The Relationship of Schizotypic Signs and Symptomatology in a Chronic Schizophrenic Population

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Thirty one male chronic schizophrenic outpatients participated in a study examining the relationship between schizotypic signs and symptomatology. Current symptomatology was assessed with the Psychiatric Evaluation Form (PEF) while schizotypy was measured with screening versions of ten schizotypy scales. Results indicate that different symptom patterns exist in this patient group and that symptoms are differentially related to schizotypic signs. The relationships between the schizotypy scales was also examined. The results are consistent with the hypothesis that schizophrenia is a heterogeneous disorder and that meaningful subgroups of schizophrenics can be identified on the basis of either symptomatology or schizotypy scores.

Over the past years, several self-report measures have been developed to measure characteristics which Meehl (1964) argues are signs of schizotypy. These include physical and social anhedonia (Chapman, Chapman, & Raulin, 1976), perceptual (body image) aberration (Chapman, Chapman, & Raulin, 1978), intense ambivalence (Raulin, 1984), magical ideation (Eckblad & Chapman 1983), social fear (Raulin & Wee 1984), somatic symptoms (Raulin, Chapman & Chapman, 1978), rage (Raulin, 1982a), distrust (Raulin, 1982b), cognitive slippage (Miers & Raulin, 1985), and impulsive noncomformity (Chapman, Chapman, Numbers, Edell, Carpenter, & Beckfield, 1984). These scales have demonstrated high internal consistency reliability and minimal method variance. On those scales evaluated, schizophrenics have shown a mean elevation relative to controls. However, schizophrenics clearly show different patterns of scores on these scales lending support to the idea that schizophrenia is a heterogeneous disorder (Propper, Raulin, Lowrie, Trigoboff, Henderson, & Watson 1987; Eckblad & Chapman, 1983; Chapman, Chapman, & Raulin, 1978). The existence of subtypes has been addressed by examining the various schizotypal signs and the appearance of symptomatology that can be classified as positive versus negative, or paranoid versus fundamental (Propper et al. 1987), and good premorbid versus poor premorbid (Chapman et al 1978).

The scales have been further validated in a behavioral high risk paradigm in which high scoring subjects were compared with subjects who scored in the normal range on some clinically relevant dimension. The high risk paradigm has been used to investigate a variety of areas including social functioning (Chapman, Edell, & Chapman, 1980), social skills (Haberman, Chapman, Numbers, & McFall, 1979), social deficits (Numbers & Chapman, 1982), social discomfort, (Raulin & Wee, 1984), interpersonal feelings (Raulin, 1984), psychological test performance (Edell & Chapman, 1979; Chapman, Chapman, & Miller, 1982; Raulin, VanSlyck, & Rourke, 1983), psychotic and psychotic-like symptomatology (Chapman & Chapman, 1980; Chapman, Edell, & Chapman, 1980; Fujioka & Chapman, 1984; Allen, Chapman, Chapman, Vuchetich, & Frost, 1987), communication styles (Adamski, 1978; Raulin & Adamski, 1981), communication effectiveness (Martin & Chapman, 1982), and attentional and neurological deficits (Raulin & Chapman, 1977, Simons, MacMillan, & Ireland, 1982). These studies have shown deficits or impairments in various areas of functioning for high scoring subjects when compared with subjects who scored in the normal range. Research with four of the published scales (Physical Anhedonia, Perceptual Aberration, Intense Ambivalence and Magical Ideation) has demonstrated stability over time for non-

psychiatric subjects. A recent study (Mahler, Raulin, O'Gorman, & Furash, 1987) utilizing a screening version (Raulin, VanSlyck, & Rourke, 1983) of the schizotypy scales has established excellent test-retest reliability in a psychiatric population regardless of the level of symptomatology. Table 1 describes each of the schizotypy scales.

Table 1
Brief Description of the Schizotypy Scales

Physical Anhedonia (PA) - A reduced capacity to experience pleasure or relate to others.

Perceptual Aberration (BI) - Deviant or distorted perceptions, feelings, and beliefs in relation to one's body.

