Internal consistency and discriminant validity of the Structured Clinical Interview for Panic Agoraphobic Spectrum (SCI-PAS)

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ABSTRACT *This paper reports on the feasibility, acceptability and psychometric properties of the Structured Clinical Interview for Panic-Agoraphobic Spectrum (SCI-PAS). This interview was designed to assess the lifetime presence of symptoms and other clinical features considered to comprise the panic-agoraphobic spectrum. The interview has 114 items grouped into nine domains. A total of 422 subjects, from 11 centres located throughout Italy, participated in this study. Data were collected from three groups of subjects: psychiatric patients meeting DSM-IV criteria for panic disorder (n = 141), cardiovascular patients (n = 140), including 29 with post-myocardial infarction, and university students (n = 141). The inter-rater reliability and the internal consistency of the SCI-PAS measures were assessed using the intra-class correlation coefficient and the Kuder-Richardson coefficient, respectively. Discriminant validity was assessed by comparing results in patients with panic disorder to those in the other groups. The interview required an average of 25 (±5) minutes to administer. Patients and clinicians found the scale to be highly useful, providing information not previously obtained. Internal consistency was good (>0.70) for six out of nine SCI-PAS domains. The inter-rater reliability was excellent (>0.70) for all the domains except for 'other phobias' (0.467). Patients with panic disorder scored significantly higher on each domain, and on the overall panic spectrum, than did the control subjects. In conclusion, the SCI-PAS is a useful clinical interview, which can be administered in a reasonable period of time. This assessment further demonstrates good internal consistency, discriminant validity, and inter-rater reliability.*

Key words: panic-agoraphobic spectrum, panic disorder, internal consistency, discriminant validity.

Introduction

The Structured Clinical Interview for Panic-Agoraphobic Spectrum (SCI-PAS) was designed to assess the lifetime presence of a group of symptoms, behavioural tendencies, and temperament traits, typical of panic-agoraphobic patients, but not included in a standard DSM-IV or ICD-10 assessment. The interview consists of 114 items organized into nine groups, called 'domains'. In addition to the expected occurrence of panic spectrum manifestations in patients who meet DSM-IV criteria for panic disorder, features of panic spectrum may occur in the absence of full diagnostic criteria. These isolated typical and atypical symptoms, traits and behaviours may be found as prodromal, residual or isolated manifestations of panic-agoraphobic phenomenology (Cassano and Savino, 1993; Cassano, Michelini, Shear, Coli, Maser and Frank, 1997; Frank, Cassano, Shear, Rotondo, Dell'Osso, Mauri, Maser and Grochocinski, 1998).

Recently, Wittchen, Reed and Kessler (1998) investigated the lifetime prevalence and severity of panic symptoms, including DSM-IV panic disorder, panic attacks, limited-symptom episodes ('subthreshold panic attacks') and discrete periods of intense fear or discomfort without other symptoms, in a community sample of young adolescents and young adults. The investigators also documented the occurrence of agoraphobic situations (for example, being at home alone, standing in line, being in a public place or shops). They found that a substantial number of respondents who reported fearful spells (10.5%), limited symptoms panic attacks (3.7%), or full blown panic attacks (4.3%) did not meet criteria for DSM-IV panic disorder or agoraphobia. They may, however, have panic spectrum disorder.

Moreover, other authors (Krystal, Woods, Hill and Charney, 1991; Alastair, Flint, Cook and Rabins, 1996; Shioiri, Someya and Fujii, 1997) have shown that even incomplete manifestations of panic disorder might have clinical relevance. Olfson (1996) studied an outpatient primary care sample, in which six groups of subthreshold psychiatric symptoms were defined. Subthreshold panic was found in 10.5% of the sample and was associated with a higher level of impairment compared with that in subjects with no psychiatric symptoms.

Nevertheless, such a subthreshold 'halo' of symptomatology is often overlooked by clinicians, and few researchers have made sustained attempts to assess this broad area of symptomatology, or to examine the clinical correlates of such symptoms in a systematic manner. Two reasons for this paucity of data could be the lack of a guiding theory and lack of an appropriate measuring instrument. The SCI-PAS, which is based on Cassano's theory (1997) of panic spectrum, fulfils both needs.

The present paper reports the psychometric properties of the SCI-PAS interview, including internal consistency, inter-rater reliability, and the ability to discriminate between outpatients with panic disorders and three comparison control groups, namely hypertensive patients, post-myocardial infarction patients, and university students.

