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Assessment of Alexithymia With the Rorschach Comprehensive System: The Rorschach Alexithymia Scale (RAS)

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In this study, we developed the Rorschach Alexithymia Scale (RAS) to be used with protocols scored with the Comprehensive System (CS; Exner, 1993). A total of 92 patients with medical disease and 127 psychiatric outpatients were administered the Rorschach and the 20-item Toronto Alexithymia Scale (Bagby, Parker, & Taylor, 1994a, 1994b). We used a systematic approach, including cross-validation, to reduce a pool of 27 CS codes issued from an earlier investigation (Porcelli & Meyer, 2002) to 3 variables: Form%, CDI, and Pop. The RAS showed excellent diagnostic accuracy (hit rate of 92%, sensitivity of 88%, specificity of 94%, and area under the curve of .96). We suggest that the RAS can be used as a reliable integrative tool in a multimethod assessment approach to measuring alexithymia.

Alexithymia is a multifaceted personality construct that represents a deficit in the cognitive processing of emotion. It is currently conceived as composed by two higher order factors including deficit of affect awareness (difficulty identifying and describing feelings) and operatory thinking (externally oriented thinking and poor imaginal processes; Bagby, Taylor, Parker, & Dickens, 2006; Taylor, Bagby, & Parker, 1997). Although it was early considered as one of the core personality determinants of psychosomatic illness (Nemiah, Freyberger, & Sifneos, 1976; Nemiah & Sifneos, 1970; Sifneos, 1973), alexithymia is currently understood to be related to a variety of medical and psychiatric syndromes included in the broader spectrum of disorders of affect regulation. Affect regulation is thought to involve three interrelated systems: neurophysiological (autonomic nervous system and neuroendocrine activation), motor expressive (e.g., facial expressions, body posture, voice tone), and cognitive experiential (subjective awareness and verbal reporting of feeling states (Taylor, 2000). It is strongly influenced by early interactions with caregivers because inadequate responses to the child's emotions have a major influence on the ability to self-regulate both emotional (through internal working models, ego defenses, self-esteem) and neurobiological (through the autonomic, endocrine, and immune activity) states later in adulthood (Taylor et al., 1997). Another consequence in adulthood is a further characteristic that is often described in alexithymic individuals, although it is not included in the usual definition of alexithymia, namely social conformism. These subjects display superficial adaptation to social reality with strict adherence to role status, difficulty in close relationships, and poor empathy.

Alexithymic individuals therefore show a difficulty in being aware of and expressing their own feelings and in representing experience, behaviors, and mental states in themselves and others. From this theoretical perspective, alexithymia is similar to other psychological constructs that highlight deficits in the functioning of referential activity (Bucci, 1997), reflective function (Fonagy, Gergely, & Elliot, 2002), and emotional intelligence (Parker, Taylor, & Bagby, 2001). Two lines of research support alexithymia as a personality construct of affect dysregulation, conceived as the inability to tolerate negative affect by balancing it with positive affect without mostly or solely relying on external objects or behavioral actions (Taylor et al., 1997). One is based on neurobiological studies with functional magnetic resonance imaging and positron emission tomography suggesting that alexithymia is related to impaired coordination and integration of interhemispheric transfer communication, dysfunction of the right hemisphere, or dysregulation over prefrontal cortex and anterior regions (e.g., anterior cingulate cortex; Kano, Hamaguchi, Itoh, Yanai, & Fukudo, 2007; Karlsson, Näätänen, & Stenman, 2008; Moriguchi et al., 2007, 2006). The other is related to the high prevalence rate of alexithymia that has been found in a variety of medical and psychiatric disorders of affect regulation such as eating disorders, substance use disorders, somatoform disorders, and panic disorder (Taylor, 2000; Taylor et al., 1997).

In sum, so far, evidence shows that the alexithymic deficit in processing feelings is likely to affect mental and somatic health through behavioral actions as ways to regulate affective states (e.g., alcohol abuse, eating behaviors); psychopathology directly related to emotional dysregulation (e.g., somatoform disorder, panic disorder); posttraumatic shutdown of emotions (e.g., posttraumatic stress disorder, acute reactions to severe organic diseases); altered autonomic, endocrine, and immune activity (e.g., vulnerability to inflammatory processes); somatosensory amplification; health care seeking behavior; and negative treatment outcomes (Lumley, Neely, & Burger, 2007).

Several methods have been developed to measure alexithymia, including structured interviews, self-report scales, by-proxy information, and the Rorschach (Linden, Wen, & Paulhaus, 1994; Taylor, Bagby, & Luminet, 2000). Currently, the most commonly used method is the 20-item version of the Toronto Alexithymia Scale (TAS–20; Bagby, Parker, & Taylor, 1994a, 1994b; Parker, Taylor, & Bagby, 2003; Taylor, Bagby, & Parker 2003), a self-report questionnaire that assesses three facets of alexithymia reflecting its three-factor structure:

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Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF), and Externally Oriented Thinking (EOT). Extensive validation, replication of the factor structure in several languages and countries, short administration time, and ease of use have been among the reasons why the TAS–20 has become the reference standard for measuring alexithymia in several psychiatric and medical settings (Lumley et al., 2007; Taylor & Bagby, 2004).

