and anger or aggression was observed.

Keywords: Rorschach, Space responses, Frustration, Anger, Hostility, Self-assertion.

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1. INTRODUCTION

The Rorschach Inkblot Method (RIM) is still one of the most frequently used personality tests today. Since 1921, the year in which Hermann Rorschach published the 10 Cards that form the stimuli of the test and the famous monograph Psychodiagnostik [1], the RIM has been continuously studied and widely used in psychological assessment around the world. Over time, five major coding and interpretation systems were developed [2 - 6], then in 1968, John Exner and a group of collaborators founded the Rorschach Research Foundation in order to systematically review the extensive existing literature, conduct empirical research to investigate the psychometric properties of the test variables, and thus develop a new comprehensive Rorschach system. The first edition of the Comprehensive System (C.S.) was published in 1974 [7] and the most recent one in 2003 [8]. Each edition presented the updates resulting from the findings of research conducted by the Rorschach Research Foundation. The Comprehensive System includes over 70 variables and indexes grouped into seven clusters, each of which provides information on different aspects of personality functioning such as information processing, cognitive mediation, ideation, control and stress tole-

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rance, affective features, self-perception, and interpersonal perception.

A few years after Exner's death in 2006, a split occurred in the scientific community which led, on the one hand, to the establishment of the Comprehensive System International Rorschach Association (CSIRA), and on the other to the development of a new system, namely the Rorschach Performance Assessment System (R-PAS) [9]. A fundamental meta-analysis on the Comprehensive System variables [10] showed that some C.S. variables still need to be studied more thoroughly as their validity has not yet been supported. One of these variables is the Space response (S), a variable included in the Affective features cluster.

According to the C.S., Space responses (S) are coded when the respondent interprets the white background space of the blot. In the C.S., three S responses in a Rorschach protocol indicate a negativistic or oppositional attitude toward the environment, while more than three S responses are a marker of considerable generalized anger. Space Responses associated with distorted perception are coded S *minus*, and they are assumed to indicate an impairment of reality testing in coping with anger, thus they are interpreted as a marker of impaired emotional regulation regarding anger feelings.

According to the C.S. coding guidelines, responses which include a white area of the blot are coded S regardless of whether the white area is used as the primary area in the response (*e.g.*, "A spaceship" in the white area DS5 on Card II which denotes an inversion figure-ground) or as the secondary area (*e.g.*, "A butterfly, it has some white blots on the wings" on Card I, which indicates an integration of the black or colored figure with the white ground).

The hypothesis according to which Space responses might be a marker of oppositionality was first put forward by Rorschach [1], who stated that this kind of response might indicate opposite behavior compared to the request to say what the inkblot might be (*i.e.*, the psychologist asks the subject to interpret the figure, while the respondent interprets the ground). Rorschach considered Space responses to be only those in which inversion of figure and ground occurred, therefore he hypothesized that S responses in nonclinical subjects revealed an oppositional tendency in polemical, stubborn, and grumbling people.

Studies conducted between the late 1930s and early 1940s [2, 3] had already highlighted the need to distinguish primary S from secondary S, in fact some studies found that only primary S responses were associated with oppositionality [3, 11 - 14], whereas studies that did not differentiate primary and secondary Space responses did not support the relationship between S, as a whole category, and self-reported oppositional tendencies in college students [15], oppositional behavior in clinical and non-clinical samples [16], and hostility or negativism in children evaluated by the Child Behavior Checklist filled in by their parents [17]. Some authors suggested that Space responses could also be interpreted with a positive nuance, as the effort to be independent [6], or the desire for, and proclivity to, self-affirmation [4, 18, 19], as well as a marker of mental flexibility [16, 20].

Thus, in his extensive review, Fonda [21] concluded that empirical findings indicated that only primary S responses were related to ego strength because an appropriate degree of opposition could imply a need for independence, autonomy, and mastery. He proposed an optimum rate of primary S of about 4%, and suggested that deviations from the optimum rate might indicate ego efforts to defend against anxiety associated with the need for autonomy [22]. Secondary S responses did not appear to be related to primary S responses, and the lack of any empirical support for diagnostic meaning led Fonda to suggest that they should be interpreted cautiously.

