Seeing red: Affect modulation and chromatic color responses on the Rorschach

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Psychoanalytic theories suggest that color perception on the Rorschach relates to affective modulation. However, this idea has minimal empirical support. Using a clinical sample, the authors explored the cognitive and clinical correlates of Rorschach color determinants and differences among four affective modulation subtypes: Controlled, Balanced, Under-Controlled, and Flooded. Subtypes were differentiated by measures of affective regulation, reality testing/confusion, and personality traits. Initial support for the relationship of chromatic color response styles and affective modulation was found. (Bulletin of the Menninger Clinic, 77[1], 70–93)

It has long been realized that there must exist a very close relationship between color and affectivity. The gloomy person is one to whom everything looks "black," while the cheerful person is said to see everything through rose-colored glasses. (Rorschach, 1921/1942, p. 99)

Colors are not merely recognized, they are felt to be exciting or soothing, dissonant or harmonious, clamorous and shrill or tran-

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quil, warm or cool, cheerful or drab, disturbing and distracting or conducive to tranquility and concentration. (Schachtel, 1966, p. 161)

The relationship between color perception on the Rorschach and affect is controversial, with a long history of theoretical support but minimal empirical evidence. Despite this, contemporary Rorschach scoring systems hold that color responses (perception) provide an indication of the subject's capacity to modulate affect. Exner (2003) describes affective processes as both a "valuable asset" and a "serious liability." Ideally, individuals harness their emotions to guide thoughts, relationships, and behaviors. However, affect regulation may range from extremes of constricted expression to flooded dysregulation. On the Rorschach, individuals are thought to experientially demonstrate their affective style as they are moved by and in turn integrate color into their responses. As opposed to other measures of self-reported emotional dysregulation, the process of affect modulation observed on the Rorschach may have the potential to be more nuanced by elucidating an implicit process beyond what a patient can articulate through immediate self-reflection. The goal of the present study is first to present the theory and rationale behind the linking of color-form perception to affect modulation; second, to summarize the extant empirical literature on this subject; and third, to empirically investigate the relationship between chromatic color determinants and clinical correlates, including developmental history, neuropsychological functioning, and self-reported psychological functioning.

The most recent scoring systems for examining Rorschach chromatic color responses utilize the following determinants: Form Color (FC), Color Form (CF), and Color (C)[1] (see Exner, 2003; Meyer, Viglione, Mihura, Erard, & Erdberg, 2011). Affective modulation is thought to be most controlled (FC response) when the form in the responses takes a primary role with color (affect) used to accurately support the description (e.g., "*It looks like a frog—it's a green frog with legs, eyes, body, and mouth.*"). In contrast, a CF response is dominated by color but still draws

1. The present article does not discuss Color Naming, (Cn) or Color Projection (CP), both of which utilize chromatic color.

upon form (e.g., "*a beautiful rosebush—the colors of the red and pink petals with the green stem and leaves underneath*").When form is absent (e.g., pure C), it is believed that emotional responsivity due to the color stimulus has left the person without the ability to structure and organize his or her thinking (e.g., "*blood, it's all red and bloody*").

Theory

The theoretical link of color perception to affect has been developed across psychoanalytic theoretical schools with foundations in a phenomenological approach (Schachtel, 1966) and ego psychology and drive theory (Rapaport, Gill, & Schafer, 1968). Schachtel (1966) outlined three core features that link color perception and affective experience. First, he described *passivity,* stating, "Color seizes the eye, but the eye grasps for form" (Schachtel, 1966, p. 160). He paralleled color perception to that of emotional experience, which can sweep over a person without the individual's active pursuit. Next, Schachtel emphasized the common features of color perception and affect through *immediacy,* giving the example of the neon street sign that draws the individual's attention almost by force. He stated, "the eye is assailed by color whether it wants to or not" (Schachtel, 1966, p. 160). He identified *feeling tone or mood quality* as a final element shared by color perception and affectivity. For this last point, Schachtel identified cultural meanings linked to certain colors or anecdotally referred to the ways in which interior decorators speak to how colors may be linked to the feeling of a room. Rorschach (1921/1942) himself also held that feeling tone was a central link between affect and color. Overall, Schachtel proposed a theoretical vantage point that emphasized how the experience of color perception and affect have commonalities related not to specific feelings but more to how the person is vulnerable to the positive and negative effects of the impact of each domain.

