



DIAGNOSTIC EFFICIENCY OF RORSCHACH PERCEPTUAL THINKING INDEX (PTI) IN CHILDREN AND ADOLESCENT WITH PSYCHOSIS.

Psychology

Prakriti Sinha	Assistant Professor, Department of Clinical Psychology, Central Institute of Psychiatry (CIP), Ranchi, Jharkhand, India – 834006.
Ajay Kumar Singh	Assistant Professor & Head of the Department, Department of Psychology, Dr Shyama Prasad Mukherjee University, Ranchi, Jharkhand, India – 834008
Dr. Alok Pratap	MD., Associate Professor, Department of Psychiatry, Central Institute of Psychiatry, Kanke, Ranchi, Jharkhand, India-834009
Dr. Ajay Kumar Bakhla,*	M.D, DPM., Associate Professor of Psychiatry, Department of Psychiatry, Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, India-834009 *Corresponding Author

ABSTRACT

Background: Mental illness and cognitive deviance can be more difficult to diagnose in children and adolescent than in adults due to high co-morbidity and varied clinical presentation and studies which deal with Rorschach Perceptual Thinking Index, providing data about its satisfactory diagnostic performances particularly in children and adolescents are few.

Aims: To see the diagnostic efficacy of Rorschach Perceptual Thought Index (PTI) in assessment of thought disorder in children and adolescents with affective psychosis.

Method: A total of 30 patients with clinical diagnosis of bipolar manic with psychosis, and manic with psychosis and 30 normal controls between 8 to 17 years was taken and Rorschach was administered.

Results: The two groups differed significantly on the Rorschach PTI and will function most efficiently with a cut off score > 3 with high sensitivity, specificity, negative predictive power, positive predictive power, hit rate, low false positive rate & false negative rate.

Conclusion: The Rorschach PTI appears to be an efficient measure of thought disorder in children and adolescents.

KEYWORDS

Rorschach; Perceptual Thinking Index; Childhood psychosis

INTRODUCTION

Mental illness and cognitive deviance can be more difficult to diagnose in children and adolescent than in adults due to high co-morbidity and varied clinical presentation [1]. Popular means of assessing psychopathology in children and adolescent includes self report of children themselves as well as report of the parents and projective technique such as Rorschach. The Rorschach comprehensive system includes a number of imperially derived constellation indices [2]. One of them is perceptual thinking index (PTI). The PTI is a revision of what has been called the schizophrenia index (SCZI) which was formulated late 1970s and early 1980s (Exner 1983, 1996) [2]. Index constituted of five criterions initially but it was revised later in 1991 and comprised of six criterions, which are as under-

1 X+% < .61 and S-% < .41 or X+% < .50

2 X-% > .29

3 FQ->= FQ₀ or FQ->FQ₀+FQ+

4 Sum Level 2 special scores > 1 or FAB2 > 0

5 SUM 6 > 6 or W SUM 6 > 17

6 M-> 1 or X-% > .40

The critical value was taken to be 4 or more. But according to the independent studies the Index had unsatisfactory diagnostic performance as substantially high rate of false positive was noted, most frequently among the patients with major affective disturbance and among preadolescent or adolescent whose behaviors are marked by considerable anger or negativism. So Hilsenroth, Fowler and Padawar [3], studied SCZI and suggested that this Index should not be used concretely and it might be better considered as 'Psychosis Index'. So in 2000, Exner revised this Index; naming it 'Perceptual Thinking Index'(PTI). Like SCZI, PTI has no critical cut off value and is viewed as a continuous scale on which higher values are less preferable than lower ones.