Somatic Symptoms (SS) - Somatic symptoms thought to be indicative of subtle neurological dysfunction.

Intense Ambivalence (A1) - Strong simultaneous or rapidly fluctuating positive and negative feelings toward the same object or activity.

Schizotypic Ambivalence (A2) - (A revision of the intense ambivalence scale in order to assess ambivalence more typical of schizophrenics). Feelings rapidly fluctuate in both directions without a strong emotional tone.

Distrust (D) - The expectation of being unloved and unaccepted with a strong distrust of the motives of other people.

Social Fear (SF) - Fear of people and/or social interactions; the preference and tendency to be alone with anxiety in social situations.

Rage (R) - Intense and disproportionate angry outbursts.

Magical Ideation (MI) - A belief in causal connections between behavior and events that are not objectively related.

Cognitive Slippage (TD) - Unusual aberration in the perception and awareness of reality; a subtle form of thought disorder.

Some of the literature cited above has focused attention on the identification of areas and levels of symptomatology in a high risk population, lending predictive validity to the schizotypy scales. In a series of studies (Martin & Chapman, 1982: Chapman, Edell, & Chapman, 1980; Chapman, Chapman, Raulin, & Edell, 1978), college students who score high on one or more of the scales were found to display mild forms of characteristics found in schizophrenic populations such as social or cognitive deficits. The present study focuses on the relationship of general symptoms or symptom patterns to schizotypy scale scores in a schizophrenic population. It is reasonable to expect that if schizophrenics exhibit different patterns of scores on measures of schizotypy and symptomatology, there will be meaningful differences in the relationship of symptomatology to the various schizotypy scales. One of the hypotheses examined was the prediction that the measures of schizotypic signs are differentially related to reported or observed symptomatology in a schizophrenic sample. Specific predictions were made based upon already existing research with high risk subjects (Raulin, 1984; Raulin et al., 1983; Eckblad & Chapman, 1983; Chapman et al., 1980; Edell & Chapman, 1979), and are summarized in Table 2.

Furthermore, since previous research (Chapman et al., 1978; Chapman et al., 1980) with two of the scales (body-image aberration and physical anhedonia) has indicated that the scales are not correlated, it is expected that the symptoms which are significantly correlated with each of those scales will also be unrelated. The relationships between the various schizotypy scales are examined in an attempt to discover how the scales may be related in a schizophrenic sample and how these relationships may affect the occurrence of symptomatology in this psychiatric group. Recent research (Propper et al., 1987) has indicated that meaningful patterns may exist among the schizotypy scales and that these patterns may be used to distinguish groups of

schizophrenics. Schizophrenics were found to fall into two distinct clusters on the basis of their on the Physical Anhedonia scale (anhedonics) and the Distrust, Social Fear, and Magical Ideation scales (paranoids). The relationship of symptomatology to cluster scores were examined with the anticipation that reported or observed symptomatology is differentially related to cluster score.

Table 2
Predicted Relationships

	Schizotypy Scales									
Symptoms	PA	BI	SS	A1	A2	D	SF	R	MI	TD
Somatic Concerns		*	*							
Appetite Disturbance			*							
Sleep Disturbance			*							
Anxiety		*	*	*	*	*	*		*	*
Depression		*		*	*	*		*	*	*
Suicide/Self-Mutilation									*	
Social Isolation	*					*	*			
Suspicion-Persecution		*		*	*	*	*	*	*	*
Hallucinations		*							*	
Antisocial Acts-Attitudes	*								*	
Belligerence-Negativism								*		
Speech Disorganization		*							*	
Memory lapse-Disorientation				*						*

Method

Subjects

This study utilizes an existing data set from an ongoing study (Mahler, Raulin, O'Gorman & Furash, 1987). In the original study, thirty four subjects were randomly selected from patients in the Partial Hospitalization program at the Buffalo VAMC who had a current hospital diagnosis of schizophrenia or schizoaffective disorder. Eighteen other subjects refused participation and six other subjects were dropped because they were hospitalized and/or were unable to complete the task. Level of symptomatology was not included in the selection process because it was anticipated that subjects would fluctuate in their level of psychopathology over the course of the study. Only patients who were physically able to complete the self-report forms were selected. Other requirements were that patients be between the ages of 18 and 65 and have at least an 8th grade education. Subjects with a diagnosis of Organic Brain Syndrome were excluded.

