

# The SPQ: A Scale for the Assessment of Schizotypal Personality Based on *DSM-III-R* Criteria

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## Abstract

Existing self-report measures of schizotypal personality assess only one to three of the nine traits of schizotypal personality disorder. This study describes the development of the Schizotypal Personality Questionnaire (SPQ), a self-report scale modeled on *DSM-III-R* criteria for schizotypal personality disorder and containing subscales for all nine schizotypal traits. Two samples of normal subjects ( $n = 302$  and  $n = 195$ ) were used to test replicability of findings. The SPQ was found to have high sampling validity, high internal reliability (0.91), test-retest reliability (0.82), convergent validity (0.59 to 0.81), discriminant validity, and criterion validity (0.63, 0.68), findings which were replicated across samples. Fifty-five percent of subjects scoring in the top 10 percent of SPQ scores had a clinical diagnosis of schizotypal personality disorder. Thus, the SPQ may be useful in screening for schizotypal personality disorder in the general population and also in researching the correlates of individual schizotypal traits.

The increasing interest in individual differences in schizotypal personality in the normal population is reflected in the expanding use of self-report measures of schizotypal features. After the development of the Psychoticism scale (Eysenck and Eysenck 1975), scales to measure Physical and Social Anhedonia (Chapman et al. 1976), Magical Ideation (Eckblad and Chapman 1983), Perceptual Aberration (Chapman et al. 1978), Schizophrenism (Venables et al. 1990), and "STA" (Claridge and Broks 1984) have been developed. These scales constitute valid and reliable measures of individual features of schizotypal

personality and varying types of proneness to psychosis (Chapman et al. 1982; Raine and Manders 1988; Lenzenweger and Loranger 1989; Katsanis et al. 1990).

Yet there appears to be no published self-report measure that assesses all nine features of schizotypal personality disorder as defined by *DSM-III-R* (American Psychiatric Association 1987). Magical Ideation and Perceptual Aberration scales, for example, represent single features of *DSM-III-R* schizotypal personality. While STA and Schizophrenism measures are broader test instruments, they each assess only three of the nine features of schizotypal personality (Hewitt and Claridge 1989; Venables et al. 1990). Similarly, the inability to experience pleasure in the physical or social domains (physical and social anhedonia) are not listed as features of *DSM-III-R* schizotypal personality.

A questionnaire closely modeled on *DSM-III-R* schizotypal personality disorder criteria would be of value for at least three reasons. First, although studies on single features of schizotypal personality are valuable, research into the overall concept of schizotypal personality is of major importance. Second, in addition to facilitating the understanding of schizotypal personality in the general population, such an instrument could screen populations for subjects who may meet a clinical diagnosis of schizotypal personality disorder and thereby help to advance much-needed research in this area. Third, if such a questionnaire incorporated brief subscales assessing each of the

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nine schizotypal features, it would facilitate research into these schizotypal subcomponents along with research into the overall concept of schizotypal personality.

This study's primary aim was to develop a Schizotypal Personality Questionnaire (SPQ) closely modeled on *DSM-III-R* criteria that could provide an overall measure of schizotypal personality. A secondary aim was to develop short subscales to assess each of the nine schizotypal features, while keeping the questionnaire as short as possible. Two samples of subjects were used to test replicability of findings. Convergent validity was gauged by relating scores to other scales that assess schizotypal traits. Discriminant validity was gauged by relating scores to scales that assess features of psychosis-proneness not contained in *DSM-III-R* criteria for schizotypal personality disorder. Criterion validity was gauged by conducting diagnostic interviews for *DSM-III-R* schizotypal personality disorder with subjects who scored high and low on the SPQ.

## Method

**Subjects.** Two populations of subjects were employed in the construction of the questionnaire. The first sample consisted of 302 undergraduate student volunteers; this sample was randomly divided into two subsamples (1a and 1b), each containing 151 subjects. Sample 1a consisted of 66 males and 85 females, while sample 1b consisted of 70 males and 81 females. These two subsamples were used in the initial construction stage of the SPQ, with subsample 1b acting as a replication sample for 1a. The second population of subjects (sample 2) consisted of 195 under-

graduates (100 male and 95 female). Sample 2 was used to test the replicability of results generated in the initial construction stage as well as to provide data on new items to increase subscale reliability.

**Item Generation.** Since one of the primary goals was to develop a questionnaire that assessed all nine features of *DSM-III-R* schizotypal personality disorder, items were generated in order that these nine traits would receive representation in the final questionnaire, thus ensuring high sampling validity. These nine traits are listed in table 1.