The Rorschach perceptual Thinking Index (PTI);

1 XA% < .70 and WDA% < .75

2 X-% > .29

3 LVL 2 > 2 and FAB2 > 0

4 R < 17 and W SUM 6 > 12 or R > 16 and W SUM 6 > 17

5 M-> 1 or X-% > .40

Age adjustment for W SUM 6:

If R > 16: 5 to 7 = 20; 8 to 10 = 19; 11 to 13 = 18

If R < 17: 5 to 7 = 16; 8 to 10 = 15; 11 to 13 = 14

PTI Scores of 4 or 5 signify considerably more mediational/ideational trouble than scores of one or two but that is a concrete differentiation. Exner found that adolescent with schizophrenia produced inflated SCZI variables. Similarly Stokes et al [4] in their study on in-patient children found that those with elevated SCZI scores (<4) had elevated scores on several PIC-R (parent related personality inventory for children) variables related to thought disorder, anxiety and cognitive dysfunction. Viglione [5] found in his study that children and adolescents produce more false positive SCZI scores than do adult population. Franklin and Corneal [6] found in their study bright and talented adolescents often display higher SCZI scores. Holoday [7] in his study on out-patient children and adolescents diagnosed with post traumatic stress disorder, found significantly higher scores on SCZI than oppositional defiant disorder (ODD). Hence many studies found SCZI to be clinically useful, reliable and valid among adult population [3,8]; but results have been somewhat mixed among children and adolescents.

Moreover, there are few studies on Rorschach PTI (Perceptual Thinking Index). One such study was done by Smith et al [9] on 42 patients including children and adolescents and concluded that "PTI is a pure measure of thought disturbance in children and adolescent." Indian studies which deal with Rorschach Perceptual Thinking Index, providing data about its satisfactory diagnostic performances particularly in children and adolescents are few.

MATERIAL AND METHODS

- A total of 30 patients with clinical diagnosis of psychosis and 30 normal controls between 8 to 17 years was taken and Rorschach was administered.
- To rule out mental retardation Standard Progressive matrices (SPM) was used in suspected cases.
- The patient group was rated on Childhood BPRS-A and Normal Control was assessed on GHQ-12
- Independent sample t and chi square tests were used to compare sample characteristics and Diagnostic Efficiency Statistics were estimated as described Kessel and Zimmerman [10].

RESULTS

The Student 't' test and chi-square was computed to find out the group differences among the various socio- demographic variables. The findings suggest that there was significant difference in terms of religion and family history and there was no significant difference between the groups on the basis of age, sex and education. The result

also indicated that the psychotic group scored significantly higher than the control group on total score of Perceptual Thought Index(PTI).There was significant difference between the groups on the criterion 1,2,4 ,5 (p<.05) of PTI Whereas criterion 3 showed no significant differences. When taking the PTI ≥ 3 , the sensitivity was .77, specificity was .90, Positive Predictive Power (PPP) was .88, Positive Predictive Power (NPP) was .79, hit rate was False positive rate was .23 and false negative rate was .10. However if with the PTI ≥ 4 , the sensitivity reduced to .20, specificity increased to 1, PPP to 1, NPP to .56, false positive rate was 0 and false negative rate was .80. However if we take PTI =5, the sensitivity level reduces to .03, specificity increases to 1, PPP to 1, NPP to .51, hit rate , false positive rate is 0, and false negative rate as .97. The correlation between PTI criterion and items of Brief Psychiatric Rating Scale(BPRS) was seen. The result showed negative correlation between guilt and Fab2(p< .01) and positive correlation between suspiciousness and Fab2(p< .05), and positive correlation between suspiciousness and LVL2(p<.05), positive correlation of suspiciousness & conceptual disorganization with Wsum6 (p<.01).

DISCUSSION

However, before discussing the results, it is imperative to discuss some other relevant factors such as socio-demographic and clinical profile of the groups. The findings indicate that there were no differences between the groups on the basis of age, education and sex. This is important because some studies reported that many of the Rorschach variables are correlated with the number of responses [11,12] and as the number of responses(R) might be influenced by educational level, its influence on other scores is problematic [13]. Some other researchers have also observed gender, age, and education effects on Rorschach protocols [14, 15]. In this study the groups are statistically well-matched on age, sex and education, so we can say that effect of these variables on Rorschach protocols have been controlled. The results show difference between the groups on religion and family history. When considering the differences of the religion, the reason may lie in the referral pattern of the hospital from where the data has been calculated and moreover there was no conscious effort from the examiner's part to match the subjects on the basis of religion. Differences in family history may be due to the fact that hereditary is an important predisposing causal factor in many psychiatric disorders, including pediatric bipolar [16,17].