A third type of Space response, *i.e.*, the fusion of figure and ground, identified by some scholars in the 50s and 60s [23, 24], was not investigated until recently [25, 26]. This kind of Space response, recently named Space-fusion (S-fus) [25, 26], occurs when the respondent fuses the figure and the ground, thus perceiving a single figure (*e.g.*, "a rather fat dancer on tip-toe, these are her feet [D2], the body [DS5+D6]" on Card II reversed; "a monster [D1] with raised arms and lungs [D3] in its belly [DdS24]" on Card III; "a smiling face, the chin [D4], the smile [DS10], here, the eyes [D1]" on Card VII; "a monster's face, the nose [DS3], the mouth [DdS32] and the eyes [DdS99 below Dd22]" on Card VIII; "a clown, his white forehead [DS8], the orange hair [D3], the green collar [D1]" on Card IX; " a man [DdS22] with green legs [D4], a red cloak [D9], the orange mouth [D3], a gray hat like a helmet [D11]" on Card X).

Although Bohm [23] hypothesized that this type of response was a likely indicator of psychopathology, to the best of our knowledge, no empirical studies of its diagnostic significance were conducted until 2015. The absence of studies in this regard is probably due to the fact that Space-fusion response was considered very rare in the past [21].

On the contrary, recent studies [25, 26] found that S-fusion response is not a rare response nowadays, and is observed in about half of the Rorschach protocols that are examined. It was seen that the three types of S responses were not correlated with each other, and that only S-fusion responses showed substantial association with self-reported feelings of anger [25] and with physical and verbal aggression, hostile thoughts, and feelings of anger as reported by clinicians [26]. These recent findings suggest that S-fusion, and not S-reversal or S-integration are likely to be specifically associated with more dysfunctional emotional regulation of anger feelings

The recently developed Rorschach Performance Assessment System [9] differentiates primary and secondary S responses, labeling them SR (Space Reversal) and SI (Space Integration), respectively. However, unlike Rosso and colleagues [25, 26], R-PAS guidelines do not consider the two kinds of S responses to be mutually exclusive and do not take S-fus responses into account. According to R-PAS, an S-fusion response might be coded SI, or SI+SR, or not be coded S at all. For example, "A face [W]" on Card III is not coded **S** at all if the respondent does not specifically communicate that the white areas are part of the response, it is coded SI if the respondent clearly indicates that he/she sees the DdS23 area as the mouth, and the same response is coded SI+SR if the respondent says "Just a white face here with a sort of triangular

shape [DdS24], hair all around [D1], and some red blots on the skin [D2 +D3]". Rosso *et al*. distinguish between integration and fusion of figure and ground. S-integration is coded when white and other areas of the blot are related but still differentiated, not fused (*e.g.* "Some islands [W], the sea all around" [the white space around the blot] on Card VII; "A spaceship [DS5] in the dark sky [D1]" on Card II), whereas S-fusion responses are coded when white and non white areas of the card are fused, thus a new single percept emerges, as in the following example: "a rather fat dancer on tip-toe, these are her feet [D2], the body [DS5+D6]" on Card II reversed. Thus, R-PAS proposes two not mutually exclusive types of S responses, while Rosso *et al*. suggest that three mutually exclusive types of S responses must be taken into account, considering S-fusion as a distinct variable.

In summary, the construct validity of S responses is far from established and further study is needed as, to date, the association between Space reversal, aggression, and proclivity to self-affirmation is controversial, the diagnostic meaning of S-integration has not been thoroughly investigated, and the construct measured by S-fusion responses has not yet been explored.

As Rosso *et al*. [25] reported, studies that were included in the recent, previously mentioned meta-analysis [10] did not support the relationship between S responses and aggression, however they did investigate the Space responses exclusively in Rorschach protocols from individuals with overtly aggressive behavior, while none of the studies evaluated aggression or anger as an internally experienced emotion.

Moreover, as the most recent systematic literature review [27] has shown, S responses were considered indicative of very different constructs (*e.g.*, anger, aggression, negativism, assertiveness, autonomy), which were not always clearly operationalized.

Given the methodological limitations that have considerably confounded research on Space responses [25, 27], we believe it is appropriate to investigate which distinct constructs are measured by which distinct types of space responses. Aggression may or may not be manifested, it might be manifested physically and/or verbally, and it has affective and cognitive components. Buss and Berry [28] accurately operationalized these constructs by differentiating physical aggression, verbal aggression, anger, and hostility.

In addition, aggressiveness can also have positive components, for example, it can be expressed through the ability to be assertive and to adequately cope with frustrating situations. Frustration is a powerful trigger for anger, and how individuals modulate their emotional reaction to frustration is extensively considered a reliable index of their ability to regulate anger feelings [29].

