Heterogeneity of Schizotypy:
Searching for Symptom Patterns

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Ten measures of schizotypic symptoms were examined for their utility in identifying subgroups of schizotypes in a clinical population. Factor analysis extracted four factors which accounted for 58% of the variance. Clustering subjects produced three distinct subgroups, each characterized by a particular pattern of schizotypic symptoms. These two different techniques showed some overlap in the observed patterning of schizotypic symptoms. These results address the issue of heterogeneity of schizotypes (and possibly schizophrenics) by suggesting that potentially meaningful subgroups of schizotypes may exist.

When Bleuler coined the term "schizophrenia" in the early 1900s, he referred to it as the "group of schizophrenias.' Since that time, many researchers have attempted to identify various subtypes among this group, in the hopes that our understanding of the etiology (or etiologies) and of the various characteristics of schizophrenia might be increased if more homogeneous groups of individuals could be studied. Over the years, such distinctions as paranoid vs. non-paranoid, process vs. reactive, and the currently popular positive vs. negative symptomatology have been suggested as meaningful subtypes of schizophrenia. Although these distinctions have shown some predictive utility, they have had limited success in solving these issues that continue to puzzle researchers in this field.

Despite the limited ability to distinguish meaningful subtypes, most researchers seem to agree that subtypes of schizophrenia exist. Gottesman and Shields (1972) argue for the heterogeneity of schizophrenia, suggesting that, like mental retardation, a polygenic theory of etiology is appropriate. Eckblad and Chapman (1983) also use their research to suggest that "different clusters of prepsychotic symptoms very likely presage different psychoses hidden within schizophrenia and within other conventional categories of psychosis" (p. 216). If schizophrenia is, in fact, a heterogeneous group of disorders, then one might expect these disorders to have various etiologies or predisposing factors.

Although most of the research related to genetic etiology has taken the direction of family and twin studies, Meehl (1964) has developed a behavioral approach to identifying individuals who he believes are genetically at risk for developing schizophrenia. Meehl calls these individuals schizotypes, and he has generated a list of 25 behavioral criteria on which to base this label of schizotypy. The presence of these schizotypic signs can be judged from material gathered through diagnostic and therapeutic interviews. Meehl anticipated this checklist as being useful for identifying semi-compensated schizotypes and not necessary for identifying decompensated schizotypes (or schizophrenics).

The Chapmans and their colleagues have devoted considerable effort to developing self-report scales to measure many of these schizotypic signs. To date, the signs for which scales exist are Body-Image (Or Perceptual) Aberration (BI; Chapman, Chapman, & Raulin, 1978), Physical

Anhedonia (PA; Chapman, Chapman, & Raulin, 1976), Intense Ambivalence (AMB; Raulin, 1984), Schizotypic Ambivalence (SA; Raulin, 1986), Somatic Symptoms (SS; Raulin, Chapman, & Chapman, 1978), Rage (R; Raulin, 1982a), Distrust (D; Raulin, 1982b), Cognitive Slippage (CS; Miers & Raulin, 1985), Magical Ideation (MI; Eckblad & Chapman, 1983), and Social Fear (SF; Raulin & Wee, 1984). In general, high-scorers on these scales show more social deficits, report more problems in daily social functioning, have unusual communication styles, and show differences in perceptual processing (Beckfield, 1985; Chapman, Chapman, Raulin, & Edell, 1978; Chapman, Edell, & Chapman, 1980; DePalma & Raulin, 1982; Eckblad & Chapman, 1983; Edell & Chapman, 1979; Friedland, Raulin, & Rourke, 1984; Fujioka & Chapman, 1984; Haberman, Chapman, Numbers, & McFall, 1979; Martin & Chapman, 1982; Miller & Chapman, 1983; Numbers & Chapman, 1982; Raulin, 1984; Raulin & Henderson, 1987; Raulin, Van Slyck, & Rourke, 1983; Simons, 1981, 1982; Simons, MacMillan, & Ireland, 1982a, 1982b).

The Schizotypy Scales

Following is a description of the schizotypy scales currently in use. Included in these descriptions are the definitions of the terms, the research findings with these scales, and the relations between the scales. In general, most of the scales are not related to demographic variables such as age, education, social class, and sex. Since several of the scales have not been published, limited research findings are available for these scales.