The Rorschach seems to be an appropriate method for evaluating alexithymia because of its multifaceted nature. First, the Rorschach is a broadband personality assessment instrument and is able to evaluate a number of psychological aspects that are included in the construct of alexithymia such as cognitive style, cognitive processing of perceptual stimuli, affective dimensions, ability to tolerate and control stress, and interpersonal representations. Second, the Rorschach may add the assessment of subtle psychological aspects in the individual personality organization for understanding alexithymic characteristics at a deeper level (Porcelli, 2004). Because alexithymia is thought to be a developmental deficit in affect representation and expression, Acklin (1992) understood the pattern of Rorschach response as representative of parallel developmental lines of affect differentiation and self-representation and/or object representation, ranging from the primitive expressions of undifferentiated, global, passively experienced raw emotions—related to merged self-representation and/or other representation—to complex, differentiated, well articulated adaptive affects related to whole object relations. Acklin (1992) argued that people with alexithymia lack internalized schemas of available, caretaking human beings that are associated with positive, supportive affects. Therefore, Acklin (1992) argued that some Rorschach scores, such as human movement (M) and color responses ranging from Pure C to FC, may represent the core features of alexithymia, indicating deficiency in fantasy life, reasoning, mature object relationships, and availability of emotional resources in coping and adaptation.

Several studies have investigated the assessment of alexithymia by the Rorschach. There have been two main approaches: (a) group comparisons in which at least one group is expected to exhibit alexithymia (e.g., psychosomatic patients) and (b) comparison with self-report measures of alexithymia. However, findings have been mixed and, importantly, difficult to interpret given many methodological problems with previous studies. For example, many studies have shown groups differ in response productivity (R) but have not controlled for R (e.g., Acklin & Alexander, 1988; Keltikangas-Jarivinen, 1982; Petot, 1996); have used criterion variables or comparisons that were problematic or unclear (e.g., Pierloot, Houben, & Acke, 1988; Taylor, Doody, & Newman, 1981; Vogt, Buerckstuemmer, Ernst, Meyer, & von Rad, 1977); did not require at least 14 responses (e.g., mean R's of 12.82 and 8.75, respectively, for Clerici, Albonetti, Papa, Penati, & Invernizzi, 1992, and Keltikangas-Jarivinen, 1982); and most studies addressing Rorschach assessment of alexithymia have not used the Comprehensive System (CS; Exner, 1993) or reported interrater reliability.

Specific to this study, two studies have used Rorschach indexes directly relevant to alexithymia (Tibon, Weinberger, Handelzalts, & Porcelli, 2005; Vogt et al., 1977). Vogt et al. developed the Rorschach Fantasy Syndrome scale. In that study, Vogt et al. (1977) found that M and FC:CF+C were lower in psychosomatic than neurotic patients but did not indicate their psychosomatic criteria. However, Keltikangas-Jarvinen (1985) did by comparing patients with gastrointestinal disorders thought to be psychosomatic (ulcerative colitis, peptic ulcer, and irritable bowel) to patients with organic diseases (gallstone disease, inguinal hernia, and varicose veins) with Vogt et al.'s scale but found that it did not significantly differentiate groups. Tibon et al. (2005) used a new Rorschach index, the Reality–Fantasy Scale (RFS), and found that it was strongly associated with TAS–20 scores in a sample of patients with chronic medical disease. However, this scale was developed for a different purpose and does not aim primarily at assessing alexithymia with the Rorschach.

Because no firm conclusion can be drawn from literature, in a previous study, Porcelli and Meyer (2002) attempted to address some of the methodological problems by, for example, using the currently most popular Rorschach system (the CS; Exner, 1993), assessing interscorer reliability, and using a well-validated external criterion (i.e., the TAS–20). In a group of inflammatory bowel disease (IBD) patients, they found that 24 out of 27 CS variables, a priori selected as theoretically consistent with the alexithymia construct and grouped in six clusters of fantasy, affect, adaptive resources, cognition, social adaptation, and projection, were able to significantly differentiate three subgroups of patients with absent, moderate, and severe alexithymia (based on the TAS–20 cutoff scores) in the expected direction. In this study, we aimed to develop a Rorschach Alexithymia scale by pursuing the previous line of research shown in Porcelli and Meyer's (2002) study. In contrast to Porcelli and Meyer's study, we analyzed TAS–20 continuous scores instead of dichotomous scores, consistent with the current view of alexithymia as a personality dimension and not a categorical trait (Parker, Keefer, Taylor, & Bagby, 2008). Our goal was to develop a Rorschach scale to assess for alexithymia using a new sample of outpatients and to cross-validate it with Porcelli and Meyer's IBD sample.

METHOD

Participants

The samples were taken from two different adult populations in Italy. The sample used to initially develop the scale was a psychiatric outpatient group consisting of 127 adults (57.5% women) with a mean age of 30.4 years ($SD = 9.9$) and a mean education of 13.0 ($SD = 3.7$) years. The sample used for cross-validation was the group of medical patients with IBD used in Porcelli and Meyer's (2002) study consisting of 92 adults (42.4% women) with a mean age of 36.2 years ($SD = 8.9$) and a mean education of 11.2 ($SD = 3.0$) years.

Measures

The Rorschach test was administered and scored according to the CS (Exner, 1993; Exner & Erdberg, 2005). The CS is the most commonly used Rorschach scoring system and has shown excellent psychometric properties. Excellent reliability has been evidenced across clinical and nonclinical samples, with intraclass correlation coefficients ranging from .82 to .97 (Meyer et al., 2002). Using studies with a wide variety of test predictors, criterion variables, and study populations, a meta-analysis showed an overall validity effect size of .29 for the Rorschach variables (Hiller, Rosenthal, Bornstein, Berry, & Brunell-Neuleib, 1999).