Thirty one subjects from the original study who had completed at least one follow-up interview over the course of their participation in the original study were included in the present study. The average age of the sample was 40.13 (s = 13.75); the average level of education was 12.06 years (s = 2.89); the average number of years since the first diagnosis of psychosis was 16.65 (s = 9.27). All patients were male; 26 patients were Caucasian; 5 patients were black; 3 patients were currently married.

Procedure

Each patient was initially interviewed using a slightly modified version of the *Schedule for Affective Disorders and Schizophrenia -- Lifetime Version* (*SADS-L*; Spitzer & Endicott, 1977) to verify the hospital diagnosis and to determine the current level of symptomatology. Modifications to the *SADS-L* included breaking some of the complex two part questions into separate questions in order to facilitate understanding by the patients as well as the addition of some of the schizotypy questions. Interviewing was conducted by the senior investigator and another graduate student in clinical psychology who was thoroughly trained in the use of structured interviews. Each patient was given a test protocol containing screening versions of the schizotypy scales listed above (items intermixed). Follow-up data were collected at approximately four- month intervals for twelve months. At each follow-up subjects completed the schizotypy scales and were interviewed with the *Psychiatric Evaluation Form* (*PEF*; Spitzer, Endicott, Mesnikoff, & Cohen, 1968), a comprehensive survey of current symptomatology which does not focus on specific diagnostic questions. The *PEF* was also used to rate the patient on the *Global Assessment Scale* (*GAS*; Spitzer, Gibbon, & Endicott, 1976). The *GAS* is intended to provide an overall rating of current adjustment. Since previous research (Mahler, et. al. 1987) demonstrates the stability of the schizotypy scales in a psychiatric population regardless of the level of symptomatology, mean schizotypy scores were used in the data analysis.

The *PEF* interview with the lowest *GAS* score (most severe rating of symptomatology) for each subject was selected for analysis. The rationale for this decision was to obtain a more variable base of symptomatology from which the relationships between schizotypic signs and symptomatology might be discerned. A *PEF* coding manual for use by a trained undergraduate assistant was developed by the senior investigator for use in this study. The scoring procedure included the scoring of responses to each question on the *PEF* protocol in order to obtain a rating for each symptom area. The *PEF* assessed twenty different symptom areas including somatic concerns, disturbances in appetite, sleep disturbances, anxiety, depression, suicide/self-mutilation, social isolation, suspicion/persecution, grandiosity, hallucinations, alcohol abuse, routine/leisure time impairment, narcotics/drug use, antisocial acts/ attitudes, belligerence/negativism, psychomotor retardation/lack of emotion, agitation/excitement, speech disorganization, disorientation/memory lapse, and five areas of role impairment (including housekeeper. employed wage earner, student/ trainee, marital, and parental). Interrater reliability between the senior investigator and a trained undergraduate assistant averaged .80. All interview ratings were conducted blindly with respect to information about the subject which was not a part of the *PEF* protocol.

Results

Table 3 presents the significant Pearson product-moment correlations ($p < .05$) of symptom areas with schizotypic signs. Of the 40 predictions made, 25 (62.5%) were confirmed. Two hundred correlations between twenty symptom variables and the ten schizotypy scores were conducted. At $p=.05$ one would expect to find ten significant correlations by chance alone. Eight significant correlations which were not predicted were observed. These may be chance findings due to a problem of joint alpha. An examination of Table 3 also suggests the predicted lack of overlap in the symptoms correlated with Physical Anhedonia (PA) and the symptoms correlated with Perceptual Aberration (BI).