Using a drive theory perspective, Rapaport et al. (1968) expanded on this work not only by commenting on the process of affective experience but also by providing an elaborate theory for

how the Rorschach assessed affect modulation through the ways in which form quality was integrated into the color response. As the responses became less and less form dominated, the individual was seen as having less and less regulatory control over the experience of affect. Rapaport and colleagues (1968) posited that color triggers impulsive responsiveness as part of a need for instinctual release of tension or affective discharge. In explaining the process of affect modulation, they suggested that the way an individual incorporated form into the color response represented the ability to "delay" and therefore adapt to have a more flexible control that integrated more thought and structure. This would translate into greater affect modulation, being characterized by profiles with more FCs than CFs and Cs.

Utilizing these theories, conceptualizations were made regarding how profiles characterized by each of the three chromatic color determinants would translate into the presentations of patients in clinical settings. FC determinants were expected to be highest in "neurotics" and reflect capacity for "affective rapport" and "emotional adaptation" (Rapaport et al., 1968, p. 380). Rorschach described these responses as the "successful integration of color and form," highlighting the value of being able to control and modulate emotional experiences. In contrast, the CF was thought to be more common in individuals with "vivid unfettered affectivity" in which there was less restraint and capability for managing affect (Exner, 2003; Rapaport et al., 1968). Rapaport et al. suggested that these responses would be most common in "unclassified schizophrenics" and "hysterics." Overton (2000) articulated the difference between CF and FC by suggesting that the FC is like *being* in love as compared to the CF, which is like *falling* in love. Finally, the pure C determinant, response with no form whatsoever, was described by Rapaport and colleagues as the "abandonment of control over affects and actions" (p. 386) that would be found at the highest levels in schizophrenia. Drawing on the work of Schachtel, the pure C response highlights the passivity of the experience because there may be an inappropriateness of the flattening of affect.

Research

As presented above, there is a well-developed psychoanalytic theoretical basis linking the relationship of chromatic color determinants to affective adaptation. However, to date there is minimal empirical evidence to support this claim. For example, using a sample of undergraduate students, Stevens and colleagues (1993) compared subgroups of high-affect modulators (high FC and low CF+C; $n = 6$) and low-affect modulators (low FC and high CF+C; $n = 10$), with "high" and "low" defined by median values of the determinants in the sample. Although a small sample was used, this research found no support for the affect modulation hypothesis using discrepancy scores between a person's perception of his or her affect and a coder's perception of the person's affect in a videotaped discussion. Frank (1976, 1993) reviewed the literature and asserted that there was no empirical foundation linking color to affect and speculated that the relationship has been falsely perpetuated by cultural lore. He (1993) goes as far as to state, "clinicians should not interpret persons' responses to color as representative of the vicissitudes of their emotional life; the data do not justify such an interpretation" (p. 13). However, despite this assertion, more recently several studies have linked increased color responses to personality disorders characterized by affective dysregulation. Specifically, Blais, Hilsenroth, and Fowler (1998) found that the sum of color determinants was significantly positively correlated with not only specific symptoms of histrionic personality disorder but also the number of symptoms of this disorder. In another study, Zodan, Charnas, and Hilsenroth (2009) found that the weighted sum of color responses could differentiate between those with and without a borderline personality disorder diagnosis. Couples engaged in custody disputes have also been found to have higher rates of domestic violence when they have greater levels of C and less FC, suggesting less control over strong affects (Miller, 1999; cf. Exner, 2003). When studying the color determinants in relationship to psychotherapy, Exner and colleagues (Exner, 1978; Exner & Murillo, 1975; Exner, Murillo, & Cannavo, 1973) found that "successful" posttreatment outcomes were associated with color responses shifting to be more dominant by form than by color (a shift in the FC:CF+C ratio). In

an older study, Weiner (1964) found that pure C responses could help in differentiating those with and without schizophrenia.

This handful of studies suggests that there may be value in further testing the relationship between chromatic color and affective modulation. While emotional regulation can be assessed through self-report and observations in clinical interview, the value of using a performance-based measure is to assess aspects of a patient's emotional world that may not be readily accessible for the patient to articulate. Therefore, drawing upon the existing theoretical foundation and long history of application of color determinants to understand affect modulation in the context of individual assessment protocols, this study sought to empirically assess the relationship of chromatic color determinants to measures of cognition, personality, and psychopathology. The first part of the study used exploratory analyses examining bivariate correlations of color determinants treated dimensionally with historical, cognitive, psychological, and personality variables. On the basis of existing theory, we expected that the FC variable would be associated with variables linked to variables across domains that are tied to better abilities to modulate, while the CF and C would be tied to higher levels of psychopathology and maladaptive personality. In the second part of the study, a priori hypotheses were tested regarding the differences between Exner's categorical FC:CF+C affective subgroups (see Table 6) in domains of personality and psychopathology.

