The Structure of *DSM-III-R* Schizotypal Personality Disorder Diagnosed by Direct Interviews

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Abstract

Confirmatory factor analysis techniques were applied to test how competing models (unifactorial, bifactorial, and trifactorial) could be used to explain the structure of schizotypal disorder as defined in *DSM-III-R* and *DSM-IV*. Subjects were 538 nonpsychotic psychiatric outpatients and a replication sample of 225 nonpsychiatric patients and control subjects, interviewed by clinicians using the Structured Interview for *DSM-III-R* Personality Disorders. The study found that the best-fit solution encompassed three factors: cognitive-perceptual, interpersonal, and oddness. Future studies may benefit from considering schizotypal personality disorder as composed of three factors that may indicate the existence of three underlying (dys)functional systems.
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Current evidence (Kendler and Diehl 1993; Nigg and Goldsmith 1994) indicates that the phenotypic expressions of liability for schizophrenia are not confined to schizophrenia alone, but rather include some abnormal personality variants that can be considered sources of endophenotypic information in their own right (Gottesman 1991; Claridge 1994). Schizotypal personality disorder (SPD), as defined in the *DSM-III* and later in *DSM-III-R* and *DSM-IV* (American Psychiatric Association 1980, 1987, 1994), is a diagnostic category of interest because it may represent an operational definition of a phenotype of familial-genetic liability to schizophrenia (Battaglia and Bellodi 1992, 1996). Although SPD is conceptualized in the *DSM-III, DSM-III-R,* and *DSM-IV* as a discrete condition, the results of twin studies based on these criteria are more consistent with a dimensional, rather than categorical, concept of the disorder (Kendler et al. 1991).

The question of whether SPD should more accurately be viewed as a discontinuous condition or as a normally distributed trait is confounded by empirical evidence that the construct is not unidimensional. The *DSM-III-R* category of SPD has immediate clinical usefulness and is a valid diagnosis (Siever et al. 1993). It may not be structurally unitary, however, and distinct components (Raine et al. 1994), perhaps corresponding to distinct (dys)functional substrates, have been found.

Explorations in the dimensional model of schizotypy measured by several combined self-administered questionnaires, including the scales for perceptual aberration and for physical anhedonia (Chapman et al. 1980), or by single scales for schizotypy (Venables et al. 1990) also provided evidence of multidimensionality, with two to four factors best accounting for the structure (Vollema and van den Bosch 1995).

Indeed, the categorical and dimensional approaches may not be mutually exclusive (Eaves et al. 1993a), even if they differ to some extent (Nigg and Goldsmith 1994). Some studies have shown that an effective bridge between the dimensional and categorical models for psychopathology and genetics can be reached by postulating the existence of latent constructs that account for the observed associations of symptoms in categorical diagnoses (Eaves et al. 1993a, 1993b). Noteworthy advantages of this strategy include the opportunity to look at important genetic issues without deciding too early between a categorical and a dimensional approach (Eaves et al. 1993a) and the possibility of employing information extracted from subjects who are below the threshold required to be considered "affected." Given the connections of SPD to the schizophrenia spectrum, there is an urgent need for an accurate definition and comprehension of the structure of this disorder.