Body-Image (or Perceptual) Aberration. Body-image aberration is defined by Meehl as deviant perceptions, feelings, and beliefs concerning one's body. Some examples are perceptions of alterations in the size or shape of the body, feelings of unreality, or of one's body not being one's own. Researchers have found that individuals who score high on the Body-Image Aberration Scale report more auditory and visual hallucinatory-like experiences, depersonalization and out-of- body experiences, ideas of reference, extreme suspiciousness and paranoid ideation, and aberrant beliefs than a group of normal controls (Chapman et al., 1980). In addition, these individuals score higher on schizophrenic-like thought disorder on the Rorschach (Edell & Chapman, 1979), have more difficulty concentrating, complain of mixed-up speech, and have more history of therapy than normal controls (Chapman et al., 1980). Within a group of schizophrenic patients, high scores on this scale were associated with poor premorbid history (Chapman, Chapman, & Raulin, 1978). High scores on this scale are also associated with a 2-7- 8 MMPI profile, a typical psychotic profile (Raulin et al., 1983).

Physical Anhedonia. Anhedonia is defined as a deficiency in the capacity to experience pleasure. According to Meehl, this deficiency impairs one's ability to relate to others, weakens feelings of joy and affection, and may lead to social withdrawal. Individuals scoring high on the Physical Anhedonia Scale show more social withdrawal and less heterosexual interest and activity than normal controls (Chapman Ct al., 1980). Anhedonics were also found to perform more poorly than controls on a social skills role-playing task (Haberman et al., 1979), to show thought disorder on the Rorschach (Edell & Chapman, 1979), and, in schizophrenics, to have poorer prognosis (Chapman et al., 1976). Anhedonia and perceptual aberration are only modestly correlated with each other (r= -.15), which might suggest that these scales tap proneness to different psychoses. Only about one-third of schizophrenics score high on this scale.

Intense Ambivalence. Ambivalence is defined as simultaneous or rapidly changing strong positive and negative feelings toward the same object or activity. Individuals who score high on this scale also tend to show the 2-7-8 MMPI profile (Raulin et al., 1983), to score high on the perceptual aberration scale (Raulin, 1984), and, in schizophrenics, to score fairly high on a measure of depression (Raulin, 1984). These individuals also showed more cognitive slippage, distractibility, pan-anxiety, distrust, "different from others" feelings, and disruption of family

relationships when compared to normal controls in an interview situation (Friedland, Raulin, & Rourke, 1984).

Schizotypic Ambivalence. The Schizotypic Ambivalence Scale is a revised version of the Intense Ambivalence Scale. The scale was revised based on an item analysis of the original scale (Raulin, 1984) which indicated that the relation between that scale and depression was due to items which assessed a change from a positive to a negative emotion. The revised scale assesses ambivalence more typical of schizophrenics: emotions fluctuate in both directions, not only from positive to negative, and a strong emotional tone is not attached to them. To date, this scale has not been used in published research.

Magical Ideation. Magical ideation is defined as the belief that events which cannot cause each other might nevertheless do so. High-scorers on the Magical Ideation Scale report more thought-broadcasting experiences, auditory hallucinatory-like experiences, aberrant beliefs, schizotypal experiences (e.g., depersonalization, hypnagogic phenomena, poverty of thought, ideas of reference, odd communication), difficulties in concentrating, and more affective symptoms than normal controls (Eckblad & Chapman, 1983). Magical ideation is also found to be positively correlated with perceptual aberration and slightly correlated in a negative direction with anhedonia (Eckblad & Chapman, 1983).

Cognitive Slippage. Cognitive slippage is defined as unusual aberration in regard to how accurately one perceives and thinks about reality. Cognitive slippage is associated with a 2-7-8-0 MMPI profile and is correlated with the Perceptual Aberration, Ambivalence, and Magical Ideation scales (Miers & Raulin, 1985). In addition, individuals who scored high on this scale were found to report having significantly more bizarre fantasies than normal control subjects (Castrianno & Raulin, 1986).

Social Fear. Social fear is defined as the marked preference to be alone and the tendency to feel anxious around others. The Social Fear Scale correlates positively with interview ratings of social fear and negatively with interview ratings of sociability (Raulin & Wee, 1984). In addition, this scale is correlated with the Perceptual Aberration, the Ambivalence, and the Cognitive Slippage Scales (Castrianno & Raulin, 1986; Miers & Raulin, 1985; Raulin & Wee, 1984).

Distrust. Distrust is defined as the expectation of being unloved and unaccepted and the belief that anyone who is loving or accepting is a fake. Little research has been done with this scale, but distrust was found to be correlated with cognitive slippage (Miers & Raulin, 1985).

Somatic Symptoms. Somatic symptoms are the occurrence of any of the following signs: psychosomatic skin problems, anorexia, psychosomatic fever, vasomotor dyscontrol, conversion symptoms, and neurological signs with no neurological disease. High-scorers on this scale also show the 2-7-8 MIMPI profile (Raulin et al., 1983). This scale is correlated with the Perceptual Aberration, Social Fear and Cognitive Slippage scales (Miers & Raulin, 1985; Raulin & Wee, 1984), but little other research has been done with this scale.