Method

Participants

Participants were a clinical sample of 88 individuals (67% male) referred for psychological testing at a large urban hospital. As part of this assessment, the Rorschach was administered in the context of a larger battery and then scored with the Exner Comprehensive System (CS). The large majority of the participants were Caucasian (90%), and their ages ranged from 16 to 69 (M = 37.6; SD = 13.8). Most of the participants had never been married (68.2%). Approximately half (48%) of the participants had graduated from college, and 56% were unemployed at the time

of the assessment. The preassessment diagnoses received from the referring clinician included 44.3% depressive disorder, 17.0% bipolar disorder, 13.6% anxiety disorder, and 4.5% psychotic disorder. Our assessment clinic maintains an Institutional Review Board (IRB)–approved deidentified data repository containing all assessment data and extensive demographic information for all evaluations conducted. The assessment and demographic data reported in this study were obtained from this IRB-approved data repository.

Measures

PEaRL Semi-structured Clinical Interview (PEaRL-SSCI). The PEaRL-SSCI (Blais, 2011) aims to systematically capture clinically relevant information regarding a patient's current functioning along with his or her psychiatric, developmental, educational, relational, occupational, medical, and legal history. Data from this measure have demonstrated interrater reliability. In a previous study (Slavin-Mulford et al., 2012), the interrater reliability of the developmental history variables has been strong, ranging from .61 (past psychiatric hospitalization) to .85 (for both suicide attempt and education [education was coded categorically: <12 years, 12 years, >12 years, college graduate, and ≥16 years]). All participants in the present study completed this interview as part of the standard assessment protocol.

Rorschach Ink Blot Test. The Rorschach (Rorschach, 1921/1942) is a performance-based measure used to assess personality, psychopathology, and psychological functioning. In this study, all participants completed the Rorschach, which was administered and scored using the Exner Comprehensive System (2003). The Rorschach protocols were scored and administered by six different individuals, and two licensed clinical supervisors reviewed the scoring of predoctoral interns and postdoctoral fellows. The use of multiple examiners and supervisors reduces the risk that a single individual could have systematically influenced the Rorschach scores. Rorschach protocols used in this study had more than 14 responses and no Card rejections. Only the three chromatic color determinants (FC, CF, C) are used in the analyses in the present article.

Personality Assessment Inventory (PAI). The PAI (Morey, 1991, 2007) is a self-report multiscale personality measure used to assess psychopathology, substance abuse, treatment-related issues, and interpersonal style. It contains 344 items comprising 22 nonoverlapping scales: 4 validity scales, 11 clinical scales, 5 treatment scales, and 2 interpersonal scales. Norms for the PAI were developed from three separate samples: a census-matched sample (N = 1,000), a college sample (N = 1,051), and a clinical sample (N = 1,246). In this study, we examined the following 13 PAI full scales: Somatic Complaints (SOM), Anxiety (ANX), Anxiety Related Disorders (ARD), Depression (DEP), Mania (MAN), Paranoid (PAR), Schizophrenia (SCZ), Borderline (BOR), Antisocial (ANT), Alcohol Problems (ALC), Drug Problems (DRG), Suicidal Ideation (SUI), and Aggression (AGG). Ten of these PAI scales also contain subscales (ALC, DRG, and SUI do not have subscales) that were also explored in the study. Of the total sample in this study, 85 participants completed the PAI.

NEO Five Factor Inventory (NEO-FFI). The NEO-FFI (Costa & McCrae, 1992; McCrae & Costa, 2004) is a 60-item personality inventory that yields five factors: Extroversion, Agreeableness, Openness to Experience, Neuroticism, and Conscientiousness. Participants rated how true a statement was for them on a five-point Likert-type scale ranging from "strongly agree" to "strongly disagree." Of the total sample in this study, 77 participants completed the PAI.

