Refinements in the Rorschach Ego Impairment Index Incorporating the Human Representational Variable

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The Ego Impairment Index (EII; Perry & Viglione, 1991) is a composite measure of psychological impairment and thought disturbance developed from the empirical and theoretical literature on the Rorschach. In this article, we summarize reliability and validity data regarding the EII. Our major goal was to present the rationale and empirical basis for recent refinements in the EII. Among the subcomponents of the original EII was the Human Experience variable (HEV), which has recently been revised and replaced with the Human Representational variable (HRV; Viglione, Perry, Jansak, Meyer, & Exner, 2003). In this study, we replaced the HEV with the HRV to create the EII–2. This was accomplished by recalculating the factor coefficients with a sample of 363 Rorschach protocols. We present additional validity data for the new EII–2. Research recommendations and interpretive guidelines are also presented.

The Ego Impairment Index (EII; Perry & Viglione, 1991) has emerged as a measure of psychological impairment and thought disorder. It is a theoretically derived, composite variable obtained from factor analysis of Comprehensive System (CS; Exner, 1993) variables. The EII was intended to provide data regarding deficits in ego functions (reality testing, reasoning processes, and the quality of object relations) beyond that which can be obtained via self-report and symptom rating scales. Perry, Viglione, and Braff (1992) suggested that the Rorschach offers an optimal opportunity to measure impairment because it induces the respondent to use available cognitive, affective, and human or representational resources to organize a response to an ambiguous and complex task. The Rorschach instructions, administration context, and stimuli offer the respondent very little guidance and structure The EII incorporated five subcomponent variables selected to correspond with one or more of these ego functions. Each of the variables, in various forms, has shown empirical associations with impairment and psychological disturbance (e.g., see summaries in Exner, 1993; Perry & Viglione, 1991; Viglione, 1999; Weiner, 1966). We describe the five EII subcomponent variables briefly following:

1. Distorted Form Quality (FQ–) measures perceptual inaccuracy or poor reality testing.
2. The weighted sum of the six cognitive Special Scores (WSum6) measures thought disturbance in various

Rorschach responses, and social discourse. They include anatomy, blood, explosions, fire, food, sex, X-ray contents, and both aggressive and morbid Special Scores.[1]

4. Distorted Human Movement responses (M–) are another measure of thought disturbance but unlike WSum6 capture distortions in interpersonal perception or object representations.
5. The Good-to-Poor Human Experience variable

(Eckblad & Chapman, 1983; $r = .41$) and Scales 6 ($r = .47$), 8 ($r = .41$), and Ego Strength ($r = –.44$) from the Minnesota Multiphasic Personality Index (MMPI; Hathaway & McKinley, 1943). The EII also differentiated between smaller groups of paranoid ($n = 14$) and nonparanoid ($n = 12$) schizophrenic patients who were matched on age and education. As expected, the nonparanoid (undifferentiated and disorganized subtypes) patients scored higher on the EII, thus demonstrating more impairment (Cohen's $d = 1.37$; $r = .56$). The CS Schizophrenia Index did not differentiate these two groups, suggesting some incremental validity for the EII.

Perry, Moore, and Braff (1995) examined gender differences on three measures of thought disturbance among patients with schizophrenia. Male and female patients demonstrated similar degrees of thought disturbance on the standard symptom-rating scales but the male patients had higher EII scores (Cohen's $d = .58$). This finding is consistent with the widely held hypothesis that male patients with schizophrenia have a more "malignant" form of the disease. The researchers also found a strong relationship between the EII and a gross measure of social competency ($r = –.42$). Observer and interview rating scales of thought disorder were not associated with social competency or with gender, again suggesting incremental validity for the EII.

Among patients with schizophrenia, Perry and Braff (1994) demonstrated a relationship between information processing deficits and disturbances in thinking as measured by the EII and its subcomponent variables. The EII was correlated in the expected direction with visual backward masking ($r = –.40$, $p < .01$; $N = 35$), auditory prepulse inhibition ($r = –.26$, $p > .10$; $N = 39$), and tactile prepulse inhibition ($r = –.23$, $p > .10$; $N = 35$). In the Perry and Braff (1994) study, Poor Human Experience (PHE) an EII subcomponent, was consistently and strongly associated with these tasks. PHE was correlated with visual backward masking ($r = –.42$, $p < .01$; $N = 35$), auditory prepulse inhibition ($r = –.37$, $p < .025$; $N = 39$), and tactile prepulse inhibition ($r = –.35$, $p < .025$; $N = 35$). Interview, or observationally based thought disorder measures, and self-report were not associated with these neurophysiological information-processing measures. None of the 12 relevant self-report or interview correlations were significant at $p < .05$, and they ranged in magnitude from $r = –.27$ to $r = .05$, with negative correlations being in the expected direction. The mean correlation was $r = – .16$.