The TAS–20 is comprised of 20 items rated on 5-point Likert scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The Italian version of the TAS–20, used in this study, showed good internal consistency (Cronbach's α of .75 and .82 in normal and clinical groups, respectively) and high test–retest reliability over 2 weeks ($r = .86$). In addition to the total score, the TAS–20 yields scores for three factor scales: DIF, DDF, and EOT. A confirmatory factor analysis revealed the same factor structure as the original English version and adequate internal consistency of the subscales, with α coefficients equal or greater than .70 (Bressi et al., 1996).

Procedures

Psychiatric outpatients were referred for psychological consultation for a variety of psychological problems associated with functional somatic disorders and/or psychopathology. All psychiatric outpatients received a psychiatric diagnosis through the Italian version of the Structured Interview for the *Diagnostic and Statistical Manual of Mental* Disorders (4th ed. [*DSM–IV*]; American Psychiatric Association, 1994) Disorders (SCID; First, Spitzer, Gibbon, & Williams, 2000). The most common psychiatric diagnoses were, in order, somatoform (25.2%), anxiety (22.1%), mood (21.2%), personality (15.7%), and adjustment (7.1%) disorders. Outpatients were excluded if they had a psychotic disorder. The psychiatric outpatients were enrolled during the psychological consultations, whereas the IBD patients were consecutively enrolled during the routine medical follow-up consultations. Further details on the recruitment of the IBD patients can be found in Porcelli and Meyer (2002).

Patients were initially administered the Rorschach test according to the CS administration standards before completing the TAS–20. For the IBD group, as described in Porcelli and Meyer (2002), the TAS–20 was also administered after 6 months of routine follow-up, and the mean of the two TAS–20 results was used for that group. Although both the Rorschach and the TAS–20 were given by P. Porcelli, we administered the Rorschach and scored it before the TAS–20. The investigator (P. Porcelli) was therefore blind to the alexithymia score of each patient at the time he administered and scored the Rorschach.

RESULTS

The TAS–20 mean score for the psychiatric outpatients was 52.2 ($SD = 12.9$); and in the IBD sample, using the mean of both of their TAS–20s, it was 52.1 ($SD = 12.1$). Therefore, although the IBD sample showed some significant differences compared to the psychiatric sample (lower prevalence of women, older age, and less education years), the two groups had similar levels of alexithymia.

Reliability of Rorschach Protocols and Scores

All 127 psychiatric outpatients gave valid Rorschach protocols with an adequate number of responses ($R \geq 14$); 10 of the 102 IBD patients gave an insufficient sampling of responses ($R < 14$; Exner, 1993). As it was not possible to administer the test a second time, we excluded the 10 patients from the study, leaving 92 IBD patients with data for analysis.

As described in Porcelli and Meyer (2002), we randomly selected 30 protocols to evaluate interrater agreement. The examiners (including P. Porcelli) involved in the interrater agreement trial were adequately trained in the CS and had extensive experience with this system. Because the Rorschach protocols were initially obtained and written verbatim in Italian, the 30 protocols were translated into English. They were rescored twice, in the English translation and in the original Italian version. The scoring was done blindly and independently without discussion between scorers. The mean intraclass correlation coefficient (ICC) was $.87 \pm .11$ in the Italian–English interrater trial. The variables used in the study obtained ICC values that ranged from .72 (for FC) to 1.00 (for R, Afr, Blends, Pure Form%, and Zf). The Italian–Italian interrater trial showed higher scoring agreement (mean ICC $= .96 \pm .07$), ranging from ICC $=$ 0.90 (for X–%) to ICC $= 1.00$ (for R, WSumC, FC, Afr, and Pop). Notable discrepancies between the two interrater trials concerned FC, FD, X–%, M, passive movements, and SumT. The differences in reliability might be due to slight linguistic modifications in translation from Italian to English, leading to different CS scores. Alternatively, because P. Porcelli trained the second Italian rater, the within-site reliability may have been higher than the cross-site reliability. In either case, the results of both ICC analyses showed generally excellent agreement between raters.

Development of the Rorschach Alexithymia Scale

As the first step, we aimed to reduce the number of CS variables to use in the construction of the alexithymia scale. Especially, we were interested in the scale's ease of use in practice and wished to focus it on the most common, nonredundant, and potent predictors. Therefore, the initial pool of 27 CS variables used in Porcelli and Meyer's (2002) study[1] was first reduced by eliminating nontypical CS scores (A%, Cont%, R-Engagement, and M with FQo and FQu, and M+FM+m). We also eliminated completely overlapping scores (i.e., we excluded EA and EB but kept their component variables M and WSumC). This method left 20 CS variables for use clustered in four groups of fantasy, affect, cognition, and interpersonal relationships. The descriptive statistics of these variables for each of the two samples are shown in Table 1.

Next, we computed the correlation of the CS variables with the TAS–20 in both samples. Although the correlations are reported for both samples in one table for efficiency, we first determined if there are any relatively unreliable variables in the initial (outpatient) sample on which the scale would first be developed, which we defined as Rorschach variables that did not show at least a solidly medium effect size (i.e., $r < |.30|$). The Pearson's r coefficients and the expected direction are shown in Table 2. We note that all but three variables (DEPI, An+Xy, and imbalanced a:p) correlated with the TAS–20 in the expected direction, regardless of their statistical level of significance. Narrowing the pool to those variables that showed an effect size of at least |.30| and were correlated in the expected direction in the outpatient sample resulted in the following variables: Form%, CDI, Blends, Sum6, DQ+, M, SumT=0, FD, Pop, WSumC, Zf, and PSV.