Although results from recent research show that Perceptual Thinking Index (PTI) can be used dimensionally [3, 18], they can be interpreted categorically using cutoff scores as well. In this study our aim was to see how effectively the PTI can classify subjects as having or not having the target diagnosis i.e. psychosis, at various cutoff scores. It was found that the groups showed significant difference in fulfilling the Perceptual Thinking Index (PTI) criterion. 76.7% of the psychotics patients fulfilled the Perceptual Thinking Index(PTI) criteria ≥ 3 , whereas only 3 normal control obtained the score of 3 or more on Perceptual Thinking Index (PTI). But in identifying psychosis, PTI were found more efficiently when comparing with the Exner's psychiatric sample of adults with the diagnosis of schizophrenia (n=110) where 75% had a Perceptual Thinking Index(PTI) value equal to or greater than 3 and similar findings have been reported by smith et al(2001) in his study on children & adolescents. When considering the PTI total scores, in this study the psychotic group produced significantly more mean scores than the control group.

An ideal predictive test would produce high sensitivity, high specificity, and low false positive and false negative rates. The present findings about the diagnostic efficiency of the PTI show sensitivity of .77, specificity of .90, positive predictive power.88. Negative predictive power.79, hit rate.83, false positive rate. 23 and false negative rate of .10 when the cut off scores of PTI ≥ 3 was taken. However the cut off scores of ≥ 4 or =5 resulted in a 0 false positive rates; that is no normal were misclassified as psychotics. However, these scores led to what might be considered unacceptably high false negative rates: that is, individuals diagnosed with psychosis who were not identified as not having psychosis by the PTI. As Cut off scores always involve decisions regarding the types of error most tolerable given the nature of assessment. The overall classification rates indicated that the cutoff score of ≥ 3 provided the best overall classification, with reasonable trade-off between false positives and false negatives.

Similar findings have been reported by previous study by Dao &

Prevatt [19] that yielded the sensitivity of .85, specificity.87, positive predictive power.83, negative predictive power.88, false positive rate.13, false negative rate.15, hit rate of.86 with a PTI criterion of ≥ 3 on patient with schizophrenic spectrum disorder(SSD) and patients with mood disorder but the study was done on adult population. Moreover, Smith et al. [9] in his study using a cutoff of ≥ 3 on inpatient children & adolescents, concluded Perceptual Thinking Index (PTI) as a pure measure of psychosis.

However, contrary to our findings Kumar & Khess [20] in their study obtained a high hit rate of 83% with a cutoff 4 on PTI but again the study was conducted on inpatient adults. Clearly, the use of particular cutoff scores will be contingent on the nature and the consequences of decision being made. In the present study we examined the contributions of the each of the 5 PTI criterion to the classification of psychosis. From all the 5 criterion 1, 2, and 5 (p<.001) and 4(p<.05) contributed significantly in classification of psychotics from normal control. But, very much contrary to our findings earlier studies also suggested that the new segments like XA% and WDA% (criterion1) were not better than the existing variables in differentiating schizoprenics from manic but the findings here should be interpreted with caution as the study had no normal control group like which might have yielded highly significant difference in our study. It reaffirms the fact that the perceptual distortions are more common in affective psychosis but significantly severe thought disturbances are characteristic of schizophrenia. When considering the whole result the positive findings for PTI are consistent with other studies [9, 19] suggesting that PTI may be a promising tool for measurement of thought disturbance in children and adolescents.