The association between the EII and neurophysiological information processing measures has been partially replicated in a sample of patients with schizotypal personality disorder (Cadenhead, Perry, & Braff, 1996). In this small study with limited power ($n = 13$), visual backward masking was associated with the EII ($r = –.78$, $p < .01$) but was not significantly associated with the PHE ($r = –.50$, $p < .06$).

These studies, typical of work with thought disorder measures, have addressed the relationship between predictors and criteria collected at two different points in time. When interpreting these nonsimultaneous data, the researchers have concluded that a causal or contemporaneous relationship exists between these two data sets. To eliminate some of the doubt in attributing thought disorder to information-processing problems, Rorschach responses and information-processing measures were collected in a near-simultaneous computerized procedure (Perry, Geyer, & Braff, 1999). In this small study with limited power ($N = 21$), information-processing deficits correlated reasonably well with subcomponents of the EII. The EII subcomponents were Form Quality, cognitive Special Scores (WSum6), and Critical Contents, all divided by the number of responses. Associations between these EII subcomponents and information-processing deficits were moderate to large (three nonsignificant and three significant correlations ranging fro/F2 1 Tf203 TD-197.5(s2II.)-17((ranW-220.1(fro/F2 1 n(CadenII.

TABLE 1
EII Descriptive Data for Adults Published in Journal Articles or Dissertations

Source	Sample Description	N	EII	
			M	*SD*
Netter, 1990	Nonpatient volunteers	20	–0.66	1.12
Perry & Viglione, 1991 from Haller & Exner, 1985	Inpatients with depression symptoms	50	0.00[a]	1.00[a]
Perry & Viglione, 1991	Outpatients, depression diagnosis	49	0.08	0.96
Auslander, 2000	Elderly nonpatients, *M* age = 75	45	0.19	0.83
Adrian & Kaser-Boyd, 1995[b]	Outpatients	24	0.23	0.93
Auslander, 2000	Elderly schizophrenic patients, stabilized on medications, some with late-life onset, *M* age = 60	44	0.25	1.08
Perry, McDougall, & Viglione, 1995	Perry & Viglione's (1991) outpatients 5 years later	17	0.30	0.85
Ingham, 1993	Women whose military husbands were about to deploy overseas	68	0.41	1.19
Adrian & Kaser-Boyd, 1995[b]	Clinical team diagnosis, nonpsychotic; inpatients and outpatients	48	0.52	1.3
Cadenhead, Perry, & Braff, 1996	SCID diagnosed schizotypal personality disorder	13	0.58	NA
Adrian & Kaser-Boyd, 1995[b]	Inpatients	61	1.1	2.1
Adrian & Kaser-Boyd, 1995[b]	Clinical team diagnosis, major depression; inpatients and outpatients	22	1.1	1.9
Adrian & Kaser-Boyd, 1995[b]	Clinical team diagnosis, psychotic; inpatients and outpatients	37	1.3	2.4
Perry & Braff, 1994[c]	Schizophrenia from structured interview	52	1.3	NA
McDougall, 1996	Schizophrenia from structured interview	40	1.55	2.16
Perry, Viglione, & Braff, 1992	Schizophrenia from structured interview	34	1.6	NA
Netter, 1990	Inpatient, schizophrenia diagnosis from locked residential-care ward	20	1.62	1.90

Note. EII = Ego Impairment Index; SCID = Structured Clinical Interview for *Dianostic and Statistical Manual of Mental Disorders—III–R*; NA = not applicable. [a]These descriptive data are for the original factor scores, which by definition set the mean equal to zero and the standard deviation equal to one. [b]The samples from Adrian and Kaser-Boyd (1995) study are overlapping in that respondents are contained in one of the setting groups (i.e., inpatient or outpatient) and one or more of the disorder groups (i.e., psychotic or nonpsychotic; depressed). [c]Includes 34 participants from Perry, Viglione, and Braff (1992).

among patients with schizophrenia and/or psychosis. From this perspective, the EII appears to measure thought disorder across a broad range of cognitive and psychological functioning (Kleiger, 1999; Perry, Minassian, Cadenhead, Sprock, & Braff, 2003).

As noted in the beginning of this article, the HEV is one of the five subcomponents of the EII. The HEV has been replaced by the HRV, which is a slightly modified and psychometrically improved variable (Viglione et al., in press). The challenge in this study was to preserve the EII while replacing the HEV subcomponent with the HRV. To accomplish this recalculation of the EII to create the EII–2, we used multiple regression analysis with a large and diverse sample to produce an equivalent, recalculated EII–2. We present that analysis here. We also present other data relevant to the psychometric characteristics and validity of the EII–2.