Thus the aim of the current study was to investigate the construct validity of S responses in a nonclinical sample by exploring the association of the three different types of S responses coded according to the criteria proposed by Rosso *et al*. (Space-reversal [S-rev], Space-Integration [S-int], and Space-Fusion [S-fus]) with a) the observer-rated motor, emotional, and cognitive components of aggression, and b) the direction and the emotional regulation of aggression in socially frustrating situations.

In agreement with previous studies, the different types of Space responses were expected to be uncorrelated. Space-reversal responses were expected to be correlated to proclivity to extra-aggression in coping with socially frustrating situations, and not to be correlated to an increase in observer-rated aggression. In line with the more recent literature, we hypothesized that Space-reversal responses were not associated with manifested forms of aggression [27] but with a tendency to react to frustrating situations with increased responsiveness and with a lesser modulation of feelings of anger and their overt expression.

No significant association of Space-integration response with anger was assumed [27], while a positive correlation of Space-fusion responses with higher levels of hostility, and with more difficulties in coping with frustration in interpersonal relationships in terms of emotional dysregulation was expected since recent literature [30] found that this type of S response was associated with more dysfunctional aspects of personality functioning.

Since previous studies found gender differences in identifying, experiencing, and processing anger [31 - 37], as well as in the frequency of S responses to Rorschach testing [38, 39], gender differences on the variables of interest were investigated.

2. MATERIALS AND METHODS

2.1. Participants

Data were obtained from 151 subjects and their mothers from a nonclinical community sample. Subjects ranged in age from 18 to 46 years (M = 29.14, SD = 8.47; 47 males [30.9%]; mean years of education 14.01, SD =2.11, range 8-18). Students comprised 29.1% of the sample, 16.6% were housewives, and 54.3% were employed. Singles constituted 56.3% of the sample, 32.4% were married, and 11.3% were separated. 40.4% of the subjects lived with their parents. The subject's mothers ranged in age from 39 to 71 years (M=54.59; SD=8.52). Married mothers comprised 64.9% of the sample, 23.8% were separated, and 11.3% were widowed. Among them, 48.3% were employed, 27.2% were housewives, and 24.5% were retired. All the participants were recruited by graduate students among their acquaintances using a solicitation letter (available on request) written by the first author. The letter, which also served as an informed consent form, discounted any possibility of feedback concerning results and identified the project as one designed to investigate the interpersonal behavior in a nonclinical population. Consistent with the statement in the letter, participants who signed the informed consent form were subsequently called by other graduate students who were not acquainted with them to make an appointment. The data were collected anonymously, each subject was assigned an identification number, and no compensation was provided.

2.2. Materials

2.2.1. The Rorschach Inkblot Method

The Rorschach Inkblot Method (RIM) was administered according to the C.S [8]. Five variables were coded and taken into account in the subsequent analyses: S and S *minus* according to the C.S.; S-reversal (S-rev), S-integration (S-int), and S-fusion (S-fus) according to the Rosso *et al*. [25] criteria. S responses were coded whenever a white space area was included in the response, S *minus* responses were coded whenever the response indicated a substantial disregard for the structural properties of the white blot area that was used. S-rev responses were coded if the response concerned only a white space area of the blot, (*e.g.*, "a missile" in DS5 on Card II), S-int was coded whenever a response integrated white details with other areas while considering different areas as separate but related to each other (*e.g.*, "an airplane in the night with fire coming out of the bottom" in WS on Card II). Lastly, S-fus was coded whenever the response was the result of a fusion between figure and ground, considering white areas and light and shade/colored areas on the same plane [*e.g.*, "a face" in WS on Card III; "a monster (D1) with raised arms and lungs (D3) in its belly (DdS24)" on Card III].

2.2.2. Rosenzweig Picture-Frustration Study

The Rosenzweig Picture-Frustration Study (RPFS) [29] was also administered. It is a semi-projective test designed to measure how individuals regulate anger in frustrating interpersonal situations. Participants are given a pamphlet that portrays 24 frustrating social circumstances. Each cartoon represents two people, with one person saying something to the other who has a blank speech box beside them. The participant has to write what the person in each cartoon would say in that situation in the blank speech box. The instructions invite the participant to write down the first response that comes to mind as well as to complete the task as quickly as possible.

For example, in cartoon n. 13, a man at a desk informs the person who has just arrived that he cannot keep a previously arranged appointment . The participant is invited to write down in the blank speech box what the person who just arrived would respond.