The study had its limitations characterized by a small Sample size due to time constraint. Sample included patients with affective psychosis only, other psychotic disorder like schizophrenia, schizoaffective were not included in the sample because of unavailability of such cases. To determine the diagnostic utility of Perceptual Thinking Index (PTI) for affective psychosis, a better study design would have been including 3 groups i.e. euthymic bipolar, bipolar mania with psychosis and manic without psychosis to ascertain the nature of psychotic features associated with these disorders. Knowing the diagnosis of the patient may also influence rater's rating. No provision was there for checking the inter rater reliability of Rorschach Inkblot test.

CONCLUSION

The study results indicate that clinical (affective psychosis) group differed significantly from the normal group as they gave high mean score on the PTI total scores. The clinical group differed significantly from the control group in fulfilling PTI criteria, particularly the criterion 1,2,4 and 5 helped in differentiating the two groups. The diagnostic efficiency statistics of PTI indicate that PTI will function most efficiently with a cut off score ≥ 3 with high sensitivity, specificity, negative predictive power, positive predictive power, hit rate, low false positive rate & false negative rate. Hence conclusively, it can be said that the new Rorschach PTI appears to be a promising tool for measurement of thought disorder in children and adolescents. Thus, the findings of this study have implication for assessment practice as clinicians using behavior ratings and self report measure and Rorschach in their assessment of young children & adolescents may find PTI a useful addition to their assessment of thought disorder.

Table 1: Showing the socio demographic details of the sample

Socio demographic Variables		Clinical Group (N=30)	Control Group (N=30)	t/2 & Significance
Age in years	Mean & SD	15.57+1.22	14.53+2.89	1.806
		n (%)	n (%)	
Sex	Male	20 (66.7)	14 (46.7)	2.433
	Female	10 (33.3)	16 (53.3)	
Education	Illiterate	1(3.3)	2(6.7)	2.587
	Primary	5 (16.7)	9(30)	
	Secondary	24(76.7)	19(63.3)	
Religion	Hindu	21(70)	14(46.7)	9.459**
	Muslim	9(30)	8(26.7)	
	Christian	0(0)	8 (26.7)	
Family history of mental illness	Absent	23(76.7)	30(100)	7.925**
	Present	7(23.3)	0(0)	

** Significant level < .01

Table2: Difference between groups on Perceptual Thinking Index (PTI) total scores-

Variable	Clinical group N=30 Mean & SD	Control Group N=30 Mean & SD	t value (Df =) & Significance
PTI total	2.77 ± 1.19	.70 ± 1.09	7.01***

*** Significant level <.001

Table 3: Comparison between clinical and control group on Perceptual Thinking Index (PTI) criteria

Variables	PTI Variables	Clinical group N = 30 (%)	Control group N=30(%)	x ² (Df=1) Significance
Criteria 1	XA% < .70 and WDA% < .75	25(83.3)	7(23.3)	21.696***
Criteria 2	X-% > .29	27(90.0)	8(26.7)	24.754***
Criteria 3	LVL 2 >2 and Fabcom2 > 1	3(10)	0(0)	3.158
Criteria 4	R<17 and WSum6>12, or R> 16 and WSum6> 17	5(16.7)	0(0)	5.455*
Criteria 5	M- > 1 or X-> .40	23(76.7)	6(20)	19.288***

* Significant level < .05, ** Significant level < .01, *** Significant level < .001

Table 4: Showing correlation between items of Brief Psychiatric Rating Scale (BPRS) and PTI

Correlation between BPRS and PTI							
BPRS items	XA%	WDA%	X-%	LVL2	FAB2	Wsum6	M-
Guilt	.a	-0.15	0.043	-0.335	-.454*	0.305	-0.266
Suspiciousness	-0.271	-0.112	0.226	.404*	.405*	.474**	0.03
Conceptual disorganization	0.069	#value!	-0.082	0.239	0.129	.459**	0.271

Table 5: Shows the diagnostic efficiency statistics for different Perceptual Thinking Index (PTI) cut off scores