Based on the historical origins of the diagnostic category (Kendler 1985) and the development of the criteria (Spitzer et al. 1979), some authors have described SPD as a de facto bidimensional category (Siever and Gunderson 1983; Widiger et al. 1988). This grouping is composed of cognitive-perceptual traits (e.g., magical thinking, paranoid ideation, odd speech, unusual perceptual experiences, ideas of reference) on one side and social-interpersonal traits (e.g., restricted affect, social anxiety, no close friends) on the other. However, a review of the studies that explored the structure of SPD diagnosed by direct personal interviews shows that available empirical support for a bidimensional view is limited. A factor-analytic study based on direct assessments of *DSM–III* Axis II criteria (Rosenberger and Miller 1989) showed three distinct factors in SPD: schizotypal thought, interpersonal sensitivity, and schizotypal behavior. Two other studies have addressed this issue with clinician-administered structured interviews that probed for all the *DSM–III–R* criteria of SPD: In their exploratory factor-analysis study of 29 nonpatient twin pairs, Kendler et al. (1991) showed that the VARIMAX rotation provided two factors, designated "positive" and "negative." However, the suspiciousness and social anxiety criteria loaded differently on both factors, and oddness, traditionally viewed as a more positive feature, loaded negatively, as described by Raine et al. (1994). Torgersen et al. (1993) used the Structured Clinical Interview for *DSM–III–R* (Spitzer and Williams 1988) to assess *DSM–III–R* personality disorders (PDs) in a twin-family sample of 72 index twins. In commenting on their finding of the nine SPD traits spread over five dimensions, Torgersen et al. (1993) suggest that replications on larger samples are needed. In another attempt to investigate the factor structure of *DSM–III–R* SPD empirically, Raine et al. (1994), in a large community sample, employed the Schizotypal Personality Questionnaire (Raine 1991), a self-administered questionnaire aimed at assessing all nine *DSM–III–R* traits of SPD and thought to be useful in screening for SPD in the general population. Their provocative finding of three factors (cognitive-perceptual, interpersonal, and disorganized) instead of two is interesting because they employed confirmatory factor analysis (a technique that allows for testing competing models) to demonstrate the better fit of a tridimensional model. They considered this model more accurate in describing SPD (Raine et al. 1994) and supporting the structural similarity of SPD to schizophrenia (Bilder et al. 1985; Arndt et al. 1991; Andreasen et al. 1995).

In addition to providing conflicting results, the studies of Kendler et al. (1991) and Raine et al. (1994) share some limitations. Both were based exclusively on nonpatient subjects; therefore they could not clarify whether the structure of SPD might be different in clinical versus non-

clinical populations. Furthermore, the sample of Kendler et al. was small, and although the Raine et al. study had a large sample, it was based on self-reports rather than face-to-face interviews. When assessing important behavioral traits of SPD, such as an odd or guarded appearance, an expression of aloofness, or poor eye contact, only direct interviews can be considered reliable (Kendler 1988). Accordingly, self-reports and even telephone interviews might not ensure sufficient sensitivity and specificity for SPD traits, even though some data (Raine 1991) show good concordance between self-rated and interviewer-rated constricted affect. Moreover, the available evidence of a genetic relationship between schizophrenia and SPD is based exclusively on studies that used direct interviews, not self-rated questionnaires (Kendler and Hewitt 1992). Thus, it is unclear to what extent the findings based on self-assessments of SPD also are relevant to the schizophrenia spectrum. An important exception to these critiques is represented by the factorial analysis of schizotypal symptoms and signs collected with the Structured Interview for Schizotypy (Kendler et al. 1989) in 1,272 relatives of probands included in the Roscommon Family Study (Kendler et al. 1995). This factorial study again shows that SPD is a complex, multidimensional, clinical construct.

In the present study, confirmatory factor analysis of the results of direct interviews of nonpsychotic psychiatric outpatients and nonpatient subjects has been used to define the structure of *DSM–III–R* SPD.

Methods

Subjects and Criteria of Selection. The subjects were 538 outpatients (59.6% women, mean age = 34.6 ± 12.6 years) and a group of 225 nonpatient subjects (57% women, mean age = 36.7 ± 16.1 years). The controls included 45.3 percent surgical outpatients recruited at day-hospital facilities for lithotrypsy and knee pathology, 22.2 percent hospital employees, 21 percent medical students, and 11.5 percent relatives of outpatients with mood or anxiety disorders who participated in different studies undertaken by the authors (Battaglia et al. 1995b, 1995c). The patients, seen at the Department of Neuropsychiatric Sciences, San Raffaele Hospital, Milan, were self-referred or were referred by general practitioners or fellow psychiatrists working in other facilities in the same geographic area, always on a voluntary basis. These patients belong to a clinical sample for whom systematic diagnostic assessments were made based on structured interviews that would be used in family and epidemiological studies in the department. Axis I assessment was made with the Italian version of the Diagnostic Interview Schedule—