Items for the SPQ were generated from four sources. First, items were taken from, or closely modeled on, existing interview schedules for schizophrenia and schizotypal personality including the Present State Examination (PSE; Wing et al. 1974), the Scale for the Assessment of Negative Symptoms (SANS; Andreasen 1982), the Structured Clinical Interview for *DSM-III-R* Personality Disorders (SCID-II; Spitzer et al. 1987), and the Schedule for Affective Disorders and Schizophrenia (SADS; Endicott and Spitzer 1978). Second, new items were modeled on examples of schizotypal traits outlined in *DSM-III-R*. Third, some items were included from published questionnaires measuring schizotypal features; these included the STA scale (Claridge and Broks 1984), the Schizotypy scale (Venables et al. 1990), the Perceptual Aberration scale (Chapman et al. 1978), and the Magical Ideation scale (Eckblad and Chapman 1983). Fourth, new items were generated by the author to fill gaps in the item pool and to complement items generated by the first three approaches.

Item generation for each of the nine subscales resulted in an initial

pool of 110 items. The proportions of items in this pool from the four sources described above were as follows: interview schedules (34%), *DSM-III-R* (8%), self-report questionnaires (18%), and new items (40%). With respect to the generation of new items, an attempt was made to avoid double negatives embedded within the question and to keep items brief and simple. Furthermore, items that could result in artificial differences because of sex bias were not included in the questionnaire.

**Item Deletion.** For each of subsamples 1a and 1b, items were grouped into their respective subscale and corrected item total correlations calculated for each of these nine subscales. Items were deleted from their subscales if in either sample fewer than 10 percent of subjects endorsed the item or if in either sample the corrected item total correlation was less than 0.15. Some additional items were deleted if removal of the item did not lead to an appreciable reduction in coefficient alpha for that subscale. This strategy was employed to keep the SPQ as short as possible without adversely affecting reliability. In total, the SPQ was reduced by 40 percent, from 110 to 66 items.

**Item Addition.** To increase the reliability of four of the nine subscales, additional items were administered to sample 2. Eight of these items were subsequently added to the original pool of 66 items. Consequently, the final scale contains 74 items, and takes from 5 to 10 minutes to complete. The full 74-item questionnaire, broken down into its nine subscales, is shown in table 1. A copy of the questionnaire, scoring procedures, and detailed findings with respect to construct validity are available from the author upon request.

**Table 1. Items for the nine subscales in the final 74-item version of the Schizotypal Personality Questionnaire**

|  |   |  |
|--|---|--|
| <b>Ideas of Reference</b>  |   |  |
| 1. Do you sometimes feel that things you see on the TV or read in the newspaper have a special meaning for you?          | 29. I get anxious when meeting people for the first time.   | 22. When you look at a person, or yourself in a mirror, have you ever seen the face change right before your eyes? |
| 10. I am aware that people notice me when I go out for a meal or to see a film.  | 38. Do you often feel nervous when you are in a group of unfamiliar people?                                 | 31. I often hear a voice speaking my thoughts aloud.   |
| 19. Do some people drop hints about you or say things with a double meaning?   | 46. I feel very uncomfortable in social situations involving unfamiliar people.                             | 40. Have you ever seen things invisible to other people?   |
| 28. Have you ever noticed a common event or object that seemed to be a special sign for you?                             | 54. I would feel very anxious if I had to give a speech in front of a large group of people.                | 48. Do everyday things seem unusually large or small?  |
| 37. Do you sometimes see special meanings in advertisements, shop windows, or in the way things are arranged around you? | 71. I feel very uneasy talking to people I do not know well.  | 56. Does your sense of smell sometimes become unusually strong?  |
| 45. When shopping do you get the feeling that other people are taking notice of you?                                     | <b>Odd Beliefs or Magical Thinking</b>  |  |
| 53. When you see people talking to each other, do you often wonder if they are talking about you?                        | 3. Have you had experiences with the supernatural?  | 61. Do you ever suddenly feel distracted by distant sounds that you are not normally aware of?                     |
| 60. Do you sometimes feel that other people are watching you?  | 12. Do you believe in telepathy (mind-reading)?   | 64. Are your thoughts sometimes so strong that you can almost hear them?   |
| 63. Do you sometimes feel that people are talking about you?   | 21. Are you sometimes sure that other people can tell what you are thinking?                                | <b>Odd or Eccentric Behavior</b>   |
|  | 30. Do you believe in clairvoyancy (psychic forces, fortune telling)?                                       | 5. Other people see me as slightly eccentric (odd).  |
|  | 39. Can other people feel your feelings when they are not there?  | 14. People sometimes comment on my unusual mannerisms and habits.  |
|  | 47. Have you had experiences with astrology, seeing the future, UFOs, ESP, or a sixth sense?                | 23. Sometimes other people think that I am a little strange.   |
|  | 55. Have you ever felt that you are communicating with another person telepathically (by mind-reading)?     | 32. Some people think that I am a very bizarre person.   |
|  |   | 67. I am an odd, unusual person.   |
|  |   | 70. I have some eccentric (odd) habits.  |
|  |   | 74. People sometimes stare at me because of my odd appearance.   |
| <b>Excessive Social Anxiety</b>  |   |  |
| 2. I sometimes avoid going to places where there will be many people because I will get anxious.                         | <b>Unusual Perceptual Experiences</b>   |  |
| 11. I get very nervous when I have to make polite conversation.  | 4. Have you often mistaken objects or shadows for people, or noises for voices?                             | <b>No Close Friends</b>  |
| 20. Do you ever get nervous when someone is walking behind you?  | 13. Have you ever had the sense that some person or force is around you, even though you cannot see anyone? | 6. I have little interest in getting to know other people.   |
|  |   | 15. I prefer to keep myself to myself.   |
|  |   | 24. I am mostly quiet when with other people.  |