The answers are then scored according to two dimensions: the direction of aggression as well as the type of aggression. The aggression could be directed inwards (*intra-aggression*), outwards (*extra-aggression*) or repressed/neutralized (*imm-aggression*). The type of aggression could be *obstacle-dominance* (focus on objects), *ego-defense* (focus on people) or *need-persistence* (solution-focused).

Since each type of aggression may have three directions, nine factors could be coded. For instance, the following nine responses could be given to situation n. 13, depending on the two dimensions regarding the direction and type of aggression:

[1] "I came here just to see you! I don't know when I will be able to come again!" (the aggression is directed outwards and the obstacle is prominent)

[2] "Why did you not inform me? Why do you make appointments if you are not sure you will be available" (the aggression, hostility or blame, is directed outwards and the people are prominent)

[3] "Why not? Do you not even have a few minutes?" (the aggression is directed outwards and the solution is prominent in that the request is that someone else would offer the solution to the frustrating situation)

[4] "What a mess! I'm sorry!" (the aggression is directed inwards and the obstacle is prominent, frustration is denied, maybe embarrassment for provoking another's frustration is expressed)

[5] "Maybe it's my fault. I should have called you to confirm the appointment" (the aggression is directed inwards and the people are prominent, the blame is accepted for the frustrating situation)

[6] "Ok, I will come again later" (the aggression is directed inwards and the solution is prominent, reparation is offered, usually out of a sense of guilt)

[7] "It doesn't matter! I have something else to do" (the aggression is repressed and the obstacle is prominent, the frustrating situation is minimized or even denied)

[8] "Ok, don't worry!" (the aggression is repressed and the people are prominent, the frustrating situation is considered inevitable so that nobody is blamed)

[9] "When will you be available? When may I come again?" (the aggression is repressed and the solution is prominent, the hope that a solution will come about over time is expressed, patience is the feature).

According to Rosenzweig, Clarke, Garfield, and Lehndorff [40], in the context of RPFS, the construct of aggression does not have negative implications alone, as it is defined as self-affirmation, which could have both positive and negative connotations. Rosenzweig *et al.* [40] found that the need-persistence category, which implies solution-focused responses, represents a constructive (somewhat creative) form of aggression, whereas the ego-defense category frequently has a destructive quality. Since RPFS depicts commonly occurring, frustrating social situations, such as missing a train, receiving a wrong number call during the night, waiting for someone who is late, being rebuked, not being invited to a party and so on, it could be considered an ecological measure of the regulation of anger. RPFS showed good inter-rater reliability [41, 42] and test-retest reliability (for a review [43]). Rosenzweig and Adelman [44] reported acceptable construct validity, and moreover, Rosenzweig [45] found satisfactory criterion-related and pragmatic validity.

2.2.2.1. Aggression Questionnaire

An Italian observer-rated version [46, 47] of the Aggression Questionnaire (AQ) [28] was administered to the participants' mothers. The AQ is a 29-item questionnaire designed to measure levels of anger and aggression. Participants were thus asked to rate the extent to which each item was characteristic of the person they were evaluating on a Likert-type 5-point scale with anchors 1: Extremely uncharacteristic and 5: Extremely characteristic. The AQ provides a total score and scores on four scales: Physical aggression (PA, nine items, *e.g.*, "Given enough provocation, she/he may hit another person"), verbal aggression (VA, five items, *e.g.*, "She/he can't help getting into arguments when

people disagree with her/him"), anger (AN, seven items, *e.g.*, "She/he has trouble controlling her/his temper"), and hostility (HS, eight items, *e.g.*, "She/he is suspicious of overly friendly strangers"). The first two scales assess the motor or instrumental components of aggression. Anger represents the affective and emotional component of aggression and includes psychological activation and preparation for aggression. Hostility represents the cognitive component of aggression and concerns basic thoughts of resentment and injustice. The Italian AQ [46, 47] consistently replicated the factor structure of the original version; in the validation study, high AQ total and scale scores showed significant ($p < .001$) associations with (i) high scores on self-reported novelty seeking and harm avoidance, and low scores on cooperativeness and self-directedness; (ii) low scores on secure attachment, and high scores on discomfort with closeness; and (iii) high scores on measures of Cluster B personality disorders (especially narcissistic, borderline, and antisocial). In the current study, adequate internal consistency of the scales was found (Cronbach α's ranging from 0.87 to 0.95).