Revised (Robins et al. 1989) by trained psychiatry residents. To assess *DSM-III-R* Axis II disorders, the Italian version of the Semistructured Interview for *DSM-III-R* Personality Disorders (SIDP-R; Pfohl et al. 1989) was used. This instrument covers the full *DSM-III-R* range of PDs, and it takes approximately 90 minutes to complete. Interviewers using the SIDP-R were psychiatry residents, trained in the use of the instrument, with satisfactory interrater reliability: the mean kappa value, chance corrected for SIDP-R-generated Axis II diagnoses, was 0.83; the kappa value, chance corrected for SIDP-R diagnosis of SPD, was 0.89 (Battaglia et al. 1994, 1995*a*). To conform with previous studies (Battaglia et al. 1991, 1993, 1995*d*), all patients having a diagnosis of schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder, or dementia and those showing evidence of an organic mental disorder or mental retardation were excluded from personality assessment. The subjects in this study thus are mostly outpatients with anxiety disorders including panic disorder (diagnosed in 38% of anxious patients), agoraphobia (33%), obsessive-compulsive disorder (25%), generalized anxiety disorder (12%), and social phobia (7%); and mood disorders, including both single-episode and recurrent major depression (77% of affective patients), dysthymia (14%), cyclothymia (4%), and bipolar disorder (13%). (The total exceeds 100% because of multiple diagnoses.) Among patients, 61 percent had at least one personality disorder based on the SIDP-R interview and an average of 2.3 personality disorder diagnoses each. Because a clinically important state of anxiety (Reich et al. 1986) or depression (Hirschfeld et al. 1983) may influence the personality evaluation, the SIDP-R always was administered when patients were in least moderate remission of symptoms, based on the judgment of the clinicians who were treating them. Thus, the SIDP-R interview took place when the patient and the clinician consensually acknowledged a global improvement in symptoms in the previous 4 weeks of at least 70 percent compared with the clinical status at the beginning of treatment. To conform with the SIDP-R instructions, subjects were invited repeatedly when interviewed to answer based on their most typical personality style (i.e., without taking into account temporary changes occurring in the course of episodes of psychiatric syndromes). According to the SIDP-R scoring sheet, 3 percent of the 538 psychiatric outpatients and 0.8 percent of 225 nonpatients in the sample had SPD (test of the difference between two proportions: $Z = 1.49$, $p = $ not significant), without a significant difference of distribution between men and women.

Analyses of Data. In the instructions of the SIDP-R a given criterion can be rated 0 (absent), 1 (present), or 2

(present, severe). Because the frequency of code 2 was rare (< 10%) in the sample, codes 1 and 2 were collapsed into a unique variable. The nine possible traits of SPD as dichotomic variables in the SIDP-R interviews of 538 psychiatric nonpsychotic outpatients were then used to build a polychoric correlation matrix (a solution preferable to the covariance matrix when treating qualitative traits), using the PRELIS (Joreskog and Sorbom 1986) program. Exploratory factor analysis (EFA) and VARIMAX rotation were then applied to these transformed data with a selection criterion of loading of 0.50 or greater for the single variables and an eigenvalue of 1 or greater, with the subroutine 4M of the BMDP (Biomedical Data Package) computer programs (Dixon 1992). Under these conditions, the EFA provided three orthogonal factors: cognitive-perceptual, oddness, and interpersonal (table 1).

The robustness of the finding provided by the EFA was then tested by applying confirmatory factor analysis (CFA) techniques with the LISREL program (Joreskog and Sorbom 1989). The fits of the empirically derived trifactorial solution of SPD were compared with those of four other competing models (described in Raine et al. 1994), as shown in figure 1, as well as to the null hypothesis (each of the nine traits of SPD is independent) in the group of 225 nonpatient subjects.

CFA differs from EFA in several ways. In EFA, there is no preassigned model that relates the latent to the observed variables, the number of latent variables is not determined before the analyses, all latent variables influence all observed variables, and identification of parameters is not required (Bollen 1989).