**Table 1. Items for the nine subscales in the final 74-item version of the Schizotypal Personality Questionnaire—Continued**

|   |  |   |  |
|---|--|---|--|
| <b>No Close Friends—Continued</b>   |  |   |  |
| 33. I find it hard to be emotionally close to other people.   | 42. Some people find me a bit vague and elusive during a conversation.                         | 68. I do not have an expressive and lively way of speaking.                           |  |
| 41. Do you feel that there is no one you are really close to outside of your immediate family, or people you can confide in or talk to about personal problems? | 50. I sometimes use words in unusual ways.   | 73. I tend to keep my feelings to myself.   |  |
| 49. Writing letters to friends is more trouble than it is worth.  | 58. Do you tend to wander off the topic when having a conversation?                            | <b>Suspiciousness</b>   |  |
| 57. I tend to keep in the background on social occasions.   | 69. I find it hard to communicate clearly what I want to say to people.                        |   |  |
| 62. I attach little importance to having close friends.   | 72. People occasionally comment that my conversation is confusing.                             |   |  |
| 66. Do you feel that you cannot get "close" to people?  | <b>Constricted Affect</b>  |   |  |
|   | 8. People sometimes find me aloof and distant.   |   |  |
| <b>Odd Speech</b>   | 17. I am not good at expressing my true feelings by the way I talk and look.                   | 36. I feel I have to be on my guard even with friends.                                |  |
|   | 26. I rarely laugh and smile.  | 44. Do you often pick up hidden threats or put-downs from what people say or do?      |  |
|   | 35. My "nonverbal" communication (smiling and nodding during a conversation) is not very good. | 52. Have you found that it is best not to let other people know too much about you?   |  |
|   | 43. I am poor at returning social courtesies and gestures.                                     | 59. I often feel that others have it in for me.                                       |  |
|   | 51. I tend to avoid eye contact when conversing with others.                                   | 65. Do you often have to keep an eye out to stop people from taking advantage of you? |  |

*Note.*—The response format is "yes/no." All items endorsed "yes" score 1 point.

**Scales to Assess Convergent and Discriminant Validity.** Two scales were administered to sample 1 to assess convergent validity for the SPQ. They were chosen because they have a demonstrated validity and they each tap more than one feature of *DSM-III-R* schizotypal personality disorder.

STA (Claridge and Broks 1984) is a 37-item scale of schizotypal personality modeled on *DSM-III* (American Psychiatric Association 1980). This

scale assesses three schizotypal features of unusual perceptual experiences, magical ideation, and paranoid ideation (Hewitt and Claridge 1989).

Schizophrenism is a 14-item subscale of the Schizotypy Questionnaire (Venables et al. 1990) reflecting the cognitive, perceptual, and social-anxiety features of schizotypal personality disorder. This scale has been found to correlate with a clinical assessment of schizotypal personality

disorder independently of borderline personality disorder (Raine 1987).

Two scales also were administered to test discriminant validity of the SPQ. They were chosen because they tap features that are not part of *DSM-III-R* schizotypal personality disorder, but that nevertheless tap proneness to psychosis. Both measures have been found to load separately from other measures of schizotypal personality in factor analyses of schizotypal scales (Bentall

et al. 1989; Raine and Allbutt 1989). It was anticipated that these measures would correlate at a significantly lower level with SPQ than would the two convergent-validity measures described above.