Rage. Rage is defined as inttnse, phenotypic, verbalized, and disproportionate explosive emotional reactions. This scale has not been used in published research except in one study where it was found to be correlated with Cognitive Slippage in females only (Miers & Raulin, 1985).

Issue Addressed in the Current Study

Research using these scales has generally identified individuals who score high on some, but not all, of the scales. For instance, Eckblad and Chapman (1983) noted that they believe the Perceptual Aberration Scale and the Magical Ideation Scale identify the same syndrome, yet all individuals who score high on one do not score high on the other. Perhaps, in some individuals

who score high on both scales, the scales are measures of the same syndrome. However, it could be that when each of these scales is combined with high scores on particular other scales, a different syndrome is defined. If schizophrenia is a heterogeneous group of disorders, then one might expect different combinations of schizotypic signs to be associated with different syndromes and, possibly, different etiologies.

To date, the differential patterns of high schizotypy scores identified among various individuals have not been examined. As noted above, Eckblad and Chapman (1983) suggested that different clusters of prepsychotic signs may be associated with different disorders. Enough schizotypy scales are now available to begin to address this issue. One purpose of the present study is to examine the usefulness of the schizotypy scales in identifying different patterns of predispositions to schizophrenia. If such patterns exist, theoretically, they should be linked to different etiologies or different subtypes of schizophrenia.

To accomplish this purpose, the following question was addressed: "Do the schizotypy signs (for which scales are available) divide into factors or clusters of scales on which subgroups of schizotypes can be discriminated?"

One might predict that a variety of schizotypic patterns exist and that the likelihood of an individual with any of these patterns becoming schizophrenic is equal. If this is the case, then one might expect different subgroups of schizotypes to decompensate into different subgroups of schizophrenics. However, first, subgroups of schizotypes must be identified.

Method

Subjects

51 RDC-diagnosed (Research Diagnostic Criteria) schizophrenic and schizoaffective patients, 57 non-psychotic outpatients, and 15 hospitalized alcoholics participated in this study. This sample was chosen to increase the likelihood of obtaining a heterogeneous sample with respect to schizotypy scale scores. Prior research has demonstrated that high-scorers can be found in all of these groups. The schizophrenic, schizoaffective, and alcoholic subjects were patients of either the Veterans Administration inpatient hospital or partial hospitalization program who agreed to participate in this research project. The outpatients were clients of a university training clinic; these clients were asked to complete research forms when they entered therapy at the clinic. The outpatients represent a heterogeneous sample with respect to age, social class, and presenting complaint. Table 1 presents the demographic characteristics of the three groups of subjects in the sample.

Table 1

Demographic Characteristics of the Sample

	N	Mean Age	Mean Education*	% males
Schizophrenics	51	36.0 (22-62)	13.0 (8-17)	100%
Alcoholics	15	41.0 (24-57)	11.5 (9-18)	93%
Outpatients	57	32.0 (14-68)	13.0 (8-22)	39%

*Range shown in parentheses.

Procedure

All subjects completed screening versions (Raulin, Van Slyck, & Rourke, 1983) of the 10 available scales to measure schizotypy: Physical Anhedonia (PA), Perceptual Aberration (B!), Intense Ambivalence (AMB), Schizotypic Ambivalence (SA), Rage (R), Distrust (D), Social Fear (SF), Magical Ideation (MI), Cognitive Slippage (CS), and Somatic Symptoms (SS). An

Infrequency Scale was completed to identify random responders; subjects who scored 2 or more on this 5-point scale were eliminated from the study (N = 1). Fully- and partially-hospitalized patients (schizophrenics and alcoholics) were interviewed with a modified SADS-L (Schedule for Affective Disorders and Schizophrenia -- Lifetime Version) for purposes of diagnosis and symptomatology ratings. Non-hospitalized subjects were not formally diagnosed and, for the purpose of this study, were only classified as non- schizophrenic.

The information obtained from the SADS-L was used to make RDC diagnoses for the hospitalized patients. Only those subjects with a primary diagnosis of schizophrenia, schizoaffective disorder, or alcoholism participated in the study.

Results

Both factor analysis and cluster analysis were used to examine the differential patterns of schizotypy scores among individuals scoring high on these scales. Since the focus of these analyses was on the detection of subtypes of schizotypy and a large portion of the mixed clinical sample showed no schizotypic symptoms at all, a subsample was selected consisting of those individuals who scored at least 1 standard deviation above the mean (predetermined for a clinical population) on at least one of the scales. This subsample contained 73 subjects (36 schizophrenics, 10 alcoholics, and 27 outpatient clients). The logic of this step was to avoid a large first factor representing pathology/no pathology or a large cluster representing those subjects with low scores on all the schizotypy measures.