To reduce the overlap and increase the independence of the Rorschach variables, we reduced the pool of items by eliminating component variables of parent scales but only those that did not add extra variance in predicting the TAS–20. To deter-

[1] In this as well in Porcelli and Meyer's (2002) studies, we used the percentage of pure Form responses (Form%) rather than the conventional Lambda index because Form% has been suggested as more suitable in research studies than Lambda because of a better distribution (Meyer, Viglione, & Exner, 2001).

TABLE 1.—Descriptive statistics of the Rorschach CS variables for the OPT and IBD samples.

Groups	Variables	Clinical Meaning	*M*	*Mdn*	*SD*	Range	Skewness	Kurtosis
Fantasy	R (OPT)		23.64	22	7.73	14–62	1.78	5.09
	R (IBD)	Individual extent of	17.77	17	3.51	14–28	1.23	.95
	M (OPT)	mental representations	2.73	2	2.73	0–15	1.44	2.74
	M (IBD)		1.97	1	1.73	0–6	.67	−.75
	X–% (OPT)		.26	.25	.11	.06–.57	.53	.02
	X–% (IBD)	Projective features (enriched responses	.20	.22	.10	.00–.47	.17	.10
	Sum6 (OPT)	beyond the stimulus features)	2.02	1	2.29	0–9	1.03	.18
	Sum6 (IBD)		3.81	3	3.20	0–11	.67	−.73
Affect	WSumC (OPT)	Range of affective experience	3.19	2.5	2.80	0–14.0	1.51	2.71
	WSumC (IBD)		2.99	2.3	2.20	0–9.5	.91	.14
	FC (OPT)	Ability to modulate affect	2.18	2	1.87	0–10	1.33	2.32
	FC (IBD)		2.01	1.5	1.94	0–7	1.03	.20
	Afr (OPT)	Level of emotional involvement	.50	.47	.17	.18–1.29	1.11	3.02
	Afr (IBD)		.49	.45	.16	.22–1.00	.78	.45
	DEPI (OPT)	Depressive mood	4.22	4	1.39	0–7	−.37	−.09
	DEPI (IBD)		4.39	4.5	1.35	1–7	−.26	−.58
	Blends (OPT)	Psychological complexity	3.84	3	3.40	0–18	1.00	1.20
	Blends (IBD)		3.47	2.5	2.68	0–9	.66	−.76
Cognition	Form%[a](OPT)	Simplistic thinking	.46	.45	.24	.00–.94	−.10	−1.03
	Form%[a] (IBD)		.44	.44	.22	.04–.93	.13	−.99
	An+Xy (OPT)	Somatic preoccupations	2.04	1	2.43	0–14	2.13	6.14
	An+Xy (IBD)		1.89	1	1.96	0–10	1.35	2.46
	DQ+ (OPT)	Integrative skills	4.06	4	3.26	0–15	.79	.33
	DQ+ (IBD)		3.43	3	2.49	0–11	.76	.12
	Imbal. a:p[b] (OPT)	Ideational rigidity	.57	1	.50	0 or 1	−.27	1.96
	Imbal. a:p[b] (IBD)		.46	0	.50	0 or 1	.18	−2.01
	Zf (OPT)	Efforts for integration	9.92	9	4.19	1–22	.40	.08
	Zf (IBD)		9.49	9	3.81	3–22	.97	1.88
	FD (OPT)	Introspective skills	.99	1	1.25	0–6	1.35	1.72
	FD (IBD)		.72	0	1.16	0–7	2.38	8.46
	PSV (OPT)	Stereotypic ideation	.42	0	.68	0–3	1.52	1.48
	PSV (IBD)		.42	0	.65	0–3	1.52	2.13
Interpersonal relations	Pop (OPT)	Social conformism	5.80	6	2.24	1–11	.13	−.70
	Pop (IBD)		5.95	6	2.12	3–10	.48	−.76
	Pure H (OPT)	Interpersonal interest	1.33	1	1.34	0–8	1.81	5.52
	Pure H (IBD)		.95	1	1.02	0–4	1.06	.62
	CDI (OPT)	Social incompetence	3.38	4	1.18	0–5	−.74	.19
	CDI (IBD)		3.47	4	1.24	0–5	−.67	−.36
	SumT (OPT)	Intimacy needs	.72	0	1.25	0–7	2.25	6.01
	SumT (IBD)		.62	0	.77	0–3	1.37	1.98

Note. $N = 219$. CS = Comprehensive System; OPT = outpatient; IBD = inflammatory bowel disease; *Mdn* = median.
[a]Form% = F/R. [b]Imbalanced a:p = active movements as higher than three times as passive movements and vice versa.