Anhedonia is a 13-item subscale of the Schizotypy Questionnaire that measures social and physical anhedonia and is orthogonal to Schizophrenism (Venables et al. 1990).

Psychoticism (Eysenck et al. 1985) is the short 12-item version of the Psychoticism scale of the Eysenck Personality Questionnaire (Eysenck and Eysenck 1975). Chapman et al. (1982) suggest that this questionnaire assesses the type of antisociality that precedes later psychosis and reflects aspects such as antisocial behavior and hard-headedness.

**Diagnostic Interview for Schizotypal Personality Disorder.** Ten percent high and low cutoff scores on the distribution of SPQ scores were 41 and 12, respectively. Subject volun-

teers who met these two cutoffs were asked to volunteer for a clinical interview to assess criterion validity of the SPQ. Not all of the subjects eligible to participate volunteered for the interview; however, 14 low-scoring SPQ subjects and 11 high-scoring subjects were assessed for *DSM-III-R* schizotypal personality disorder with the SCID. Presence of each schizotypal trait was assessed on a 3-point scale (1 = absent, 2 = subthreshold, 3 = threshold); subjects had to have five traits out of nine at threshold level for a *DSM-III-R* diagnosis of schizotypal personality disorder. In addition to making a yes/no diagnosis for each subject, interviewers tallied scores on the nine traits to provide a dimensional index of schizotypal personality disorder as a parallel to the dimensional format of the SPQ. Interviews were videotaped and scored by two interviewers who independently rated the subject.

Interviews were carried out by clinical Ph.D. students trained by the

author on the SCID-II. Interviewers were blind to group membership and each other's assessment at the time ratings were conducted. Interviews took place on an average of 2 months after administration of the SPQ (range: 1 to 3 months).

## Results

**Internal Reliability.** Corrected item total correlations and coefficient alpha were calculated for sample 1 (samples 1a and 1b;  $n = 302$ ) and also for sample 2 (replication sample;  $n = 220$ ) for the initial 66-item scale. Mean, SDs, ranges, and coefficient alpha for each of the nine subscales and total SPQ score for this initial scale for both sample 1 and sample 2 are shown in table 2.

Coefficient alpha for the total SPQ score was high in both sample 1 (0.90) and sample 2 (0.91). Coefficient alpha for the nine subscales ranged from 0.66 to 0.81 (mean = 0.71) in sample 1 and from 0.63 to

**Table 2. Mean, SDs, ranges, and coefficient alpha for the Schizotypal Personality Questionnaire (SPQ) and each of its nine subscales for sample 1 ( $n = 302$ ) and sample 2 ( $n = 220$ )**

| SPQ subscale                             | Sample 1 |      |      |       | Sample 2 |      |      |       |
|--|----------|------|------|-------|----------|------|------|-------|
|  | Alpha    | Mean | SD   | Range | Alpha    | Mean | SD   | Range |
| 1. Ideas of Reference                    | 0.71     | 5.19 | 2.4  | 0-9   | 0.71     | 4.33 | 2.4  | 0-9   |
| 2. Social Anxiety                        | 0.72     | 3.67 | 1.9  | 0-7   | 0.68     | 3.86 | 2.0  | 0-7   |
| 3. Odd Beliefs/Magical Thinking          | 0.81     | 2.23 | 2.0  | 0-7   | 0.75     | 1.99 | 2.1  | 0-7   |
| 4. Unusual Perceptual Experiences        | 0.71     | 2.82 | 2.2  | 0-9   | 0.73     | 2.83 | 2.2  | 0-9   |
| 5. Eccentric/Odd Behavior and Appearance | 0.76     | 2.03 | 1.5  | 0-4   | 0.74     | 1.92 | 1.4  | 0-4   |
| 6. No Close Friends                      | 0.67     | 2.24 | 2.1  | 0-9   | 0.74     | 2.36 | 2.0  | 0-9   |
| 7. Odd Speech                            | 0.70     | 3.99 | 1.8  | 0-7   | 0.63     | 3.86 | 2.0  | 0-7   |
| 8. Constricted Affect                    | 0.68     | 1.47 | 1.5  | 0-6   | 0.65     | 1.69 | 1.5  | 0-6   |
| 9. Suspiciousness/Paranoid Ideation      | 0.78     | 3.31 | 2.2  | 0-8   | 0.73     | 3.39 | 2.4  | 0-9   |
| Total SPQ score                          | 0.90     | 26.9 | 11.0 | 0-58  | 0.91     | 26.3 | 11.4 | 1-57  |



0.75 (mean = 0.71) in sample 2. Values were similar across samples, with an average absolute difference in alphas of 0.04.