Performance-based neurocognitive abilities

The Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999) was used to assess Full Scale, Verbal, and Performance IQ. Attention, Concentration, and processing speed were assessed with Trail Making Test Part A (Monsch et al., 1992; Reitan, 1958; Reitan & Wolfson, 1985) and the Digit-Coding Scale of the Wechsler Adult Intelligence Scale–Fourth Edition (WAIS-IV; Wechsler, 2008). The Wechsler Memory Scale–Fourth Edition (WMS-IV; Wechsler, 2009) and the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS; Randolph, 1998) were used to assess logical memory (i.e., information placed in the context of a story both in terms of immediate recall

and recall of information following a delay). Measures of executive functioning included Trail Making Test Part B and Stroop (Trenerry, Crosson, Deboe, & Leber, 1989). These tests both measure the ability to inhibit responses.

Procedures

All patients were evaluated under standard clinical procedures, and the Rorschach was included as part of the assessment protocol. Participants were referred for psychological or neuropsychological assessments by a treating professional. The assessments were conducted by licensed psychologists or by postdoctoral fellows and predoctoral psychology interns under supervision. All assessment evaluations included a semistructured clinical interview and the Rorschach. Additional measures were included based on the protocol from the specific assessment. After each assessment, approximately 45 nontest variables (obtained from the semistructured interview or medical record) and all psychological and neuropsychological test scores were entered into the data repository.

Data analyses

In the first set of data analyses, we treated the chromatic color determinants dimensionally. We used bivariate correlations in exploratory analyses to identify the empirical correlates of the three chromatic color determinants in the domains of life history, neuropsychological functioning, and self-reported psychological functioning.

In the second set of analyses, we created categorical subgroups using different ratios of the FC:CF+C determinants outlined by Exner (2003; see Table 6). On the basis of Exner's (2003) descriptions, research, and theoretical work (Overton, 2000; Rapaport et al., 1968; Schachtel, 1966), we developed a priori hypotheses regarding the relationship of these variables to domains of affect regulation (PAI BOR subscales and SUI), reality testing (PAI SCZ subscales and PAR subscales), and NEO personality traits. In these analyses, scores on domains on these subscales were continuous variables, and affect modulation classification was a categorical variable with four levels (controlled, balanced, under-

Table 1. Means, standard deviations, skewness, and kurtosis for color determinants ($N = 88$)

Color determinant	*M*	*SD*	Range	Skewness	Kurtosis
Current sample					
FC	1.49	1.47	0–6	1.08	0.82
CF	1.36	1.40	0–5	0.89	−0.04
C	0.27	0.74	0–4	3.54	14.11

controlled, and flooded). Using multinomial logistic regression, we examined whether self-reported variables in these domains increased the likelihood of belonging to a subgroup with more problematic affect modulation. The logistic model interprets regression coefficients by creating an odds ratio, a ratio of the probability of whether a person is a case to the probability that a person is a noncase (Cohen, Cohen, West, & Aiken, 2003).

Results

Dimensional correlations

Descriptive statistics for chromatic color determinants in the current sample are presented in Table 1. These results can be compared to previous clinical and nonclinical samples in Table 2. As Table 1 shows, both FC and CF were normally distributed but C had a nonparametric distribution. The nonnormal distribution of C is consistent with findings from both clinical (Exner, 2001) and nonclinical samples (Exner & Erdberg, 2005). We further evaluated our data using a box-and-whiskers plot as suggested by Tukey (1977). The results of this analysis indicated that all scores greater than zero, that is, any case with a single C response, were outliers (falling above the 1.5 interquartile range) as such any transformation of the distribution of C risks profoundly altering the meaning of the variable. Therefore, given that our findings regarding the nature of C's distribution is consistent with past research and that our planned comparisons involve forming groups (categories) based upon configurations of the Color variables, we chose not to normalize/transform the distribution of C.

Table 2. Descriptive statistics (means and standard deviations) for color variables for patient and nonpatient samples

	FC	CF	C	*N*
Inpatient schizophrenia	1.54/1.60	1.24/1.38	0.42/0.72	320[a]
Inpatient depression	1.58/1.95	1.58/1.38	0.72/0.99	315[a]
Character disorder	0.98/1.29	0.86/1.08	0.47/0.86	180[a]
Nonpatients	2.97/1.78	2.80/1.64	0.17/0.45	450[b]

Note. [a]From Exner (2001). [b]From Exner and Erdberg (2005).

As part of exploratory analyses, the bivariate correlations were examined with criteria from clinical interviews, neuropsychological tests, PAI full scale and subscale scores, and NEO-FFI traits (Tables 3–7). Correlations are only reported when coefficients reached statistical significance ($p < .05$) or the level of a trend ($p < .10$). When examining the chromatic color determinants in relation to data gathered from the clinical interview (Table 3), we found that FC was negatively correlated with markers of aggression, psychosis, and head injuries, while CF was positively correlated with histories of depressed affect and suicidal ideation.