Cut off scores	Sensitivity	Specificity	Positive predictive power	Negative predictive power	Hit rate	False Positive Rate	False Negative Rate
PTI> 3	.77	.90	.88	.79	.83	.23	.10
PTI> 4	.20	1	1	.56	.60	0	.80
PTI=5	.03	1	1	.51	.52	0	.97

REFERENCES

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders (4th ed., text revision). (2000), Washington, DC: Author.
- Exner JE. A Rorschach workbook for the Comprehensive System(5th ed.). (2001), Asheville, NC: Rorschach Workshops.
- Hilsenroth MJ, Fowler JC, Padawer JR. The Rorschach Schizophrenia Index (SCZI): An Examination of Reliability, Validity, and Diagnostic Efficiency. *Journal of Personality Assessment* 1998, 70(3), 514-534.
- Stokes J, Pogge DL, Grosso C, Zaccario M. The Relationship of the Rorschach Schizophrenia Index to Psychotic Features in a Child Psychiatric Sample. *Journal of Personality Assessment* 76(2):209-28
- Viglione DJ. A review of recent research addressing the utility of the Rorschach. *Psychological Assessment*, 1999; 11: 251-265.
- Franklin KW & Cornell DG. Rorschach Interpretation with Ability Adolescent Females: Psychopathology or Creative Thinking. *Journal of Personality Assessment*, 1997; 68(1): 184-196.
- Holaday M. Rorschach protocols from children and adolescents with post traumatic stress disorder. *Journal of Personality Assessment*, 2000; 75: 143-157.
- Jorgensen K, Anderson T, Dam H. The diagnostic efficiency of the Rorschach depression index and the schizophrenia Index: A Review Assessment, 2000; 7: 259-280.
- Smith RS, Baity RM, Knowles SE. Assessment of disordered thinking in children and adolescent: The Rorschach perceptual thinking Index. *Journal of Personality Assessment*. 2001; 77, 447-463.
- Kessel JB, & Zimmerman M. Reporting errors in studies of diagnostic performance of self-administered questionnaires Extent of the problem, recommendations for standardized presentation of results and implications for the peer review process. *Psychological Assessment*, 1993; 5: 395-399.
- Fiske DW, & Baughman EE. Relationship between Rorschach scoring categories and the total number of responses. *Journal of abnormal and social psychology*. 1953; 48:25-32.
- Meyer GJ. Response frequency problems in the Rorschach: Clinical and research implications with suggestions for the future. *Journal of Personality Assessment*, 1992; 58:231-244.
- Anastasi A. *Psychological testing*. 1998; New York: Macmillan.
- Danielsson K, Edman FL. Sex differences in schizophrenia as seen in the Rorschach test. *Nordic Journal of Psychiatry*, 2001; 55 (2):137-142.
- Hays W. Age and sex differences on the Rorschach experience balance. *Journal of abnormal and social psychology*, 1952; 47(2): 390-393.
- Strober M, Schimidt-Lackner S, Freeman R. Recovery and relapse in adolescents with

bipolar affective illness: A five year naturalistic, prospective follow up study. *J Am Acad Child Adolesc Psychiatry*, 1995;34:724.

- Todd R, Newman R, Geller B. genetic studies of affective disorders: should we be starting with childhood onset probands? *J Am Acad Child Adolesc Psychiatry*. 1993;32:1164.
- Exner JE. A primer for Rorschach interpretation. 2000;Asheville, NC: Rorschach Workshops.
- Dao TK, & Prevatt F. A Psychometric Evaluation of the Rorschach Comprehensive System's Perceptual Thinking Index. *Journal of Personality Assessment*, 2006; 86 (2), 180-189.
- sKumar R, Khess CRJ. Diagnostic efficiency of Schizophrenia index and perceptual – thinking index in schizophrenia and mania. *Journal of Projective psychology and mental health*, 2005; 12:115- 122.