Mean subscale reliabilities averaged across samples fell below 0.70 for three of the nine subscales (subscales 2, 7, and 8). In addition, the fifth subscale, although having good reliability in both samples, contained only four items compared to the seven to nine items making up the other subscales. Consequently, eight of the additional items administered to sample 2 were used to increase the reliabilities of these three subscales and to increase item length of the fourth subscale, in order to ensure equal representation of subscales in the total SPQ score. The resulting reliabilities for these four subscales were as follows: 2 (Social Anxiety), 0.78; 5 (Eccentric/Odd Behavior and Appearance), 0.78; 7 (Odd Speech), 0.75; 8 (Inappropriate/Constricted Affect), 0.73. For the final 74-item questionnaire, therefore, subscale reliabilities averaged across samples ranged from 0.71 to 0.78 (mean 0.74), with a total scale score reliability of 0.91.

**Criterion Validity.** With the SCID, coefficient kappa for agreement between the two clinical raters for presence of *DSM-III-R* schizotypal personality disorder was 0.89. The degree of concordance between the two interviewers for diagnosis of schizotypal personality disorder was high and significant ( $\tau = 0.87$ ,  $p < 0.0005$ ). In the single case of disagreement where the second rater did not give a diagnosis of schizotypal personality disorder, three traits were rated as present, four traits were rated as subthreshold, and two were rated as absent. The intraclass correlation for rater reliability for the dimensional measure

of schizotypal personality disorder was also high and significant ( $r = 0.98$ ,  $p < 0.0005$ ).

Regarding criterion validity for the SPQ, of the 11 subjects who scored in the top 10 percent of SPQ scores, 6 (55%) were allocated a clinical SCID-II diagnosis of schizotypal personality disorder according to *DSM-III-R* criteria. None of the 14 subjects scoring in the bottom 10 percent of SPQ scores received such a diagnosis. A chi-square analysis using Yates' correction indicated a significant association between group membership (high/low) on the SPQ and clinical diagnosis (yes/no) of schizotypal personality disorder ( $\chi^2 = 7.3$ ,  $p < 0.007$ ). The association between questionnaire and clinical classification systems was significant ( $\tau = 0.63$ ,  $p < 0.0009$ ). The point-biserial correlation between diagnosis of schizotypal personality disorder and SPQ scores was also significant ( $r = 0.60$ ,  $p < 0.001$ ). These analyses indicate that high scores on the SPQ are indicative of a diagnosis of schizotypal personality disorder.

The 5 subjects in the top 10 percent of SPQ scores who did not receive a diagnosis of schizotypal personality disorder were compared with the 14 subjects scoring in the bottom 10 percent of SPQ scores on the dimensional SCID-II interview measure of schizotypal personality disorder. The lowest score possible on this dimensional scale is 9. The five top-scoring SPQ subjects had significantly higher scores (mean = 14.0,  $SD = 1.4$ ) than did low-scoring SPQ subjects (mean = 10.8,  $SD = 2.7$ ,  $t = 2.4$ ,  $p < 0.03$ ). Four of these five subjects had either subthreshold or threshold ratings on three to five schizotypal traits, while the remaining subject had threshold ratings on two traits. These analyses indicate that high SPQ scorers who

do not meet diagnostic criteria for *DSM-III-R* schizotypal personality disorder nevertheless possess significantly more schizotypal features than do low SPQ scorers.

As a further test of criterion validity, dimensional scores of schizotypal personality disorder derived from the diagnostic interview were correlated with SPQ total and subscale scores. Results of these analyses are shown in table 3. Total SPQ scores correlated significantly with the dimensional measure of schizotypal personality (Spearman's  $r = 0.68$ ,  $p < 0.0005$ ). All of the subscales correlated significantly with the SCID-II schizotypal score (mean Spearman's  $r = 0.65$ , range = 0.55 to 0.80,  $p < 0.005$ ).