Table 1. Results of exploratory factor analysis of *DSM-III-R* schizotypal personality disorder in 538 outpatients

Traits	Factor 1: Cognitive-perceptual	Factor 2: Oddness	Factor 3: Interpersonal
Ideas of reference	0.656	0.000	0.390
Social anxiety	0.000	0.000	0.808
Odd beliefs	0.772	0.000	0.000
Unusual perceptual experiences	0.783	0.270	0.000
Odd behavior	0.323	0.665	0.000
No close friends	0.000	0.000	0.681
Odd speech	0.000	0.798	0.000
Constricted affect	0.000	0.842	0.000
Suspiciousness	0.669	0.000	0.380
Percentage of explained variance[1]	33%	17%	15%

Note.—*DSM-III-R* = Diagnostic and Statistical Manual of Mental Disorders-Revised (American Psychiatric Association 1987).
[1]VARIMAX rotation, cumulative percentage of explained variance = 65%. Only loadings ≥ 0.25 are shown.

Figure 1. Comparison of the empirically derived trifactorial solution of schizotypal personality disorder (SPD) with four other competing models using confirmatory factor analysis
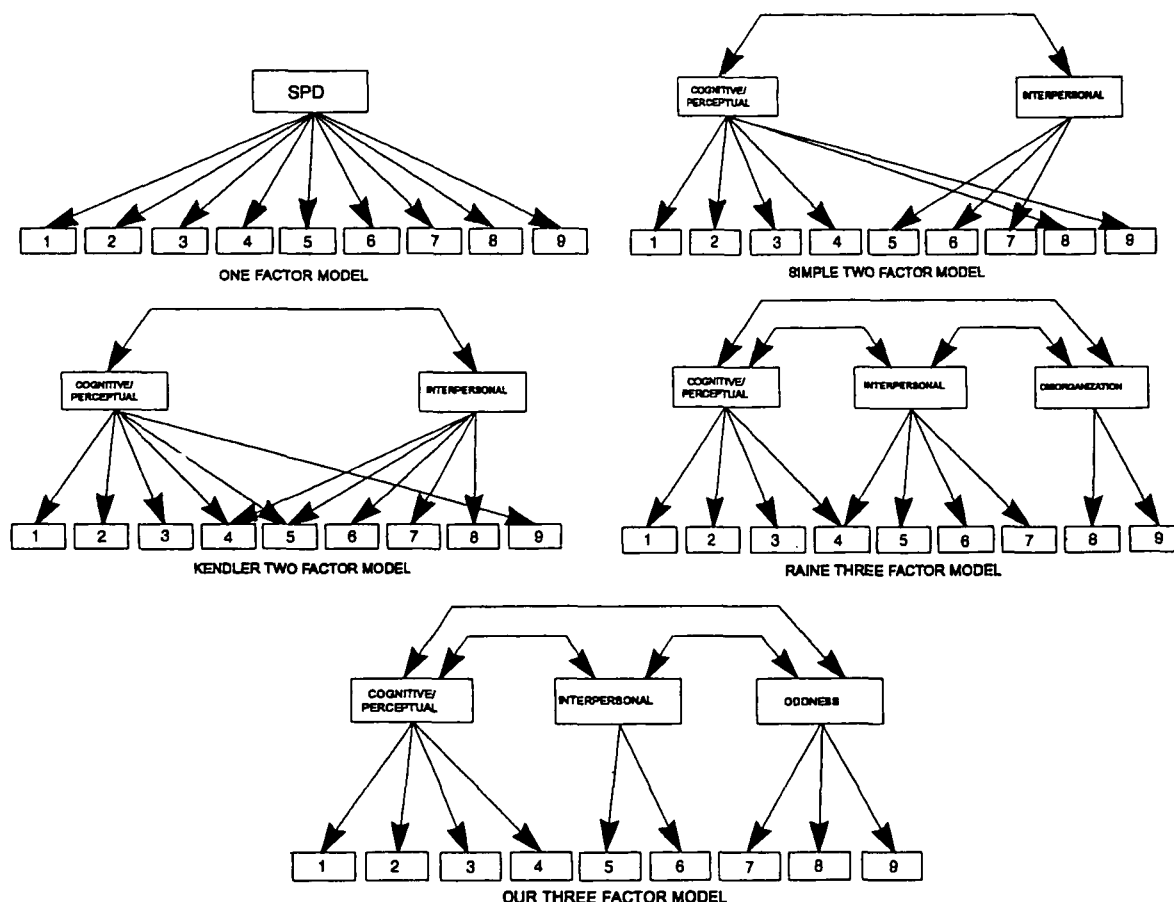
Number key: 1 = ideas of reference; 2 = magical ideation; 3 = perceptual aberrations; 4 = paranoid ideation; 5 = social anxiety; 6 = no close relationships; 7 = constricted affect; 8 = odd appearance; 9 = odd speech.