2.3. Procedure

Graduate students who were not acquainted with the participants administered the Rorschach test and RPFS. Examiners were selected by the first author from a group of graduate students who had formerly attended an academic course on RIM which dedicated a total of 30 hours exclusively to administration and inquiry issues, comprising the administration of two protocols as a practicum, followed by individual feedback from the teacher and group discussion. After passing the examination, 54 graduate students whose final marks were above 28/30, collected protocols for this study. Each examiner administered from one to three protocols. They received study credit for their contribution. The first author checked all the collected protocols to ensure that standardized procedures had been followed and that inquiries were sufficiently thorough, and found that none of the protocols had been inaccurately collected.

Both administration and inquiry followed Exner's guidelines [8]. These included side-by-side seating and use of standard location sheets to record location during the inquiry. Examiners used the standard instructions [48] to obtain a total number of responses (R) higher than 13 and/or to constrain high R. It was not necessary to repeat the test because none of the participants gave fewer than 14 responses during the initial response phase. There was no attempt to constrain lengthy responses beyond the standard guidelines, and the longest record in the sample contained 66 responses. In the first session, the Rorschach test was administered, while the RPFS was administered in a following session a week later. Examiners also met the participants' mothers at their home and administered the observer-reported version of the AQ to them.

The first author checked all the collected protocols and their associated location sheets. None of the protocols was removed. Test administration occurred at a time and place that was convenient for the participant, usually at their home. Participation in the study was voluntary and anonymous. Written informed consent was provided by both the subjects and their mothers. Subjects were informed that their mothers would be rating them on the Aggression Questionnaire. Since the participants were recruited by acquaintances, examiners verified that they gave truly free informed consent, without having felt any pressure to participate in the study. The study was conducted according to the American Psychological Association (APA) ethical standards.

3. RESULTS

All Rorschach protocols were valid regarding the number of responses that were provided (R ranged from 14 to 66, M = 24.44; SD = 9.59). Protocols were coded on the variables of interest (S, S-int, S-rev, S-fus, and S *minus)* by the first author, blind to the scores obtained on the other measures. Then 30 Rorschach protocols were randomly selected and independently re-scored by the second author, blind to the scores obtained on RPFS. Rorschach protocols and RPFS were assigned different identification numbers so that the second author, who scored the RPFS, would not know the scores that had been obtained in the other measure.

The first coder was trained in 1991 by John Exner and Bruno Zanchi, whereas the second coder was trained by the first author in 2007. He had already participated in previous Rorschach studies having coded at least 250 protocols before taking part in the current study.

RPFS were coded by the second author, then 20% of the participants' responses were randomly selected and re-scored by an independent trained coder, blind to the scores obtained on the other measures. Inter-rater agreement was excellent (according to Cicchetti guidelines [49]) with ICCs ranging between .83 for extra-aggression to .98 for S-rev.

The total number of S responses and the sum of S-, S-int, S-rev, and S-fus were calculated, as were AQ and RPFS scores, then descriptive statistics for all the variables that had been considered and Cronbach α's for AQ scores were computed. Four outliers were removed from the study (1 produced 11 S-rev, 1 reported 37 on Hostility, 1 reported 102 on AQ total, and 1 reported 24 on Need Persistence). Table **1** reports descriptive statistics for S responses, descriptive statistics and Cronbach α's for AQ, descriptive statistics for RPFS, and ICCs for Rorschach and Rosenzweig variables. None of the participants had incomplete or missing data.

At least one S response was reported by 135 (91.8%) participants. As shown in Table **1**, S-int was the most frequent S response (111 [75.5%] participants reported at least one S-int), followed by S-fus (88 [59.9%] participants reported at least one S-fus), and S-rev (53 [36%] participants reported at least one S-rev). Ninety-seven [66%] participants reported at least one S response.

Table 1. Space Rosenzweig Picture Frustration Study, and Aggression Questionnaire: Descriptive statistics, and reliability coefficients.