mine the latter, we used hierarchical regression analyses, with entry alpha levels of .05 and removal levels of .10. Because T, FD, WSumC, and M contribute to Form%, Blends are strongly related to Form%, and T and WSumC contribute to the CDI, we evaluated the potential extra variance added by these five scores (i.e., T, WSumC, M, FD, and Blends) in predicting the TAS–20. Because T and WSumC contribute to both the CDI and Form%, we entered the latter two variables into the model first using forced entry, which accounted for 61% ($R = .78$) of the variance in the first block. When T and WSumC were each independently entered into the second block, T added a significant amount of variance to predicting the TAS–20 (R^2 change $= .05$, F change [1, 123] $< .001$), but WSumC did not (R^2 change $= .003$, F change [1, 123] $= .30$). To determine if FD, Blends, and M predicted additional variance of the TAS–20 over Form%, we entered the latter into the model first using forced entry, and it accounted for 56% ($R = .75$) of the variance. When we independently entered FD, Blends, and M into the second block, each added a significant amount of variance to predicting the TAS–20 (respectively: R^2 change $= .022$, .014, and .117; F change [1, 24] $= .011$, .046, and $< .001$). These analyses eliminated WSumC, thus leaving the following 11 variables: Form%, CDI, Sum6, DQ+, M, T, Pop, Zf, FD, Blends, and PSV.

Different approaches can be used to construct a scale once key variables have been identified. We decided to use a method that weights each of the variables in a formula and then we converted the resulting raw score to a T score. This is different from how the CS constellation indexes such as DEPI or PTI are currently used, as they currently function similarly to *DSM–IV* diagnoses by using a "checklist" of dichotomized variables. However, dichotomization discards information and lowers reliability and validity relative to a dimensional approach (MacCallum, Zhang, Preacher, & Rucker, 2002). Converting the final scale score into a T score also reports the information in a metric that psychologists are accustomed to.

Therefore, we entered all of the 11 Rorschach variables mentioned previously (i.e., Form%, CDI, Sum6, DQ+, M, T, Pop, Zf, FD, Blends, and PSV) into a model using forced entry regression analyses, and we used the resulting unstandardized coefficients as the variable weights (see Model 1 in Table 3). The

TABLE 2.—Correlations between CS Variables and TAS–20 in the Two Samples.

Variable	Psychiatric Outpatients ($N = 127$)	IBD ($N = 92$)	Expected
R	−.23**	−.12	Negative
M	−.72**	−.53**	Negative
X−%	−.01	−.20	Negative
Sum6	−.39**	−.46**	Negative
WSumC	−.55**	−.19	Negative
FC	−.29**	−.55**	Negative
Afr	−.07	−.20	Negative
DEPI	−.14	−.09	Positive
FD	−.52**	−.35**	Negative
Blends	−.65**	−.46**	Negative
Form%	.75**	.68**	Positive
An+Xy	.06	−.06	Positive
DQ+	−.62**	−.43**	Negative
Imbal. a:p	−.21*	−.33**	Positive
Zf	−.43**	−.26*	Negative
PSV	.35**	.41**	Positive
Pop	.54**	.66**	Positive
Pure H	−.24*	−.13	Negative
CDI	.50**	.45**	Positive
T > 0	−.55**	−.60**	Negative

Note. CS = Comprehensive System; TAS–20 = 20-item Toronto Alexithymia Scale; IBD = inflammatory bowel disease.
* $p < .05$. ** $p < .01$.

resulting equation accounted for 77.4% of the variance in the outpatient sample ($R = .880$). When evaluating these results, however, we decided to omit Sum6, DQ+, Zf, FD, Blends, and PSV from the model and redo the analyses because all 6 had low beta weights and significance levels over .05. The results of this second regression analysis are reported as Model 2 in Table 3, which accounted for 75.6% of the variance in the outpatient sample ($R = .869$). These resulting beta weights and the amount of variance accounted for in Model 2 are similar to Model 1, and it reduces the number of variables in the scale from 11 to 5 while sacrificing very little variance.

Applying the formula created in the outpatient sample to the IBD sample and using it to predict TAS–20 scores in the IBD sample resulted in accounting for 61.2% of the variance ($R = .782$) compared to 77.4% of the variance ($R = .863$) in the initial outpatient sample. With the IBD sample, we applied the same steps that we did with the outpatient sample. The procedure retained the same three variables (Form%, CDI, and Pop), which were also included in the model that was constructed using the outpatient sample (Table 3, Model 2). The results of the regression analysis with the IBD sample using Form%, CDI, and Pop are reported as Model 2 in Table 4, which accounted for 61.7% ($R = .786$) of the variance in predicting the TAS–20. Applying the regression formula created in this IBD sample to the outpatient sample also resulted in accounting for 61.7% ($R = .786$) in predicting the TAS–20. This was also almost identical to the amount of variance in predicting the TAS–20 by applying the regression formula created on the outpatient sample to the IBD sample (61.2%; $R = .782$). Therefore, we decided to use the formula developed on the IBD sample to create the final scale.

To construct the final scale—the Rorschach Alexithymia Scale (RAS)—we employed the regression formula from Model 2 in Table 4 using the raw score weights. This resulted in the formula shown in the Appendix that can be readily applied to any single Rorschach protocol in practice and should be rounded off to a whole number. In this combined outpatient and IBD sample, the RAS raw score had a mean of 51.94 and *SD* of 9.58 (range = 29.36–73.31) and largely correlated with the TAS–20 total score ($r = .78$, $p < .001$) and the three factor scales (with DIF at .77, DDF at .63, and EOT at .69, $p < .001$; Table 5).

TABLE 3.—Forced entry regression analysis for CS variables predicting the TAS–20 in the outpatient sample.