Criterion validity of the individual SPQ subscale scores was tested by assessing whether subjects judged to have a specific schizotypal trait on the SCID-II interview also had raised scores on the SPQ subscale for the same trait. Subjects with either a threshold or subthreshold score on the SCID-II for each trait were compared with subjects in whom the trait was absent on each of the nine SPQ subscales. Table 4 shows the results of these *t*-tests. Significant group differences were observed on seven of the nine subscale scores, with a trend ( $p < 0.08$ , two-tailed) on a further subscale (Odd Beliefs/Magical Thinking). Statistical tests could not be computed on the remaining scale (No Close Friends), since no variance was observed in one of the two groups, although the group mean for the "trait-present" group was three times higher than that of the "trait-absent" group. These analyses indicate criterion validity for the SPQ subscales.

**Test-Retest Reliability.** Retest data on the SPQ were collected from the

**Table 3. Correlations of dimensional scores for schizotypal personality disorder from SCID Interview and SPQ total and subscale scores**

| SPQ subscale                             | SCID Interview    |
|--|-------------------|
| 1. Ideas of Reference                    | 0.80 <sup>1</sup> |
| 2. Social Anxiety                        | 0.67 <sup>1</sup> |
| 3. Odd Beliefs/Magical Thinking          | 0.58 <sup>2</sup> |
| 4. Unusual Perceptual Experiences        | 0.59 <sup>2</sup> |
| 5. Eccentric/Odd Behavior and Appearance | 0.55 <sup>2</sup> |
| 6. No Close Friends                      | 0.68 <sup>1</sup> |
| 7. Odd Speech                            | 0.65 <sup>1</sup> |
| 8. Constricted Affect                    | 0.72 <sup>1</sup> |
| 9. Suspiciousness/Paranoid Ideation      | 0.58 <sup>2</sup> |
| Total SPQ score                          | 0.68 <sup>1</sup> |

Note.—SPQ = Schizotypal Personality Questionnaire; SCID = Structured Clinical Interview for *DSM-III-R* Personality Disorders.

<sup>1</sup> $p < 0.0005$ , two-tailed.

<sup>2</sup> $p < 0.005$ , two-tailed.

25 subjects who undertook the clinical interview for *DSM-III-R* schizotypal personality disorder. Two-month test-retest reliability for the scale was 0.82 ( $p < 0.0005$ ).

**Convergent and Discriminant Validity.** Pearson correlations were calculated between total SPQ scores and validation scales administered to samples 1a and 1b. Because some of these validation scales contained items that overlapped with the SPQ and thus artificially increased validity coefficients, SPQ scores were individually corrected to adjust for this item overlap. Intercorrelations between the corrected SPQ scores and the validity scales for both subsamples are shown in table 5. All correlations between adjusted SPQ scores and convergent validity scales (Schizophrenism and STA) were high ( $r = 0.65$  to  $0.81$ ) and statistically significant ( $p < 0.001$ ) in both subsamples. Correlations for the two discriminant validity scales (Psychoticism and Anhedonia) were low

but statistically significant in both subsamples ( $r = 0.19$  to  $0.37$ ,  $p < 0.03$ ). The correlations for these discriminant validity scales were significantly lower than those for convergent validity scales in both subsamples in all cases (Hotelling's  $t$ -test,  $p < 0.006$ ).

## Discussion

The 74-item SPQ for the assessment of *DSM-III-R* schizotypal personality disorder provides an overall measure of individual differences in schizotypal personality together with subscores for the nine schizotypal traits. This SPQ scale shows substantial evidence for reliability and validity. The overall scale has high internal reliability (0.90 to 0.91), sampling validity (all nine schizotypal traits assessed), test-retest reliability (0.82), convergent validity ( $r = 0.59$  to  $0.81$ ), discriminant validity, and criterion validity ( $r = 0.63$ ,  $0.68$ ). Furthermore, evidence for reliability, convergent validity, and discriminant

validity was found to replicate well across separate populations of subjects.

The SPQ was found to correlate at a significantly higher level with other schizotypal personality scales than with scales that do not tap *DSM-III-R* schizotypal features; this result indicates both convergent and discriminant validity for the SPQ. As for discriminant validity, the low-level correlations obtained between SPQ and Anhedonia/Psychoticism (0.18 to 0.37) are broadly consistent with previous low-level correlations reported between these latter two scales and other individual measures of schizotypal personality traits with respect to magnitude. For example, the Magical Ideation scale has been reported to correlate 0.32 with Psychoticism and between  $-0.15$  and  $-0.29$  with Physical Anhedonia (Eckblad and Chapman 1983). Similarly, Perceptual Aberration correlates at a low level ( $-0.10$  to  $-0.22$ ) with Physical and Social Anhedonia (Chapman et al. 1978, 1982). Note, however, that the direction of these small correlations is negative in previous studies but positive in the present study.