METHOD AND RESULTS

Participants

As described in the Viglione et al. (in press) article addressing the development of the HRV, we assembled a sample of 389 Rorschach records from adults in eight subgroups. These groups were selected to represent a diverse range of impairment and administration contexts and were matched as closely as possible to the 1997 to 1998 estimated census data for age and ethnicity. The sample was 50% female participants and 33% minority participants, with 20%f the sample being 25 years of age or less and 12% being older than 54 years of age. As described in the HRV article (Viglione et al., in press), the sample closely resembles the U.S. population characteristics in terms of age and ethnicity, but high school educated individuals were slightly underrepresented. The eight subgroups were selected to provide a great variety of psychological impairment and examination contexts. They include nonpatients and character disorder patients from CS reference samples (Exner, 2002), psychiatric outpatients and inpatients (Meyer, 1999), individuals with depression (Jansak, 1996), community nonpatients (Cassella, 1999; Green, 1995; Viglione, Gaudiana, & Gowri, 1997), offenders (Montemagni, 2003; DeLucas, 1997), and patients with schizophrenia (Perry et al., 1992). Because the Rorschachs were administered at many different sites by numerous administrators, the composite sample maximizes external validity across examiners and institutions. Of these records, 363 contained more than 13 responses and were retained in the final sample. Twenty-five were eliminated because they had fewer than 14 responses, and 1 contained an input error that the computer would not process.[3]

[3]Some of the subgroup data files included only summaries for age, ethnicity, and education. In other words, for these subgroups, demographic data were not stored by individual respondent within the computerized Rorschach summary files but instead were reported for the entire subgroup. Accordingly, we were unable to identify which participants were lost when we eliminated the records with less than 14 responses and thus cannot present the demographic information for the sample of 363. The great majority of the records with fewer than 14 responses came from the sample of individuals

can be interpreted according to the ranges in Table 5. To ensure that the EII–2 is interpreted on a continuum, the interpretive ranges overlap.

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APPENDIX A
Calculating the EII–2

These calculation procedures for the EII–2 reflect changes in the Human Representational variable (HRV). The EII–2 is a weighted sum and is calculated according to the following example. Note for actual calculations, the example values underlined would be replaced by patient-specific values.

Variable Name/Step	*Step 1: List Raw Values*		*Step 2: Multiply by Coefficients*		*Subcomponent Contributions*
No. of FQ– responses	3	×	.141	=	0.423
WSum6	7	×	.049	=	0.343
Critical Contents[a]	4	×	.072	=	0.288
M–	2	×	.198	=	0.396
Poor HRV	2	×	.117	=	0.234
Good HRV	9	×	(–.104)	=	–0.936
R[b]	19	×	(–.066)	=	–1.254
Step 3: Subtract the constant value of .038:				=	–0.038
Step 4: Calculate the total EII–2 by summing all the subcomponent values: .423 + .343 + .288 + .396 + .234 – .936 – 1.254 – .038				=	–0.544

Note. EII–2 = Ego Impairment Index–2.
[a]Sum of An, Bl, Ex, Fi, Fd, Sx, Xy, AG, MOR. [b]The number of responses (*R*) is included to minimize its effects on the EII–2.

APPENDIX B
Simplified Hand Calculation of the EII–2

To assist those who calculate these variables by hand, a simplified hand-calculated EII–2 version is presented. Within the reference sample of 363, the EII–2 was correlated at $r > .9995$ with the hand calculated version. The EII–2 hand-calculated score averages about .05 less than the actual EII–2 score. About 85% of the hand-calculated scores are within .10 of the actual EII–2 scores and only 1% are larger than the EII–2 score. Thus, the hand-calculated score produces small underestimates but rarely overestimates the EII–2. Descriptive data for the hand-calculated version are presented in Table 3. The example scores used in Appendix A are also used to illustrate the following hand-calculated example. For actual calculations, the example values underlined would be replaced by client-specific values.

Variable Name/Step	*Step 1: List Raw Values*		*Step 2: Multiply by Coefficients*		*Subcomponent Contributions*		*Subtotal/Total*
No. of FQ– responses	3	×	14	=	42		
WSum6	7	×	5	=	35		
Critical Contents[a]	4	×	7	=	20		
M–	2	×	20	=	40		
Poor HRV	2	×	10	=	24		
Step 3: Compute Subtotal						=	165
Good HRV	9	×	10	=	90		
R[b]	19	×	7	=	175		
Step 4: Compute GHR and R subtotal						=	223
Step 5: Subtract Step 4 subtotal from Step 3 subtotal: 223 – 165						=	–58
Calculate the EII–2 by dividing the Step 5 total by 100: 58/100						=	–.58