Variable	*M*	*SD*	*Freq*	*Skewness*	*Kurtosis*	*α*	ICC
S	2.92	1.88	135	.512	-.258		.95
S *minus*	1.31	1.24	97	-.954	.121		.90
S-int	1.24	1.00	111	.766	.849		.86
S-rev	.50	.79	53	1.839	3.623		.98
S-fus	1.18	1.30	88	1.195	1.390		.84
Extra	11.50	2.55	147	.263	.396		.83
Intra	6.43	1.74	147	.337	-.111		.87
Neutr.	5.94	1.75	147	.059	-.010		.85
Obst.	4.64	1.58	147	.518	.446		.92
Ego	13.21	2.20	147	.116	-.193		.89
Need	6.04	2.21	147	.437	.101		.93
PA	13.33	3.78	147	1.282	2.520	.94	
VA	12.15	4.25	147	1.037	1.094	.88	
H	14.21	4.12	147	.724	.567	.87	
A	14.43	4.96	147	1.035	1.178	.91	
AQ	54.21	13.46	147	.830	.576	.95	

Note: M = Mean; SD = Standard Deviation; α = Cronbach's alpha; S = Space response according to the Comprehensive System; S *minus*= Space response of Minus Form Quality according to the Comprehensive System; S-int =Space integration response; S-rev = Space Reversal response; S-fus = Space Fusion response; Extra=Extra aggression; Intra= Intra-aggression; Neutr.= Neutralized Aggression; Obst.= Obstacle dominance; Ego= Ego-defence; Need = Needs-persistence; PA=Physical Aggression; VA=Verbal Aggression; H=Hostility; A=Anger; AQ=Total score Aggression Questionnaire.

A general linear model was used to investigate the association of the variables of interest (S responses and AQ scores) with background variables (sex, age, and years of education). After the Benjamini and Hochberg correction [50] of p-values for false discovery rate, a significant association was found between Anger scores on AQ and gender (η^2 =.9). Effect sizes (computed as (η^2) for any S response count, other AQ scores or RPFS scores were at best in the small range (.01 ≤ η^2 <.06). These results suggested that the variables of interest, except for Anger scores on AQ, were not substantially associated to any background variables. Hence, separate analyses were performed for females and males regarding Anger.

Table 2. Correlations among different subtypes of Space response.

	S	S *minus*	S-int	S-rev	S-fus
S	-				
S *minus*	.66***	-			
S-int	.61***	.18*	-		
S-rev	.46***	.11*	.17*	-	
S-fus	.67***	.75***	.05	-.03	-

Note: S = Space response according to the Comprehensive System; S *minus* = Space response of Minus Form Quality according to the Comprehensive System; S-rev =Space Reversal response; S-int = Space integration response; S-fus =Space Fusion response; *: $p < .05$; **: $p < .01$; ***: $p < .001$ (after adjustment of the p-value according to the Benjamini-Hochberg (2000) adaptive false discovery rate controlling procedure). Non parametric correlations were used for Space Reversal and Space Fusion responses.

Correlations between the different subtypes of S responses were performed using Pearson's and Spearman's correlations, respectively, for normally distributed variables and non - normally distributed variables (*i.e.*, S-rev, and S-fus). As expected, a high positive correlation (Spearman's *rho*= .75) emerged only between S-fus and S-. Correlations are reported in Table **2**.

Correlations between S responses, AQ scores, and RPFS are reported in Table **3**. Results yielded a definite relationship between S-rev and some RPFS variables; a positive correlation emerged with extra-aggression (*rho*=.32) and ego defence (*rho*=.22), while a negative correlation resulted with intra-aggression (*rho*=-.31), neutralized aggression (*rho*=-.21), and needs-persistence (*rho*=-.24).

S-fus correlated positively with hostility (*rho*=.31), the cognitive component of aggression was characterized by thoughts of resentment and injustice, and anger in females (*rho*=.36).

After correlation analyses between AQ and RPFS scores were performed to assess the discriminant validity of the individual scales, the results showed that Physical Aggression weakly correlated with both extra-aggression (*rho*= .205) and with Ego defense (*rho*=.182), verbal Aggression correlated negatively with obstacle dominance (*rho*=-.176), hostility correlated negatively with intra-aggression (*r*=-.176), and AQ total score correlated negatively with intra-aggression (*r*=-.204) and positively with ego defense (*r*=.192). Correlations are reported in Table **4**.

4. DISCUSSION

This study investigated the construct validity of the Rorschach S responses in a community sample by exploring the association of different types of S responses with performance on RPFS, and motor, emotional, and cognitive components of aggression reported by the participants' mothers.

Table 3. Correlations among different subtypes of Space response, AQ scores, and RPFS scores.