Test-retest reliability of 0.82 for the SPQ compares favorably to reliabilities ranging from 0.44 to 0.84 for five psychosis-proneness scales (Magical Ideation, Perceptual Aberration, Physical Anhedonia, Schizoidia, and Nonconformity) reported by Chapman et al. (1982). Similarly, the high internal reliability of the SPQ (0.90, 0.91) compares very well with internal reliabilities of 0.16 to 0.89 reported for these five psychosis-proneness scales (Chapman et al. 1982).

Evidence for criterion validity for the SPQ stems from the fact that all subjects who received a clinical diagnosis of schizotypal personality dis-

**Table 4. Results of t-tests comparing subjects with a schizotypal "trait present" to subjects with "trait absent" (based on SCID interview) on the SPQ subscales**

| SPQ subscale                             | Trait present<br>Mean (SD) |       | Trait absent<br>Mean (SD) |       | t   | p      |
|--|----------------------------|-------|---------------------------|-------|-----|--------|
| 1. Ideas of Reference                    | 6.7                        | (2.2) | 2.6                       | (3.0) | 3.5 | 0.002  |
| 2. Social Anxiety                        | 4.8                        | (1.9) | 2.0                       | (1.7) | 3.8 | 0.0005 |
| 3. Odd Beliefs/Magical Thinking          | 3.3                        | (2.0) | 1.5                       | (2.2) | 1.9 | 0.08   |
| 4. Unusual Perceptual Experiences        | 4.8                        | (2.8) | 0.7                       | (1.1) | 4.9 | 0.0005 |
| 5. Eccentric/Odd Behavior and Appearance | 3.5                        | (0.6) | 1.4                       | (1.5) | 2.7 | 0.01   |
| 6. No Close Friends                      | 7.0                        | (0.0) | 2.3                       | (2.5) | —   | —      |
| 7. Odd Speech                            | 5.2                        | (1.3) | 3.0                       | (2.5) | 2.7 | 0.02   |
| 8. Constricted Affect                    | 2.7                        | (1.6) | 0.6                       | (0.8) | 3.5 | 0.006  |
| 9. Suspiciousness/Paranoid Ideation      | 4.2                        | (2.7) | 1.8                       | (2.2) | 2.3 | 0.03   |

Note.—SPQ = Schizotypal Personality Questionnaire; SCID = Structured Clinical Interview for *DSM-III-R* Personality Disorders.

order came from the high-scoring SPQ group, whereas no subject from the low-scoring group received such a diagnosis. In addition, high-scoring SPQ subjects without a schizotypal diagnosis showed partial fulfillment of the criterion for this disorder. In addition, the dimensional clinical measure of schizotypal personality disorder correlated 0.68 with SPQ scores. Evidence for criterion validity is particularly marked in light of the fact that SPQ administration preceded clinical interviews by an average of 8 weeks.

If we assume that no subject outside the top 10 percent of SPQ scores would receive a diagnosis of schizotypal personality disorder, we can calculate a conservative base-rate estimate for this disorder in the present sample at 5.5 percent (55% of those scoring in the top 10% of SPQ scores had a schizotypal diagnosis). This figure is comparable to the estimate of 5.8 percent made by Baron and Risch (1987). Since high scorers on the SPQ are likely to receive a clinical diagnosis of schizotypal personality disorder, these data also suggest that the SPQ

would be of use in research into schizotypal personality disorder. For example, findings in this study indicated that 55 percent of those subjects who score in the top 10 percent of the SPQ distribution receive a *DSM-III-R* clinical diagnosis of schizotypal personality disorder, while most of the remaining 45 percent of high-scoring SPQ subjects possess between three and five schizotypal traits at a threshold or subthreshold level. This yield rate of 55 percent is substantially greater than that of 6.6 percent found by Rosenberger and Miller (1989) who also used 10 percent cutoffs on Perceptual Aberration, Magical Ideation, and two borderline scales to screen for schizotypal and borderline personality disorder. Seven of the 106 subjects who scored in the top 10 percent on these scales (6.6%) received a *DSM-III* diagnosis of schizotypal personality disorder. Initial screening of subjects with the SPQ followed by a confirmatory clinical interview (e.g., using the SCID-II or the Structured Interview for Schizotypy [SIS; Kendler et al. 1989]) would therefore seem to be a viable

strategy for recruiting subjects with schizotypal personality disorder from a nonclinical population.