An examination of the neuropsychological variables listed in Table 4 revealed no significant correlations between the chromatic color determinants and higher order cognitive abilities (Full Scale, Verbal, and Performance IQ) or measures of executive functioning. However, the FC determinant was correlated with better scores on a range of attention, concentration, and memory tests. These are intriguing findings because attentional and memory processes are considered to be important components of emotion regulation (Ochsner & Gross, 2005).

In contrast to the results from neuropsychological data, FC was unrelated to full scales on the PAI (Table 5). Instead, CF was correlated with a broad range of psychological difficulties, including suicidal ideation. In contrast to CF, pure C was related less to anxiety and stress and more to social isolation, but still had elevated depression and schizophrenia subscales. Data from the PAI subscales (Table 6) revealed a more nuanced and complex pattern of correlations. Pure C was associated with conversion symptoms. It is notable that higher pure C was also related to higher endorsement of pain in the clinical interview. Pure C was

Table 3. Correlations of chromatic color determinants with data from clinical interview ($N = 88$)

	FC	CF	C
History of suicide ideation		.30**	
History of homicide attempts	−.22*		
History of auditory hallucinations	−.26*		
History of depression		.22*	
Patient rating current depression		.36*	
Patient rating current confusion		.59**	
Patient rating current pain			.34+
History of mania		.21+	
Number of previous psychiatric hospitalizations	−.19+		
History of arrests	−.29**		
Head injury	−.21*		

Note. +$p < .10$, *$p < .05$; **$p < .01$.

also related to aspects of paranoia (hypervigilance and resentment) and depressive experience. Higher C was also tied to greater social isolation. In examining the PAI subscales, we found that CF continued to be tied to a broad range of psychopathology, including anxiety, depression, confusions, endorsement of psychotic experience, and dysregulated affect. Both the Suicide Potential Index and the Violence Potential Index (composite variables of risk factors) also showed noteworthy correlations to more color-dominated responses.

The associations between NEO traits and the color chromatic determinants (Table 7) revealed that, consistent with the findings on the PAI, CF was positively correlated with neuroticism. Pure C was associated with being more closed to experience and introverted, while the FC determinant was positively correlated with openness to new experience.

Categorical subgroups

Having identified patterns of correlations using the exploratory analyses, we next sought to examine the chromatic color determinants using the subtypes defined by the ratio of FC:CF+C. Exner (2003) and Overton (2000) outline the ways in which it is not the

Table 4. Neuropsychological testing means, standard deviations, and correlations with chromatic color determinants

	Mean (*SD*)	*N*	Correlations with color determinants		
			FC	CF	C
Cognitive-WASI					
Full-scale IQ	106.2 (16.0)	87			
Verbal IQ	107.3 (15.2)	85			
Performance IQ	102.8 (16.0)	85			
Attention					
Digit symbol coding	91.13 (17.2)	75	.28*		
Trails A	94.8 (14.5)	56	.23+		
Memory					
Logical memory immediate	88.1 (19.8)	75	.32*		
Logical memory delayed	91.6 (20.2)	75	.36*		
Executive functioning					
Stroop	98.6 (16.4)	86			
Trails B	87.7 (19.9)	55			

Note. $+p < .10$, $^{*}p < .05$.

determinant alone but the ratio of the determinants that determines the style of affective modulation. A color ratio/subgroup approach to studying the chromatic color determinants has also been utilized in research studying cognitive processes of object recognition (Kron, Cohen, Benzimana, & Ben-Shakhara, 2009). Exner (2003) proposes 10 subtypes (see Table 8) based on the ratio of color determinants. On the basis of the distribution of people across the 10 subtypes, we further collapsed the subtypes into five groups (see Table 9): *Emotional Control, Balanced, Veneered Under-Control, Under Control,* and *Flooded.* Descriptions of these groups and their incorporation of the FC:CF+C ratio are included in Table 9.