Table 3
Correlations Between Symptom Areas and Schizotypy Scales

		Schizotypy Scales							
Symptoms	PA	BI	SS	A1	A2	D	SF	R	MI	TD
Somatic Concerns		.42								
Sleep Disturbance		(.56)	.37					(.37)		(.39)
Anxiety		.48	.38		.41	.43	.39		.38	.48
Depression		.38		.48	.45	.38				
Suicide/Self-Mutilation		(.62)							.37	
Social Isolation						.37				
Suspicion-Persecution		.64	(.37)	.46	.44	.39	.38		.54	.58
Hallucinations		.54								
Narcotics-Drug Abuse						-.42				
Antisocial Acts-Attitudes	-.40									
Agitation-Excitement	(.40)									(.38)
Memory lapse-Disorientation										.38

Only significant two-tail correlations are reported. Correlations significant at .01 are underlined; correlations significant at .001 are double underlined. Correlations shown in parentheses were not predicted.

Table 4
Correlations Between Schizotypy Scales

	BI	SS	A1	A2	D	SF	R	MI	TD
Physical Anhedonia (PA)					.36	.36	.38		
Perceptual Aberration (BI)	.66	.54	.57	.44		.49	.58	.65	
Somatic Symptoms (SS)			.45	.62	.48		.49	.56	.76
Intense Ambivalence (A1)			.82	.78	.44	.38	.45	.67	
Schizotypal Ambivalence (A2)			.75	.48	.36	.47	.84		
Distrust (D)						.56	.40		.68
Social Fear (SF)								.40	.56
Rage (R)									.47
Magical Ideation (MI)									.55

Only significant two-tail correlations are reported. Correlations significant at .01 are underlined; correlations significant at .001 are double underlined.

Table 4 presents the matrix of the significant correlations among the ten schizotypy measures ($p < .05$). The failure to find a significant relationship between the Physical Anhedonia (PA) and Perceptual Aberration (BI) scales is noted once again.

In consideration of the twenty symptom variables assessed, one would expect a chance finding of ten significant correlations among the symptom variables. Due to the large number of correlations conducted, alpha was decreased to .01 in order to reduce spurious findings. At this level of probability, one would expect to find two significant correlations. A matrix of the intercorrelations of the symptom variables measured in this study contained seven significant correlations ($p < .01$). This indicates that while

most of the symptoms are discretely categorized, there appears to be some overlap with several of the symptom variables. As predicted, there is no correlation between the symptoms associated with Physical Anhedonia (PA) and the symptoms correlated with Perceptual Aberration (BI). These results are summarized in Table 5.

Table 5
Correlations Between Symptoms

	Sleep Disturbance	Anxiety	Suicide/ Self-Mutilation	Narcotics/ Drug Abuse
Depression		.56		
Suspicion/ Persecution		.46	.46	
Grandiosity			.49	
Hallucinations			.42	
Routine/ Leisure-time Impairment	.48			
Antisocial acts/ Attitudes				.47

Note: Only significant correlations ($p < .01$) are reported (two-tail tests).

Previous research (Propper, et. al., 1987) utilizing a cluster analysis of schizotypy scores found that schizophrenic subjects fell into two clusters. In order to examine the hypothesis that the two subgroups differ in their symptomatology as well as their schizotypy scores, two subgroups were established on the basis of cluster membership from Propper, et al. (1987). A "paranoid" cluster (n=16) was defined by high scores on the Distrust, Social Fear, and Magical Ideation scales while an "anhedonic" cluster (n=6) was defined by high scores on the Physical Anhedonia scale. Mean scores of the subgroups were compared on each of the symptom variables. The frequencies of hallucinations were examined with a chi square analysis. The results are summarized in Table 6.

Discussion

In an effort to address the predictive validity of the scales, the relationship of symptomatology to the various measures of schizotypy was examined. As indicated in Table 3, the data support the hypotheses that different symptom patterns exist in this patient group. An examination of the table suggests that specific symptom variables are differentially related to schizotypic signs. The perceptual Aberration scale is most clearly associated with more symptomatology than the other scales. Of the symptoms associated with Perceptual Aberration, the strongest relationship observed is with suspicion/persecution. Forty percent (40%) of the variance in the suspicion/persecution variable is accounted for by its correlation with Perceptual Aberration. This is consistent with previous research which suggests that high scorers on this scale exhibit extreme suspiciousness and paranoid ideation (Chapman et al., 1980).