Factor Analysis

The factor structure of the ten schizotypy scales was evaluated with a factor analysis. A maximum likelihood method for factor extraction and a Varimax rotation were used. Four factors were extracted which accounted for 58% of the total variance. Table 2 presents the factor loadings for the rotated factors. The first factor appears to represent positive symptoms (especially heavy loadings on Perceptual Aberration, Somatic Symptoms, and Cognitive Slippage, with somewhat weaker loadings on Schizotypic Ambivalence, Distrust, Social Fear, and Magical Ideation). Factor 2 seems to represent a negative feeling toward others (with a strong loading on Distrust and a weaker loading on Intense Ambivalence). Factor 3 seems to represent primarily ambivalence (with strong loadings on both of the Ambivalence scales and a weaker loading on Cognitive Slippage). Factor 4 appears to represent magical thinking (with a strong loading on that scale, weaker loadings on Perceptual Aberration and Intense Ambivalence, and a moderately strong negative loading on Physical Anhedonia). In past research, Anhedonic subjects have often shown little or no psychotic-like symptoms.

Cluster Analysis

In addition to the exploration of the factor structure of the ten schizotypy measures, a cluster analysis of these same 73 subjects was conducted. The purpose of this analysis was to identify homogeneous groups of subjects based on their pattern of schizotypy scores.

A centroid method of clustering based on a squared Euclidean distance function was used. Inspection of the clustering procedure suggested that the best solution contained six clusters, although three of the six clusters will not be interpreted because they contain only a single subject each. The first cluster (N=43) consisted of subjects who typically scored high (at least one standard deviation above the mean) on Distrust, Social Fear, and Magical Ideation. The second cluster (N=24) consisted of subjects who typically scored high on Anhedonia and below the mean on all the other scales. The third cluster (N=3) was characterized by high scores on both of the ambivalence scales and on Distrust. Table 3 summarizes the data from this cluster analysis.

Table 2

Factor Loadings for the Rotated Factors

	FACTORS			
SCALES	1	2	3	4
Physical Anhedonia	.00	.06	-.08	-.53
Perceptual Aberration	.62	-.11	.15	.35
Somatic Symptoms	.69	.05	.29	.14
Intense Ambivalence	.21	.43	.62	.40
Schizotypic Ambivalence	.39	.23	.88	.14
Distrust	.40	.83	.19	.05
Social Fear	.45	.24	.05	-.13
Rage	-.03	.28	.06	-.02
Magical Ideation	.53	.18	.17	.61
Cognitive Slippage	.63	.15	.45	.08
[Proportion of Variance]	(.32)	(.10)	(.10)	(.06)

Table 3

Summary of Six Cluster Solution

Number of Cluster	N	Elevated Scales	Schiz.	Alcol.	Outpat.
1	43	Distrust Social Fear Magical Ideation	26	5	12
2	24	Physical Anhedonia	10	4	10
3	3	Intense Ambivalence Schizotypic Ambivalence Distrust	0	0	3
4	1	0	1	0	
5	1	0	0	1	
6	1	0	0	1	

Discussion

In general, these data support the idea of heterogeneity among schizotypes and suggest that patterns of schizotypy scales might represent useful dimensions on which to distinguish groups of schizophrenics. The results from the factor analysis and cluster analysis seem to suggest that there may be meaningful patterns among the currently available schizotypic measures. It is encouraging that the observed patterns make theoretical sense and are consistent with previous

data. For example, the first factor was defined by symptoms that seem to be milder forms of the positive symptoms of schizophrenia. The second factor, negative feelings toward others, may represent a mild form of paranoid symptomatology. Factor three, which includes ambivalence and cognitive slippage, represents milder forms of two of the fundamental symptoms of schizophrenia (Bleuler, 1950/1911). Factor four is more difficult to interpret conceptually, but this constellation of symptoms has been characteristic of college students who show many schizophrenic-like symptom patterns (see Trigoboff et al., 1987 for a review).

There seems to be some convergence of results from both the cluster analysis and the factor analysis. One of the clusters seems to overlap factor 2 (negative feelings toward others). Subjects reporting anhedonia, a symptom which marks the negative pole of factor four, also tend to cluster together. Surprisingly, there was no clear cluster of subjects showing primarily positive symptoms as might have been predicted based on the factor analysis.

The two analyses done in this study provide different perspective on the heterogeneity of this group of subjects. Although the results of the analyses do not overlap completely, both suggest the existence of subgroups of schizotypes. Ultimately, any subgroups found must be validated by showing that the groups have meaningful differences on dimensions such as current symptom patterns, premorbid history, family history, course, and outcome. Clearly the approach used in this study seems promising for the ultimate identification of subgroups of schizophrenics.

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