	Model 1				Model 2			
Variable	*B*	*SE*	*β*	*p*	*B*	*SE*	*β*	*p*
(Constant)	38.20	4.26		.001	38.16	3.60		.001
Form%	18.08	4.57	.31	.001	16.71	3.75	.29	.001
CDI	1.83	.66	.16	.007	1.50	.64	.13	.021
Sum6	.27	.31	.04	.420				
DQ+	−.08	.38	−.02	.823				
M	−1.41	.39	−.28	.001	−1.71	.33	−.34	.001
T > 0	−6.53	1.57	−.23	.001	−5.33	1.49	−.18	.001
Pop	1.52	.34	.25	.001	1.50	.32	.24	.001
Zf	−.41	.22	−.12	.072				
FD	−.64	.68	−.06	.348				
Blends	.52	.35	.13	.146				
PSV	.53	1.01	.03	.598				

Note. $N = 127$. CS = Comprehensive System; TAS–20 = 20-item Toronto Alexithymia Scale; *SE* = standard error.

TABLE 4.—Forced entry regression analysis for CS variables predicting the TAS–20 in the IBD sample.

	Model 1				Model 2			
Variable	B	SE	*β*	*p*	B	SE	*β*	*p*
(Constant)	25.50	6.11		.001	22.04	3.01		.001
Form%	16.36	6.64	.30	.016	19.65	4.66	.36	.001
CDI	2.00	.75	.20	009	1.98	.72	.20	.007
Sum6	.09	.34	.02	.803				
DQ+	.28	.42	.06	.499				
T > 0	−4.32	2.22	−.18	.054				
Pop	2.16	.52	.38	.001	2.44	.45	.43	.001
PSV	.90	1.47	.05	.544				

Note. $N = 219$. CS = Comprehensive System; TAS–20 = 20-item Toronto Alexithymia Scale; IBD = inflammatory bowel disease; *SE* =standard error.

TABLE 5.—Correlations between the Rorschach Alexithymia Scale (RAS; total and individual CS variables) and the alexithymia measure (total and factor TAS–20 scores).

Variable	TAS–20 Total Score	DIF	DDF	EOT
RAS	.78	.78	.63	.69
Form%	.72	.73	.57	.62
CDI	.47	.47	.34	.42
Pop	.58	.57	.50	.53

Note. $N = 219$. CS = Comprehensive System; TAS–20 = 20-item Toronto Alexithymia Scale; DIF = difficulty identifying feelings; DDF = difficulty describing feelings; EOT = externally oriented thinking.
All p values < .001.

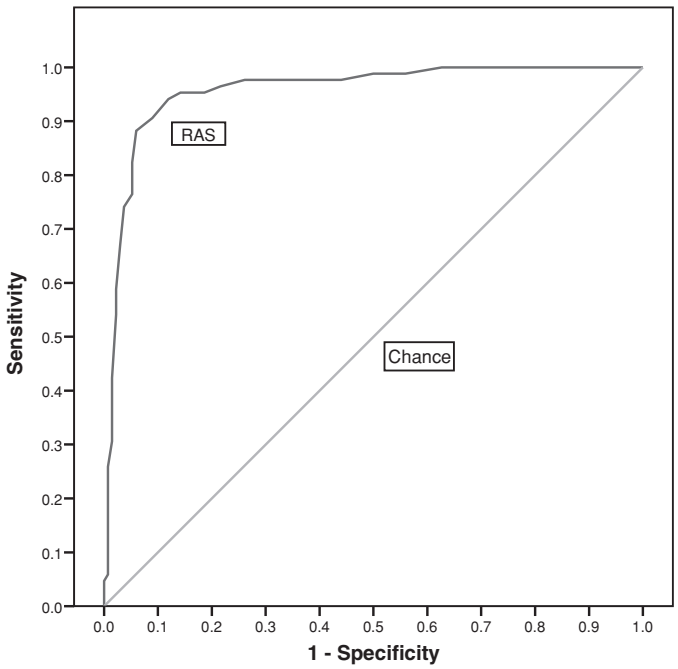

FIGURE 1.—Receiver operating characteristic curve for the Rorschach Alexithymia Scale (RAS).

RAS Diagnostic Efficiency

To determine the extent to which the RAS can accurately identify alexithymia, we used the following established TAS–20 cutoff scores to derive RAS cutoff scores (Taylor et al., 1997): <50 for no alexithymia, 50 to 60 for intermediate alexithymia, and >60 for alexithymia. To use more meaningful values, first we rounded off the RAS raw scores to whole numbers; 85 (38.8%) out of the 219 participants in the combined sample had a TAS–20 score greater than 60 and were therefore classified as alexithymic. Next, we conducted a receiver operating characteristic (ROC) curve analysis, which shows the trade-off between sensitivity and specificity. The resulting ROC curve is shown in Figure 1.

The ROC analysis also derives the area under the curve (AUC) using the association between sensitivity and specificity. The AUC is an overall index of the accuracy of discrimination provided by a scale in which 1.0 represents a perfect test and .50 indicates chance discrimination, that is, a worthless test. The AUC for the RAS raw score was very large (.956), indicating an excellent level of sensitivity and specificity of the RAS.

Next, we used the results of the ROC analysis to examine the sensitivity and specificity of the RAS using different cutting scores. Table 6 presents the sensitivity (accuracy identifying true positives), specificity (accuracy identifying true negatives), and overall correct classification rate (hit rate) for different cutting scores. A cutting score of 56 gave both the best OCC rate (.918) and maximized the sensitivity (.882) and specificity (.940) values.