CFA, in contrast, analyzes structural covariance, which explains the interrelationships among some observed variables (personality traits in the study sample) and latent variables (the hypothetical, functional factors that underlie traits). In CFA, unlike EFA, a model that accounts for the covariance matrix is preconstructed, the number of latent variables having been established before running the analysis. The direct effect of latent and observed variables can be fixed to zero (or to some other constant), covariance of latent variables can be estimated or set to any value, and parameter identification is required. Therefore, a major feature of CFA is the possibility of estimating the relationship between latent and observed variables in, and the goodness of fit for, competing models.

The models tested in CFA (figure 1) are

1. The one-factor model (SPD is a unifactorial disorder).

2. The two independent factors model. The traits of

SPD are encompassed by a two-factor solution, with the traits traditionally described as cognitive-perceptual on one factor and social-interpersonal on the other. This model also has been called the simple two-factor model (Raine et al. 1994).

3. Kendler et al.'s two-factor model. This empirically derived solution differs from the former two-factor solution in that suspiciousness and social anxiety are loaded on both factors, and odd behavior is encompassed by the interpersonal instead of the cognitive-perceptual factor (Kendler et al. 1991).

4. Raine et al.'s three-factor model. Suspiciousness again weighs on both the interpersonal and the cognitive-perceptual factors, and a disorganized factor encompassing odd speech and odd behavior is added.

5. The three-factor solution proposed by the current study.

6. The null hypothesis, which predicts the absence of correlations among the nine SPD criteria.

Several measures of absolute fit were used to estimate the degree to which the models predicted the observed variance. These included the chi-square, the goodness-of-fit index (GFI), the adjusted GFI index (AGFI), and the residual mean square root (RMSR).

The chi-square suggests GFI inversely proportional to the distance of its value from nonsignificance; therefore, a large value indicates a large discrepancy between estimated and observed matrices. However, the use of this index has been criticized (Bentler and Bonnett 1980; Joreskog and Sorbom 1989), especially when samples are larger than 200, as being too sensitive to sample size, with larger samples increasing the probability of model rejection (Marsh et al. 1988).

The GFI is a nonstatistical measure. A good fit of the model is indicated by values greater than 0.90 (Cole 1987). This measure represents the square residuals from the predictions compared with the observed data and indicates the amount of variance and covariance explained by the model (Joreskog and Sorbom 1989). The GFI is not adjusted for the degrees of freedom.

The AGFI relates the GFI of a model to the number of estimated coefficients required to achieve that specific level of fit. It is adjusted for the ratio of the degrees of freedom of the proposed model to the degrees of freedom of the null model. For the AGFI, good fit is indicated by values greater than 0.80 (Cole 1987).

The RMSR is the square root of the mean of the squared residuals, that is, an average of the residuals between observed and estimated input matrices. The lower the RMSR, the better the fit of the model.

The Akaike information criterion (AIC; Akaike 1987) is an additional measure of fit among models with differing numbers of constructs that takes into account the number of parameters that have been measured to determine the GFI. AIC estimations range from negative values to zero, with the best fit closest to zero.

Results

Table 2 shows the frequencies of the nine *DSM–III–R* criteria for SPD in the outpatients and control subjects. There are no significant differences in the distributions except for social anxiety and ideas of reference, which are significantly more common among psychiatric outpatients (test of the difference between two proportions: $Z = 4.6$, $p = 0.001$; $Z = 2.6$, $p = 0.009$, respectively).