There are additional reasons why the SPQ may be useful in future research on schizotypal personality disorder. Most studies on schizotypal personality disorder recruit subjects from hospital samples. Since many schizotypal patients are unlikely to seek help in conventional treatment centers, however, these samples are likely to be biased. Thus, recruitment of subjects with schizotypal personality disorder at a clinical level from nonclinical samples using the SPQ may be valuable in redressing this bias and increasing generalizability of findings.

It also has been argued that schizotypal individuals are genetically predisposed to schizophrenia but possess protective factors against this illness. Therefore, schizotypal subjects who do not yet feel compelled to seek out psychiatric help may represent a more appropriate sample for research on such potentially protective factors.

The SPQ may also be useful to researchers interested in schizo-



**Table 5. Intercorrelations between total Schizotypal Personality Questionnaire (SPQ) scores and convergent/discriminant validity scales in sample 1a (n = 151) and sample 1b (n = 151)**

|                       | Sample 1a         |       | Sample 1b         |       |
|-----------------------|-------------------|-------|-------------------|-------|
|                       | SPQ               | p     | SPQ               | p     |
| Convergent validity   |                   |       |                   |       |
| STA                   | 0.81 <sup>1</sup> | 0.001 | 0.81 <sup>1</sup> | 0.001 |
| Schizophrenism        | 0.59 <sup>1</sup> | 0.001 | 0.65 <sup>1</sup> | 0.001 |
| Discriminant validity |                   |       |                   |       |
| Anhedonia             | 0.19 <sup>2</sup> | 0.02  | 0.18 <sup>2</sup> | 0.03  |
| Psychoticism          | 0.37 <sup>2</sup> | 0.001 | 0.27 <sup>2</sup> | 0.001 |

Note.—SPQ scores are corrected for item overlap with other scales.

<sup>1,2</sup> Correlations with different superscripts within a sample significantly differ ( $p < 0.006$ ).

phrenia per se. Failure to obtain differences between schizophrenic patients and control subjects may occur because of the presence of some schizotypal individuals in the normal control group. Investigators could use the SPQ to screen out such subjects and thus alleviate type II errors. Alternatively, studies on schizophrenia that include a schizotypal group in addition to a normal control group may be of particular value. Studies that can simultaneously demonstrate the same dependent-variable differences in both schizophrenic subjects and schizotypal subjects relative to controls clearly offer a more potent research strategy for overcoming conceptual and methodological problems associated with schizophrenia research.

Collapsing across both subsamples, the nine SPQ subscales were found to have internal reliabilities ranging from 0.71 to 0.78 (mean 0.74). These internal reliabilities are equal to or higher than those reported for other brief schizotypal scales such as the Rust Inventory of Schizoid Cognitions (0.67; Rust 1987), Anhedonia (0.76; Venables et al. 1990), Schizophrenism (0.82; Venables et al. 1990), and Psychoticism (0.76, 0.78;

Eysenck et al. 1985). All nine subscales significantly correlated with dimensional SCID-II interview scores for schizotypal personality disorder. Furthermore, each of these subscales could differentiate the clinical presence or absence of the subscale-appropriate clinical trait (see table 4). Such analyses indicate criterion validity for these subscales and suggest that they may be useful to researchers who wish to make differential predictions for these traits.

Although the SPQ was developed with a nonpsychiatric population, it recently has been found to be suitable, after only minor modifications, for schizophrenic and bipolar patients as well as for normal adults who are not college educated. The necessary modifications consist of defining terms such as telepathy (mind-reading) and clairvoyancy (psychic forces, fortune telling) and are included in the items listed in table 1. These minor additions should be included in the administration of the SPQ to all subject samples.

Finally, an important conceptual point concerns the use of self-report measures to assess schizotypal signs, such as "eccentric/odd behavior and

appearance," "odd speech," and "constricted affect," as opposed to schizotypal symptoms, such as "unusual perceptual experiences" and "ideas of reference." Although self-report procedures may be quite appropriate for the latter, clinical experience suggests that many people are not accurate in their self-judgments of appearance and speech. Somewhat surprisingly, subscales of schizotypal signs were found to be just as valid and reliable as subscales of symptoms (see tables 3 and 4). This may be because some of the questions assessing signs were worded so that the subject reports on external corroboration of these signs (e.g., "People sometimes comment on my unusual mannerisms and habits" or "People sometimes find it hard to understand what I am saying") rather than relying solely on self-analysis.

Although they were disturbed in other areas of cognition, schizotypal individuals in this sample apparently had no significant loss of insight that would affect their self-perceptions and thus invalidate the results on subscales for schizotypal signs. Whether this finding applies to other subject samples remains to be seen.

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