Exner's subtypes: Multinomial logistic regression

Three stepwise multinomial logistic regression models were conducted to explore whether there were differences in the affective modulation groups, based on (1) difficulties with emotional regulation (PAI BOR subscales and SUI scale); (2) reality testing

Table 5. PAI full-scale means, standard deviations, and correlations with chromatic color determinants ($N = 85$)

	Mean (*SD*)	Correlations with color determinants		
	T-score	FC	CF	C
Anxiety (ANX)	65.1 (13.0)		.25*	
Anxiety-related Dx (ARD)	60.6 (14.4)		.26*	
Depression (DEP)	69.8 (15.4)		.24*	.25*
Mania (MAN)	51.4 (10.5)		.20+	
Schizophrenia (SCZ)	61.9 (13.0)		.29**	.26*
Borderline (BOR)	63.2 (11.5)		.19+	
Suicidal ideation (SUI)	65.9 (19.4)		.35**	.23*
Stress (STR)	61.0 (12.9)		.25*	
Nonsupport (NON)	58.4 (14.3)		.18+	.27*

Note. +$p < .10$, *$p < .05$; **$p < .01$.

and confusion scores (PAI SCZ and PAR subscales); and (3) normative personality traits (NEO) (see Table 10). These domains were chosen based on the extant theory, research, and results from exploratory analyses. In these analyses, we did not utilize the veneered under-control group because there was only one individual in this group. The emotional control group was used as a comparison group for the three other affect modulation groups (i.e., balanced, under-control, and flooded).

In the first model, the four PAI Borderline Subscales (i.e., negative relationships, identity problems, self-harm, and affective dysregulation) and the Suicidal Ideation (SUI) scale were entered in the model. The goodness of fit chi-square statistic indicated the model was well-fitting ($\chi^2(240) = 264.90$, *ns*; Nagelkerke pseudo R-square = .11). The results indicated that if an individual's score on the suicide scale was higher, the person had a greater likelihood of being categorized as under-controlled and flooded as opposed to emotionally controlled.

In the second model, the PAI Schizophrenia subscales (i.e., psychotic experience, social detachment, thought disorder) and PAI Paranoia subscales (i.e., hypervigilance, persecution, resentment) were entered in the model. The goodness of fit chi-square statistic indicated the model was well-fitting ($\chi^2(225) = 225.07$, *ns*; Nagelkerke pseudo R-square = .30). Here results again indicated

Table 6. PAI subscale means, standard deviations, and correlations with chromatic color determinants ($N = 85$)

	Mean (*SD*)	Correlations with color determinants		
	T-score	FC	CF	C
SOM-C Conversion	56.6 (14.3)	−.24*		.25*
SOM-H Health Concerns	58.2 (13.1)	−.22*		
Anx-Cognitive	64.6 (13.7)		.20+	
Anx-Affective	64.9 (13.2)		.32***	
ARD-Obsessive-Compulsive	52.2 (12.1)	.22*		
ARD-Trauma	63.2 (15.1)		.31***	
DEP-Cognitive	69.7 (15.7)		.28*	.30***
DEP-Affective	70.8 (15.7)		.25*	.19+
DEP-Physical	60.4 (13.1)			.18+
PAR-Hypervigilance	56.7 (11.5)			.22*
PAR-Resentment	57.8 (12.9)			.35***
SCZ-Psychotic Experience	50.3 (14.1)	−.26*	.33***	
SCZ-Social Detachment	60.7 (12.3)			.26*
SCZ-Thought Disorder	64.2 (14.7)		.24*	
BOR-Affective Instability	63.3 (11.7)		.27*	
Suicide Potential Index	65.7 (13.9)		.22*	
Violence Potential Index	56.5 (12.8)		.43***	.27*
Treatment Process Index	59.1 (15.3)		.25*	
Mean Clinical Index	59.2 (8.0)		.27*	

Note. +$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

that if an individual endorsed more psychotic experience, he or she had a higher likelihood of being classified as both under-controlled and flooded as opposed to controlled.

In the final stepwise multinomial logistic regression, the five NEO traits were entered into the model. The goodness of fit chi-square statistic indicated the model was well-fitting ($\chi^2(207) = 218.56$, *ns*; Nagelkerke pseudo R-square = .28). The results revealed that if an individual was higher in neuroticism, there was a greater likelihood of being under-controlled (only a trend for flooded) as compared to emotionally controlled. In contrast, individuals higher in openness were less likely to be flooded than emotionally controlled.

Table 7. NEO-FFI means, standard deviations, and correlations with chromatic color determinants ($N = 77$)

	Mean (*SD*)	Correlations with color determinants		
	T-score	FC	CF	C
Neuroticism	63.8 (13.3)		.35*	
Extraversion	40.4 (13.4)			−.28*
Openness	54.9 (11.2)	.24*		−.25*
Agreeableness	50.2 (13.5)			
Conscientiousness	39.2 (14.9)			

Note. *$p < .05$.