The overlap in the correlations of the anxiety, depression, and suspicion/persecution variables with several different schizotypy scales may be a function of the observed correlations between those particular scales, the patterns of scores among the scales, and the extent to which each of the schizotypy scales contribute to the variance of those symptom scores. However, all but one of the correlations (that between Somatic Symptoms and suspicion-persecution) was predicted and is consistent with previous research (Eckblad & Chapman, 1983; Miers & Raulin, 1985; Raulin & Wee, 1984).

Table 6
Mean Symptom Scores for Clustered Subgroups

	Paranoid Cluster (n=16)		Anhedonic Cluster (n=6)	
symptom	mean	SD	mean	SD
somatic concerns	1.50	1.03	1.00	1.09
appetite disturbance	.25	.44	.16	.40
sleep disturbance	.56	.51	.33	.51
anxiety	4.43	1.63	3.00	1.78
depression[1]	4.50	1.75	2.83	1.47
suicide/self-mutilation	1.31	1.49	.50	.54
social isolation[1]	1.93	1.18	.66	.81
suspicion/persecution	3.68	1.92	2.00	.89
grandiosity	.37	.61	.33	.51
alcohol abuse	2.43	3.28	3.50	3.83
routine/leisure-time impairment	2.56	1.09	2.16	.98
narcotics/drug abuse	.18	.40	.16	.40
antisocial acts/attitudes	.50	.73	.33	.81
belligerence/negativism[1]	1.62	1.20	3.00	1.41
psychomotor retardation	.81	.40	.50	.54
agitation/excitement	1.31	.60	1.16	.40
speech disorganization	.56	.72	.33	.51
hallucinations (all)[2]	68.75%		33.33%	
both auditory+visual[2]	25.00%		0.0%	

[1] *$p < .05$; two-tail tests*
[2] *X^2 performed on frequency of endorsement.*

The lack of overlap in the symptoms associated with the Perceptual Aberration and Physical Anhedonia scales observed in Table 3, the failure to find an intercorrelation between these two scales as noted in Table 4, and the absence of any correlation between the symptoms correlated with each scale as noted in Table 5 is consistent with previous research which indicates that these scales are unrelated. Thus, as suggested by the symptomatology associated with these scales, it is likely that the two scales are sensitive to different disorders subsumed within a heterogeneous schizophrenia such as an acute versus chronic onset or positive versus negative symptom pattern might suggest.

In a secondary analysis of the data, the two subgroups of schizophrenic subjects derived from Propper et al., (1987) were compared on the basis of the mean scores on each symptom variable for both groups. As shown in Table 6, t-tests produced significant between-group differences in the depression, social isolation, and belligerence/negativism scores. The anxiety and suspicion/ persecution scores fell just short of significance. An examination of the table indicates that the very small sample size, particularly in the anhedonic cluster and the restriction of range on several of the symptom variables may be contributing to a failure to find significant differences on these variables. Overall the findings suggest that the groups exhibit meaningful differences in current symptomatology and are consistent with previous research

(Propper et. al., 1987) which indicates that the scales may identify subgroups within the heterogeneous disorder schizophrenia. However, the extent to which the scales and symptoms form meaningful clusters needs to be addressed with a much larger sample size.

Previous research with the schizotypy scales has been focused on the occurrence of psychotic or psychotic-like symptomatology. This study addressed the occurrence of more general symptoms in a psychiatric population and indicates the potential value of the schizotypy scales for predicting what overall symptoms may develop in high scoring individuals. Directions for future research with the scales include the replication of the findings presented here with a much larger sample size. In order to more fully examine the extent to which the scales can be utilized to predict general psychiatric symptoms, it will be necessary to consider the occurrence of overall symptoms as they exist in other psychiatric groups. An interesting question is the extent to which each scale contributes to the various symptom areas where overlap in the correlations is observed. It is possible that some of the overlap in the relationship of a symptom variable to several scales is a function of the correlation(s) between the scales themselves.

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