Table 1 shows the three factors with eigenvalues of at least 1 identified by EFA in the nonpsychotic psychiatric outpatients, accounting for a cumulative percentage of 65 percent of the variance. An oblique rotation was applied to the data, without appreciable differences in the compo-

Table 2. Frequencies of *DSM–III–R* schizotypal traits in 538 outpatients and 225 control subjects

Traits	Outpatients n (%)	Control subjects n (%)
Ideas of reference	106[1] (19.7)	26 (11.6)
Social anxiety	186[2] (34.0)	40 (17.8)
Odd beliefs	67 (12.5)	27 (12.0)
Unusual perceptual experiences	63 (11.7)	21 (9.3)
Odd behavior	12 (2.2)	2 (0.9)
No close friends	227 (42.2)	80 (35.6)
Odd speech	14 (2.6)	3 (1.3)
Constricted affect	33 (6.1)	9 (4.0)
Suspiciousness	97 (18.0)	29 (12.9)

Note.—DSM–III–R = Diagnostic and Statistical Manual of Mental Disorders–Revised (American Psychiatric Association 1987).
[1]$Z = 2.6$, $p = 0.009$.
[2]$Z = 4.6$, $p = 0.001$.

sition of the factors or in their loadings (data available from the authors on request).

Table 3 shows the fits for the models of the five possible factorial solutions for SPD in control subjects analyzed by CFA. All five solutions fit better than the null model. None of the indices adopted had values satisfactory enough to suggest the likelihood of the unifactorial model or either of the two-bifactorial models. The trifactorial model of Raine et al. (1994) applied to the sample of control subjects provided an AGFI greater than 0.80, but the GFI was less than 0.90, and the RMSR had an unacceptably large value. The trifactorial solution, proposed in the current study, empirically derived in the sample of psychiatric outpatients by CFA and applied to the nonpatient control subjects, yielded the best values for all four indices. Although the chi-square was significant, it was the smallest chi-square of all of the models tested. Moreover, given the weaknesses of this index for large samples, the chi-square should not severely hamper the quality of the finding.

The factorial loadings estimated on the basis of our empirical model are shown in table 4. The correlations among factors are shown in table 5, and table 6 shows the results of an exploratory factor analysis with the VARIMAX rotation of the SPD criteria of the two samples combined (763 subjects).

Discussion

These data show that SPD diagnosed with personal, clinician-administered interviews can be described better and conceptualized as structurally multidimensional, and that three factors best explain the construct. These factors have low intercorrelations and therefore should be fairly inde-

Table 3. Confirmatory factor analysis goodness-of-fit indices for the six models

Models	χ^2	df	p	GFI	AGFI	RMSR	AIC
Null	306.47	36	0.00	0.767	0.709	0.174	−162.23
Unifactorial	190.33	27	0.00	0.847	0.746	0.128	−104.65
Bifactorial	176.05	26	0.00	0.857	0.753	0.123	−98.09
Bifactorial of Kendler	181.97	24	0.00	0.867	0.751	0.124	−102.98
Trifactorial of Raine	136.44	25	0.00	0.894	0.809	0.108	−79.22
Trifactorial	47.07	25	0.00	0.956	0.921	0.058	−34.53

Note.—df = degrees of freedom; GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index; RMSR = residual mean square root; AIC = Akaike information criterion.

Table 4. Trifactorial model for *DSM–III–R* schizotypal personality disorder in 225 control subjects: Confirmatory factor analysis

Traits	Factor 1: Cognitive-perceptual	Factor 2: Oddness	Factor 3: Interpersonal
Ideas of reference	0.701	—	—
Social anxiety	—	—	0.380
Odd beliefs	0.441	—	—
Unusual perceptual experiences	0.290	—	—
Odd behavior	—	0.398	—
No close friends	—	—	0.688
Odd speech	—	0.982	—
Constricted affect	—	0.565	—
Suspiciousness	0.712	—	—

Note.—DSM–III–R = Diagnostic and Statistical Manual of Mental Disorders–Revised (American Psychiatric Association 1987).