Discussion

The link between chromatic color and affect on the Rorschach is considered by some to be based on nostalgia for past theoretical models and cultural lore rather than empirical data. If this is true, it is of great concern because the ratio between chromatic color determinants on the Rorschach is routinely used in the context of a full psychological assessment battery to inform the clinician's understanding of his or her patient.

In the present study, we sought to consider this topic again with fresh eyes, while remaining informed by past theoretical models and the limited body of empirical research. Overall, our results provide moderate support for the relationship between processes of affect modulation and the chromatic color determinants in the context of a clinical setting of patients receiving psychological and neuropsychological assessment.

When treated dimensionally, the chromatic color determinants differentially correlated to measures of cognitive, psychological, and personality functioning in ways that are generally consistent with existing theory. For example, the FC determinant was related to better control over one's experiences and affective modulation as shown by stronger neuropsychological scores on concentration and memory tests, the absence of association to psychopathology, and higher openness to engage with experience in the world. Interestingly, there appears some evidence for why Rapaport and colleagues linked the CF determinant to "vivid unfettered affectivity" because it correlated with broad-ranging psychopathology,

Table 8. Exner's FC:CF+C ratio subgroups

Exner possible finding	*N* in Current Sample	FC:CF+C ratio	Exner description of affect modulation
Pf1	7	C=0 & FC≥ CF+C+1 & FC≤2(CF+C)	Modulates affect well
Pf2	0	C=0 & FC>2(CF+C) & FC< (CF+C)	More stringent control over emotional discharge
Pf3	23	C=0; & FC≥3(CF+C)	Much more overcontrolling than most; constricted
Pf4	2	C=1; & FC≥ CF+C+1 & FC≤2(CF+C)	Modulates well but some lapses
Pf5	0	C≥1 & FC>2(CF+C)	In most cases modulated affect well; control is vulnerable to failure; in conflict regarding emotions
Pf6	1	C>1 & FC≥CF+C+1 & FC≤2(CF+C)	Strives to modulate emotions effectively but serious lapses in modulation
Pf7	36	C=0; & FC=CF+C & CF+C≥FC+2	Less stringent control, more obvious and intense emotions; not necessarily bad
Pf8	10	C≥1 & FC=CF+C & CF+C≥FC+2	Serious modulation problems
Pf9	7	C=0 & FC+3≤CF+C	Modulates emotions less well than others
Pf10	2	C≥1 & FC+3≤CF+C	Significant lapses in modulating affect

suicidality, dysregulation, self-harm, aggression, and neuroticism. Finally, pure C's positive correlation with negative affect, paranoia, social isolation, lower extraversion, and openness is consistent with Schachtel's description of the flattening of affect and passivity that occurs when someone is completely overwhelmed and even paralyzed by emotional experience.

In our second set of analyses, we created categorical subgroups of individuals based on their affective modulation style. These results generally support the traditional Rorschach interpretation that a Color Ratio emphasizing form-dominated color responses

Table 9. Collapsed affect modulation subgroups

Name	Pf group	*n*	FC:CF+C ratio	Description
Emotional control	Pf 3	23	C=0; & FC≥3(CF+C)	Stringent control; constricted; defensive
Balanced	Pf 1, 4	9	FC≥CF+C+1 & FC≤2(CF+C) Balanced ratio; C≤1	Modulates affect well or modulates well but some lapses
Veneered under-controlled	Pf 6	1	Balanced ratio; C>1	Strives to modulate emotions effectively but serious lapses in modulation
Under-controlled	Pf 7	36	C=0; & FC=CF+C & CF+C≥FC+2	Less stringent control, more obvious and intense emotions; not necessarily bad
Flooded	Pf 8, 9, 10	19	CF+C levels become greater than PF7; C≥0	Significant lapses in modulating affect

(FC) reflects affect modulation or control. Furthermore, these analyses revealed that the ratio of chromatic color determinants may be seen as a possible risk factor for suicidal ideation and psychotic experiences. Theoretically this could be understood as relating to the lack of ability to delay impulsive responses to strong emotions that become enacted and experienced through psychotic-like symptoms or even wanting to die. It highlights the ways in which treatments aimed at difficulties modulating affect may not only reduce suicidality (e.g., dialectical behavior therapy, mentalization-based treatment) but also may have the potential to diminish psychotic disturbance.