TABLE 6.—Cutting scores for the Rorschach Alexithymia Scale (RAS) and resulting sensitivity, specificity, and overall hit rates for discriminating between TAS–20 > 60.

RAS Cutting Score	Sensitivity	Specificity	OCC
53	.953	.858	.895
54	.941	.881	.904
55	.906	.910	.909
56	**.882**	**.940**	**.918**
57	.824	.948	.900
58	.765	.948	.877
59	.741	.963	.877

Note. $N = 127$. The optimal cutting score is bolded. TAS–20 = 20-item Toronto Alexithymia Scale; OCC = overall correct classification.

DISCUSSION

In a previous research article (Porcelli & Meyer, 2002), a pool of Rorschach CS variables, a priori selected as theoretically consistent with the alexithymia construct, were associated with the severity of alexithymia in a group of medical patients with chronic inflammatory intestinal disease. Extending this line of research, in this study, we developed a Rorschach scale for alexithymia (the RAS) derived from the original pool of CS scores used in Porcelli and Meyer (2002) that we evaluated with a well validated measure of alexithymia (TAS–20) using an additional sample of outpatients for cross-validation purposes. The three CS variables included in the RAS—Form%, CDI, Populars—showed large associations (effect sizes [r] ranging from .42 to .78) with the TAS–20. RAS cutoff scores were established that showed excellent diagnostic accuracy (hit rate of 92%, sensitivity of 88%, specificity of 94%, and AUC value of .96). The RAS formula can be calculated by using the formula in the Appendix. Furthermore, as it is suggested for the Ego Impairment Index (Viglione, Perry, & Meyer, 2003) whose formula is based on a similar approach, by using the RAS subcomponent contributions, one can calculate each subcomponent's contribution to the final RAS score. As a clinical example, a 33-year-old woman with panic disorder with agoraphobia and TAS–20 = 77 (a high alexithymia score) obtained a RAS raw score of 59 resulting from the following calculation: 22.04+ 19.65 (Form% = .40) + 1.98 (CDI = 5) + 2.44 (Pop = 8). The largest contribution to the final RAS score coming from Pop [2.44(8) = 19.52] followed by CDI [1.98(5) = 9.90] suggests that interpersonal inadequacy—rather than simplistic, concrete thinking (i.e., Form%)—plays a major role in the client's difficulty in affect regulation, which in turn is likely to be involved in her panic disorder.

The three CS variables included in the RAS are theoretically consistent with basic facets of the construct of alexithymia. One variable, the percentage of pure form (Form%), is related to the cognitive dimension of processing external and internal stimuli. Form% showed the strongest association with the TAS–20 and the largest weight in the RAS formula, and its interpretation (e.g., Exner & Erdberg, 2005; Weiner, 2003) is highly consistent with a thinking style that typifies alexithymia—difficulty expressing affective states, low awareness of emotional states, poor fantasy, and selective focusing on concrete stimuli. High Form% (or Lambda) is thought to measure concrete and simplistic thinking, narrow perceptual field, avoidance of complexity, restricted and stereotypical ideation, limited openness to experience, and a limited ability to integrate different aspects of the stimulus field into a meaningful frame.

Alexithymia can be conceived as an emotional equivalent of blindsight (Lane, Ahern, Schwartz, & Kaszniak, 1997), and this

view is conceptually consistent with high Form% (or Lambda) accompanied by low M, that is, poor imagination, low awareness of feelings, and inability to represent experience mentally in oneself and others (Exner & Erdberg, 2005; Weiner, 2003). Although M did not enter the final formula for calculating the RAS, across both samples of this investigation, it was much lower ($M = 2.42$, $SD = 1.99$) than the CS reference value ($M = 4.83$, $SD = 2{:}18$) and slightly lower than the recently published Italian sample ($M = 3.19$, $SD = 2.15$; Lis, Parolin, Salcuni, & Zennaro, 2007); patients with low M (i.e., 0 or 1) had TAS–20 scores significantly higher, $t(217) = 15.86$, $p = .003$, than patients with M > 1; M was retained in the model in the psychiatric outpatient sample (see Table 3), and clinical experience suggests that the joint interpretation of low M and high Lambda may be indicative of poor mentalization.

Two of the CS codes in the RAS are related to the interpersonal dimension, namely, high Popular responses and high CDI. High Pop is thought to relate to strong commitment to conventionality and to adhere to social norms in a conformist way, thus reducing the subjective dimension of personal involvement in the social adaptation. High scores on CDI may indicate both limited available adaptive resources, difficulty managing interpersonal relationships, and low ability to promote oneself through effective and rewarding feedback from significant others.

The combination of Pop and CDI seems consistent with the limited interpersonal skills described in alexithymic subjects, although it is not clear whether conformist interpersonal relationships should be seen as a consequence of the alexithymic cognitive deficit of emotional processing or a distinct alexithymia facet defined by a deficit to use social interactions for affect regulation (Taylor et al., 1997). Previous studies have reported that subjects with high levels of alexithymia show cold and socially avoidant behavior (Spitzer, Siebel-Juerges, Barnow, Grabe, & Freyberger, 2005), reduced social support (Kojima, Senda, Nagaya, Tokudome, & Furukawa, 2003; Posse, Hallstrom, & Backenroth-Ohsako, 2002), disrupted parental bonding (King & Mallinckrodt, 2000; Kooiman et al., 2004), and insecure attachment (Troisi, D'Argenio, Peracchio, & Petti, 2001; Wearden, Lamberton, Crook, & Walsh, 2005).