Table 5. Correlation matrix among factors

Factors	Factor 1: Cognitive-perceptual	Factor 2: Oddness	Factor 3: Interpersonal
Cognitive-perceptual	1	—	—
Oddness	0.05	1	—
Interpersonal	0.246	−0.126	1

Table 6. Factors and loadings (≥ 0.5) of *DSM–III–R* schizotypal personality disorder based on factor analysis applied to the two samples of 538 outpatients and 225 nonpatients, subjects combined

Traits	Factor 1: Cognitive-perceptual	Factor 2: Oddness	Factor 3: Interpersonal
Ideas of reference	0.714	—	—
Social anxiety	—	—	0.830
Odd beliefs	0.795	—	—
Unusual perceptual experiences	0.753	—	—
Odd behavior	—	0.728	—
No close friends	—	—	0.731
Odd speech	—	0.861	—
Constricted affect	—	0.856	—
Suspiciousness	0.712	—	—

Cumulative percentage of variance explained by the three factors: 65%

Note.—DSM–III–R = Diagnostic and Statistical Manual of Mental Disorders–Revised (American Psychiatric Association 1987).

pendent. The study's finding that more than one dimension underlies the construct of SPD generally accords with the results of several other studies, including those based on self-rated scales that adopted the dimensional approach to schizotypy (Hewitt and Claridge 1989; Kendler and Hewitt 1992; Vollema and van den Bosch 1995), the *DSM–III–R* categorical construct of SPD (Raine et al. 1994), and clinician-administered interviews of *DSM–III* and *DSM–III–R* criteria (Rosenberger and Miller 1989; Kendler et al. 1995). However, similarities and differences in the composition of the factors of these studies are notable.

There seems to be a general agreement across most of the studies, regardless of their adoption of a dimensional or categorical definition of SPD, in finding a positive, or cognitive-perceptual factor that consists, of illusions or perceptual aberrations, magical thinking, and ideas of reference (Rosenberger and Miller 1989; Kendler et al. 1991, 1995; Torgersen et al. 1993; Raine et al. 1994; Vollema and van den Bosch 1995). The compositions of the other factors are less consistent across studies. However, a review of the results of the few investigations, including the current study, that adopted a *DSM–III–R* definition of SPD, reveals that the similarities across studies outnumber the differences.

Overall, the results confirm the findings obtained by Raine et al. (1994) with their *DSM–III–R*-based, self-administered questionnaire. The cognitive-perceptual factor overlaps with that of Raine et al. (1994) and closely resembles the cognitive-perceptual dimension conceptualized by Siever and Gunderson (1983) and Widiger et al. (1988). The oddness factor is similar to the disorganized

factor of Raine et al. (1994) that accounts for the presence of odd speech and odd appearance. The presence of constricted/inappropriate affect in this same factor is at variance with the results of the studies of Kendler et al. (1991) and Raine et al. (1994); their work included constricted/inappropriate affect in the interpersonal factor. The results obtained more recently by Kendler et al. (1995), however, show a first factor of schizotypy consisting of poor rapport, aloofness, odd behavior, and guardedness that more closely resembles the oddness factor in the current study. It is interesting that all components of the oddness factor (constricted/inappropriate affect, odd speech, and odd appearance) also are encompassed by the so-called affect-constricted dimension recently isolated by a psychometric-genetic study based on the Norwegian twin register (Torgersen et al. 1993). A fairly high coefficient of heritability has been shown for this component, which the authors defined as the true (i.e., genetic) factor of SPD (Torgersen et al. 1993; Torgersen 1994). In addition, several family studies of schizophrenia have shown that the same traits of constricted/inappropriate affect, odd speech, and odd appearance are the most typical of the nonschizophrenic relatives of patients with schizophrenia (Gunderson et al. 1983; Kendler and Gruenberg 1984; Lyons et al. 1994; Torgersen 1994). All of these previous findings of independent groups may provide external support for the consistency of the oddness factor. Finally, an interpersonal factor was isolated that encompassed social anxiety and social isolation. Although the presence of social anxiety and social isolation in the same factor may sound quite logical—and is a finding common to other studies (e.g., Kendler et al. 1995)—this result should be viewed critically. Several sources of evidence show that social isolation is a heterogeneous condition and that it can be fairly independent of social anxiety (Mishlove and Chapman 1985; Widiger et al. 1988; Torgersen et al. 1993). Psychometric analyses of the *DSM–III* and *DSM–III–R* criteria for SPD (Widiger et al. 1988; Torgersen et al. 1993) found that social anxiety was not correlated with social isolation, but rather with "avoidant hypersensitivity to rejection." In the psychometric-genetic study of Torgersen et al. (1993), it correlated negatively with schizoid aloofness and schizoid indifference to praise and criticism; thus, it was assigned systematically to the "avoidant" category. The combined presence of social anxiety and social isolation in the same factor may have been influenced, at least in the current study, by the higher prevalence of avoidant PD (23%), compared with the relatively low prevalence of schizoid PD (4%) in the sample. This result may have led to an interpersonal factor biased toward the avoidant construct, as found previously by Mishlove and Chapman (1985).