Results examining normative personality traits were also revealing, as it appears that individuals higher in neuroticism were more likely to be in the under-controlled group than in the emotionally controlled group. This is consistent with the hypotheses of Rapaport and colleagues, who thought that these individuals would be most likely to be "hysterics." It also suggests that this group experiences affect in ways that likely leave them dysregulated and emotionally labile. In contrast, the flooded group was

Table 10. Results from stepwise logistic regression analyses with Emotional Control group as comparison

	Balanced			Under-controlled			Flooded		
Variable	b	*SE*	Exp(b)	b	*SE*	Exp(b)	b	*SE*	Exp(b)
Dysregulated affect analysis:									
PAI Suicide Scale	.02	.03	1.02	.04*	.02	1.04	.05*	.02	1.05
Reality testing/paranoia analysis:									
PAI Psychotic Experience Scale	.01	.05	1.01	.08*	.03	1.08	.07*	.03	1.07
NEO traits									
Neuroticism	.04	.03	1.04	.07**	.03	1.07	.04+	.03	1.04
Openness	.03	.04	1.03	−.01	.03	.99	−.07*	.03	.93

+$p < .10$, *$p < .05$, **$p < .01$.
Note. Significance tests for variables included in each block are based on Wald's statistic.

differentiated by lower levels of openness and extraversion as compared to the emotionally controlled group. Clinically, this suggests a person who, rather than acting out when emotionally overwhelmed, instead shuts down and closes off experience. As the ratio of FC:CF+C becomes more heavily weighted on the CF+C side, treatment interventions may greatly differ based on knowledge of how the person may be coping with the affective intrusions in his or her life.

An interesting finding that emerged in these analyses was the lack of evidence to suggest that the emotionally controlled group was in any way overly inhibited and constricted emotionally. While the FC determinant individually was correlated with higher levels of obsessive control, when the categorical affective modulation subgroups were used, no such finding emerged (e.g., conscientiousness could have been highly elevated in this group). This result may be related to the specific nature of our clinical sample, in which greater adaptive control is likely to be a strong protective factor in relation to whatever issue the participants were being assessed for. However, it also may indicate that the FC:CF+C ratio is most informative when looking at the increasing levels of CF and C, which appear to move from more traditional affective dysregulation to more extreme affective flooding that has resulted in a modulation "shutdown."

Strengths and limitations

This study has a number of strengths. It is perhaps the most comprehensive set of analyses to date to examine the chromatic color determinants in relation to a full psychological assessment. This is particularly timely given the development of new Rorschach coding systems, which thankfully are more stringently emphasizing the empirical foundations of the scores. Next, the clinical sample provides an image of real patients who are being referred for evaluations, thus having naturalistic validity. There is currently minimal research studying Rorschach profiles as used in clinical settings (rather than in research studies). Third, this study relied on multimethod and multitrait measures. Sources of data included the clinical interview, self-report measures, and neuropsychological and psychological performance-based measures.

Despite these strengths, there are also a number of limitations. First, the subjects were not part of a random sample and sample size was relatively small. However, given that our limited sample size reduced statistical power, this in fact means that our significant results are conservative. In addition, our sample, although somewhat representative of the hospital population, was ultimately lacking in diversity and therefore generalization. Finally, the chromatic color determinants from the Rorschach were not double coded by independent raters.

Future directions of this work include replicating these findings in a larger diverse normative sample. There is a need to continue empirically testing the assumptions tied to variables on the Rorschach. As mentioned, it would be interesting to see whether higher levels of FC in the FC:CF+C ratio might be associated with negative consequences of emotional constriction in nonclinical samples. Next, given that the meaning of a higher CF+C appeared to change as that side of the ratio grew, it would be valuable to further parse this finding. For example, are pure Cs and CFs making different contributions to disturbances in affect modulation capacities? Finally, there is a need to better define and differentiate affect modulation as assessed by the Rorschach and emotional regulation. It appears possible that affective modulation is a different process that is less tied to managing mood lability and more representative of having the means to engage and shape affective responses to further expression as opposed to being dominated by them either through a bursting of frenzy or simply being flattened alive.

In conclusion, the Rorschach's chromatic color determinants may have the potential to measure aspects of a patient's affective modulation. Utilizing the Rorschach in conjunction with other self-report and clinician-report measures allows for an empirical view of implicit process that may be outside of the patient's awareness yet still affecting the person in his or her daily life.

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