	PA	VA	H	Af	Am	AQt	Extra	Intra	Neutr.	Obst.	Ego	Need
S	.05	-.06	.29***	-.06	.17	.06	.12	-.14	-.05	-.02	.15	-.15
S *minus*	.01	-.07	.12	-.07	.09	.01	-.06	.07	.03	.04	-.04	.01
S-int	-.12	-.08	.08	-.13	.01	-.07	.05	-.09	.01	.06	.07	-.13
S-rev	.03	.18*	.05	-.16	-.20	-.09	.32***	-.31***	-.21*	.04	.22**	-.24**
S-fus	.13	.10	.31***	.09	.36*	.22**	-.05	.02	.09	-.06	.03	.04

Note: PA=Physical Aggression; VA=Verbal Aggression; H=Hostility; Af=Anger (female group); Am= Anger (male group); AQ=Total score Aggression Questionnaire; Extra=Extra aggression; Intra= Intra-aggression; Neutr.= Neutralized Aggression; Obst.= Obstacle dominance; Ego= Ego-defence; Need = Needs-persistence; S = Space response according to the Comprehensive System; S *minus* = Space responses of Minus Form Quality according to the Comprehensive System; S-rev = Reversal S response; S-int =Figure-ground integration S response; S-fus = Fusion S response; *: $p < .05$; **: $p < .01$; ***: $p < .001$ (after adjustment of the p-value according to the Benjamini-Hochberg (2000) adaptive false discovery rate controlling procedure). Non parametric correlations were used for Space Reversal, Space Fusion responses, Physical Aggression, Verbal Aggression, and Anger.

Table 4. Correlations among AQ scores and RPFS Scores.

	PA	VA	H	Af	Am	AQt
Extra	.21*	.07	.10	.16	.04	.15
Intra	.22*	-.13	.-18*	-.19	-.29	-.20*
Neutr.	.09	-.05	-.01	-.01	.15	-.05
Obst.	.12	-.18*	-.05	-.17	-.02	-.13
Ego	.18*	.05	.13	.07	.23	.19*
Need	-.11	.02	-.12	-.01	.02	-.11

Note: PA=Physical Aggression; VA=Verbal Aggression; H=Hostility; Af=Anger (female group); Am= Anger (male group); AQt=Total score Aggression Questionnaire; Extra=Extra aggression; Intra= Intra-aggression; Neutr.= Neutralized Extra-aggression; Obst.= Obstacle dominance; Ego= Ego-defence; Need = Needs-persistence; *: $p < .05$; **: $p < .01$; ***: $p < .001$ (after adjustment of the p-value according to the Benjamini-Hochberg (2000) adaptive false discovery rate controlling procedure). Non parametric correlations were used for Physical Aggression, Verbal Aggression, and Anger.

S responses were coded according to Exner's Comprehensive System [8], and to Rosso *et al*. [25] criteria. Inter-rater reliability was excellent for all the subtypes of S responses. The frequency of S responses was slightly higher compared to the most recent Italian nonclinical sample (Cohen's d =0.20) [47]. In the current study, 135 (91.8%) participants reported at least one S response, and the S-integration responses were the most frequent, followed by S-fusion and S-reversal. This finding, consistent with the most recent studies [25, 26], shows that S-fusion responses currently are not an uncommon finding in Rorschach protocols, as was hypothesized in earlier studies [21, 24], and suggests that studies are needed to investigate the psychological processes underlying this type of Rorschach response.

The lack of correlations that was observed in both this study and in the previous ones [25, 26], among S-integration, S-reversal, and S-fusion suggests that the responses were prompted by different psychological processes. As reported above, S-fusion responses very frequently were scored Form Quality *minus*, as the marked relationship between S-fusion and S *minus* showed.

Only S-fusion highly correlated with S *minus*, which means that providing such a response very often involves disregarding the "perceptual" reality of the blot. As in a previous study [26], S-fusion – and not S-reversal or S-integration- was associated with observer-reported hostility and anger. Thus, it could be hypothesized that S-fusion responses are indicative of feelings of anger and hostile thoughts in more dysfunctional personalities suffering from impaired emotional regulation regarding feelings of anger. This finding is in line with Exner's interpretation of S *minus* responses, which are considered a reality testing dysfunction prompted by an affective reaction related to negativism or anger [8].