This specific aspect may deserve more attention, and diagnostic criteria and instruments that discriminate better among the different constructs related to social isolation would have addressed this specific issue more adequately. The use of a large sample and direct interviews administered by clinicians in the present study should provide a reliable description of the structure of *DSM–III–R* and *DSM–IV* SPD (the criteria were the same as those in *DSM–III–R*).

The distribution of the different traits in the sample may have influenced the polychoric correlation matrices because the two most common criteria, the four criteria with midway prevalence, and the three least common criteria happen to cluster together in the factor analysis. The estimation standard error of the polychoric correlations partially depends on the frequency of traits (Guilford and Fruchter 1978); therefore, base rates can play some influence on the polychoric correlation matrix (Bollen 1989). This fairly complex issue (Guilford and Fruchter 1978) may constitute a potential limitation in the present study. However, the factors have several similarities with the solutions found by other investigators (Raine et al. 1994; Kendler et al. 1995), and at least the oddness factor seems to have externally supported validity that is suggested by genetic-epidemiological data (Gunderson et al. 1983; Kendler and Gruenberg 1984; Torgersen et al. 1993; Torgersen 1994).

The finding that more than one factor underlies a categorical diagnosis is common to other *DSM–III* and *DSM–III–R* disorders, including schizophrenia. Latent structure analyses provided support for a three-process model (Lenzenweger et al. 1991) and were compatible with the Strauss et al. (1974) hypothesis of three independent pathological processes including positive symptoms, negative symptoms, and disordered personal-social relationships in schizophrenia. Other authors (Bilder et al. 1985; Arndt et al. 1991; Andreasen et al. 1995) similarly showed that three-factor solutions are more realistic than the usual positive/negative symptom dichotomization of schizophrenia (Smeraldi 1988), although their composition varied across studies.

As noted previously (Raine et al. 1994), if three, instead of two, factors underlie SPD, future studies should account for this fact when exploring the schizophrenia spectrum, with three latent factors putatively corresponding to relatively independent (dys)functional systems involved in the liability to schizophrenia.

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Minority Research Training in Psychiatry

Through a 5-year grant from the National Institute of Mental Health, the American Psychiatric Association (APA) is seeking through the Program for Minority Research Training in Psychiatry (PMRTP) to increase the number of minority psychiatrists entering the field of psychiatric research.

The program provides medical students and psychiatric residents with funding for stipends, travel expenses, and tuition for an elective or summer experience in a research environment, with special attention paid to trainees' career development in research. In addition, stipends are available for a limited number of 1- or 2-year post-residency fellowships for minority psychiatrists. Training takes place at research-oriented departments of psychiatry in major U.S. medical schools and other appropriate sites throughout the country. An individual at the site (the research "mentor") is responsible for overseeing the research training experience.

The program, administered by the APA's Office of Research, includes outreach efforts to identify minority medical students and residents who are potential researchers and to put them in touch with advisors who counsel them about careers in psychiatric research. Additional activities assist fellows and alumni in their research career development.

The director of the PMRTP is Harold Alan Pincus, M.D.; the project manager is Ernesto Guerra. An advisory committee of senior researchers and minority psychiatrists developed guidelines for applicants and criteria for selection. The members of this committee evaluate and select trainees, oversee the research training experiences, and play a role in evaluating the effectiveness of the program.

The deadline is December 1, for applications for residents seeking a year or more of training and for post-residency fellows. For medical students and other residents, applications are due 3 months before training is to begin. Summer medical students who will start their training by June 30 should submit their applications by April 1.

For more information about the PMRTP, call the toll-free number for the PMRTP, 1-800-852-1390, or (202) 682-6225, or write to Dr. Pincus at the American Psychiatric Association, 1400 K Street, NW, Washington, DC 20005.