We mention two surprising results in this study. First, although CS codes for affect were associated with the TAS–20, none of these codes entered the regression equation for building the RAS. We have no definite explanation for this unexpected finding. One possible explanation is that the Rorschach test may have lower predictive validity for affect dimensions than other personality dimensions. Alternatively, the cognitive and interpersonal dimensions of alexithymia assessed with the Rorschach have higher priority and subsume the affect-related codes. Finally, the TAS–20 as criterion might have highlighted more of the cognitive aspect of the alexithymia construct when assessed with the Rorschach.

Second, to the best of our knowledge, the RAS obtained the highest effect size ($r = .79$) with the TAS–20 compared to other Rorschach scores (Porcelli, 2004) as, for example, the RFS (Tibon et al., 2005; .60), and observer-based measures such as the Toronto Structured Interview for Alexithymia (Bagby et al., 2006; .68). These figures are very high if one considers the low effect sizes found between heteromethod assessment measures both in general (Meyer, Finn, et al., 2001) and in the alexithymia research field (Lumley, Gustavson, Partridge, & Labouvie-Vief, 2005), with typical coefficients ranging from $r = .10$ to .30. Also for that we do not have definite explanations. One possible explanation is the composition of our sample. Most psychiatric patients had symptoms of somatization, and a quarter fulfilled *DSM–IV* criteria for somatoform disorders; and medical patients had a severe, chronic inflammatory disease that hampers quality of life and is associated with psychological problems (Moser, 2006). Our findings might have been therefore influenced by clinically significant psychological symptoms that were not controlled for. Furthermore, we used the CS and the TAS–20, whereas previous studies have used other Rorschach scoring systems and less reliable methods for assessing alexithymia (e.g., Acklin & Alexander, 1988; Akimoto, Fukunishi, Baba, Matsumori, & Iwai, 2002; Petot, 1996). Our results need therefore to be confirmed by further studies to ascertain both the predictive validity of RAS for different personality dimensions and the use of multiple external criteria in the evaluation of alexithymia with the Rorschach.

Some issues limiting the generalization of these findings should be acknowledged. For example, one single external criterion for alexithymia was used, the self-report TAS–20, and therefore the association with the Rorschach variables might have been influenced by the self-reported nature of information on alexithymic features. Other methods should be used to ascertain whether the RAS shows similar construct validity. Furthermore, the validity of the RAS was not compared with other methods for assessing alexithymia such as structured interviews and other performance-based tests (see Bagby et al., 2006). This limitation does not allow evaluating the incremental validity of this Rorschach scale over and above other reliable methods. Finally, because diagnostic accuracy is strongly affected by base rates, it is important to note that 39% of patients scored in the high range on the TAS–20, which is somewhat higher than expected in other clinical settings or general population (Lumley et al, 2007). It is possible that the diagnostic efficiency of the RAS might decrease in settings with lower prevalence of alexithymia. Further studies are needed by using different samples recruited from various clinical and research settings as well as multiple assessment methods for alexithymia.

The need for multiple measures of alexithymia has been repeatedly underscored in recent years with the double aims of reducing the potential influence of monomethod assessment response biases and of enhancing the understanding of the multifaceted construct of alexithymia (Bagby et al., 2006; Lumley, 2000; Taylor & Bagby, 2004). In this regard, however, an important limitation is constituted by the fact that the most validated measure of alexithymia, the TAS–20, is a self-report scale. With this in mind, recently several studies have compared non-self-report measures of alexithymia with the TAS–20 to integrate multiple sources of information such as structured interview (Bagby et al., 2006), by-proxy assessment (Berthoz, Haviland, Riggs, Perderau, & Bungener, 2005), and observer-based criteria (Beresnevaité, Taylor, & Bagby, 2007; Porcelli & De Carne, 2001). Even though our results should be replicated with different samples, the RAS represents a further contribution for future heteromethod studies on alexithymia by integrating the Rorschach test with the gold standard, self-reported TAS–20.

The results of this study suggest that the RAS might have potential clinical utility, bearing in mind the limitations that accompany a new scale. The RAS could be used in clinical practice when the Rorschach is administered in routine

personality examinations. If clinical observations show concerns for alexithymia features, and the client's RAS score is in the positive range, clinicians might consider widening the assessment with a deeper and systematic evaluation of alexithymia. The information obtained by the RAS overall score and its components can be used as indicators of alexithymia-related psychological functioning that should be explored further.

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APPENDIX

Formula for Calculating the Rorschach Alexithymia Scale (RAS)

$$\begin{array}{rcrcrcrcl} & & & & & & & & 22.04 \\ 19.65 & \times & \text{Form\%}^a & = & \_\_\_\_\_ & = & + & \_\_\_\_\_ & \\ 1.98 & \times & \text{CDI} & = & \_\_\_\_\_ & = & + & \_\_\_\_\_ & \\ 2.44 & \times & \text{Pop} & = & \_\_\_\_\_ & = & + & \_\_\_\_\_ & \\ & & \text{Total RAS raw score} & & & & = & \_\_\_\_\_ & \\ & & & & & & & & \text{(round to the nearest whole number)} \end{array}$$

[a] Form% = Pure F/R.