S-reversal responses, on the other hand, showed a small but definite relationship with the type and the direction of the aggression. In the present study, a positive correlation was found between S-reversal responses and the tendency to direct the aggression outwards, as well as to focus on the people in the context of frustrating interpersonal situations. Coherently, we observed a negative correlation between S-reversal responses and the propensity to both direct aggression inwards or to suppress it and to focus on solving the problem. These findings support the hypothesis according to which S reversal responses were expected to be associated with a more aggressive attitude in challenging interpersonal context and with being less inclined to repress aggressive emotional experience in order to cope with socially frustrating situations. Yet Space reversal responses were also associated with being less focused on the solution of the frustrating situation along with being more focused on blaming others. These findings offer further support to interpreting S-reversal responses as being indicative of negativism, a result already found in previous studies [11, 51. 52). However, the lack of correlation between S-reversal responses and AQ scores may suggest that in a non-clinical population the propensity to direct aggression outwards can be considered more a marker of the tendency towards self-assertion than an indicator of hostility or anger that could be so marked as to be evident to an observer. S-reversal responses were found to be indicative of self-assertiveness and independence in two previous studies [12, 13]. An alternative explanation might be that the scores on the AQ scales were restricted in range, thus it may be possible that the failure to find correlations with the AQ scales could be related to this restriction in range.

According to the hypotheses, S-integration responses were not correlated with any anger or aggression variables. This finding offers further support to the hypothesis that S-integration could be indicative of other, different psychological processes, perhaps complex and flexible thinking and creativity [27], creativity [53], IQ [17, 54], and that it should be studied in future research.

The main limitations of this study include using the participants' mothers as observers, using a dated instrument, as

is RPFS, and having a sample with a substantial number of female participants.

Using the participants' mothers as observers may have introduced some unknown confounders into the study. These subjects were chosen as they were considered a reliable source of information about their child's aggressive behavior, but there were some things we could not establish: for example, the quality of the relationship they had with their children, and how frequently the participants see their mothers, which could have had a blurred effect on their observations. For instance, mothers of female children reported higher levels of anger in their daughters and this may be due to the more conflicting nature of the mothers' relationships with their daughters than with their sons. In addition, if on the one hand mothers may know their children very well, on the other hand, they might be more likely to describe them in a fairly favorable manner. In addition, younger participants were still living with their mothers, while the older ones were not. Nonetheless, it must be emphasized that while it is possible to use reliable clinician-reported measures when evaluating a clinical sample, in an adult non-clinical sample individuals who do not have a relationship with some emotional valence with the observed subject cannot be used as observers.

Although RPFS might be considered an obsolete instrument with dated reference norms, we decided to use it in the present study because, to our knowledge, it is presently the only validated non-self-report measure for assessing the type and direction of aggression. RPFS can also be considered an instrument which is able to detect a dimension of assertiveness, defined as the ability to express oneself without anger or aggression in interpersonal situations of potential conflict of opinions, needs or rights [55, 56].

It must also be noted that in the current study, there were a substantial number of female participants: together with the convenience sampling procedure that was employed, this should be considered a limitation for the generalization of the results to the population.

CONCLUSION

Despite the limitations set out above, this study offers support for differentiating three types of mutually exclusive Space responses: S-reversal, S-integration, and S-fusion responses. The hypothesis according to which Space reversal responses were indicative of a propensity to direct aggression outward in the context of interpersonal frustrating situations was supported, as was the hypothesis according to which Space-fusion responses could be indicative of a greater amount of anger feelings and hostile thoughts associated with a deficit in anger and emotional regulation that may contribute to impair reality testing. As with previous studies, no association between S-integration responses and anger or aggression was found.

To make progress, further investigation into the construct validity of Space integration responses is encouraged so as to examine the relationships with the intelligence, mental flexibility, and cognitive complexity assumed by Scharmann [20], Schachter [16], and more recently proposed by Meyer *et al*. [9]. Additional research, especially using clinical samples, is also needed in order to expand the understanding of the diagnostic meaning of the Space fusion responses. In addition, using behavioral measures as well as clinician rating scales will be necessary to replicate the findings of this study, the major limitation of which is that it used a fairly dated projective test to evaluate the type and the direction of aggression.

LIST OF ABBREVIATIONS

RIM	=	Rorschach Inkblot Method
CS	=	Comprehensive System
CSIRA	=	Comprehensive System International Rorschach Association
SR	=	Space Reversal
SI	=	Space Integration
RPFS	=	Rosenzweig Picture Frustration Study
AQ	=	Agressive Questionnarie

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was conducted according to APA ethical standards.

HUMAN AND ANIMAL RIGHTS

No Animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

All the study participants provided written informed consent.

AVAILABILITY OF DATA AND MATERIALS

The data sets used and analyzed during the current study are available from the corresponding author.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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