Methods

Instruments

Structured Clinical Interview for Panic-Agoraphobic Spectrum (SCI-PAS)

The SCI-PAS includes four sections:

- general and demographic information;
- DSM-IV multi-axial assessment;
- treatment history; and
- panic-agoraphobic spectrum interview, including questions in nine domains: (a) typical panic symptoms; (b) atypical panic symptoms; (c) anxious expectation; (d) typical agoraphobia; (e) other phobias; (f) reassurance sensitivity; (g) substance sensitivity; (h) stress sensitivity; (i) separation sensitivity.

Scoring of the SCI-PAS interview is done by scoring items, domains and the overall instrument. Each item is coded as 'absent' (1), 'present' (2), or 'not applicable/unknown'. Similarly, each domain is scored as present or absent according to criteria that require raters to inquire about severity of symptoms when only a few are present. Specifically, to score as present the domains of typical and atypical panic symptoms, agoraphobia, other phobias, reassurance and separation sensitivity requires endorsement of three items or at least one symptom rated as severe. The domains of anxious expectation, substance sensitivity, and stress sensitivity are scored as present when at least one item is endorsed (Cassano, Rotondo, Maser, Shear, Frank, Mauri, Dell'Osso, 1998).

Ratings of acceptability

We developed a questionnaire to assess the rater's judgement of usefulness of the SCI-PAS instrument. The questionnaire includes 5 questions rated on a four-point scale, where 0 is 'not at all', 1 is 'a little', 2 is 'moderately' and 3 is 'a lot'. The rater indicates how useful he or she finds the PAS model, whether the SCI-PAS interview is useful for understanding the panic-agoraphobic spectrum, how much the SCI-PAS interview helps to understand the patient, whether the rater thinks patients felt better understood through use of the SCI-PAS and how difficult it was to administer the SCI-PAS. Pisa interviewers were excluded from this assessment. A similar questionnaire was devised for the patients, inquiring how meaningful they considered SCI-PAS questions, how difficult or distressing they found the questions, whether they felt reassured after the interview, whether the interview helped them better understand their problems, and whether they thought the interview helped the doctor to better understand their problems.

Interviewer training

Raters were 18 resident psychiatrists who underwent formal training in the use of the Structured Clinical Interview for Panic-Agoraphobic Spectrum. During a two-day session, the concept of panic-agoraphobic spectrum was described and discussed, along with an introduction to the instrument and instructions on scoring. The trainees then viewed two videotaped interviews, which stimulated further discussion of more complex rating issues.

Following the training session, during a six-week period of practice, each rater interviewed at least two patients a week. After four weeks, each rater sent an audiotaped interview to Pisa. Weekly phone

consultation was also provided by supervisors at Pisa. At the end of this six-week period a second meeting was held for all raters. Two new-videotaped interviews were presented and scored by both raters and Pisa-based supervisors. Inter-rater reliability was calculated and showed excellent reliability had been achieved (r = 0.90).

Procedures

Subjects from all 11 sites were assessed over a two-month period using the SCI-PAS. Raters and patients also completed the acceptability questionnaire. Summary score sheets were faxed to Pisa after each interview where data were checked for completeness and entered into the study data base.

Study sample

Data were collected from 422 subjects, who were consecutively recruited, and who included 141 psychiatric patients who met DSM IV criteria for panic disorder on clinical assessment, 111 patients with hypertension, 29 post-myocardial infarction patients, and 141 university students. These subjects were recruited from catchment areas around Pisa (Cagliari, Siena, Bologna, Parma, Napoli, Sassari, Roma, Torino, Brescia, and Milano). Exclusion criteria included (a) age below 18 years, (b) DSM-IV diagnosis of organic mental disorder, and (c) DSM-IV diagnosis of substance use disorder within the last three months. All subjects signed informed consent prior to participating in the SCI-PAS interview. The mean age in the overall sample was 39.6 ± 16.8 years (range 18–86). Women constituted 62% of the sample. All subjects were Caucasian. Demographic differences between the subject groups are shown in Table 1.

Statistical analysis

Inter-rater reliability of the presence/absence of the domains of the SCI-PAS was assessed using Cohen's kappa (1968) and internal consistency was tested using the Kuder-Richardson coefficient, a particular form of Cronbach's alpha for dichotomous items. Discriminant validity was assessed by comparing the mean scores of the domains and subdomains in two or more groups using t-tests and one-way analyses of variance (ANOVA), respectively. When the ANOVA results were significant, post-hoc pairwise comparisons were performed using the Bonferroni test. The frequency of item endorsement was compared across the four groups of subjects by inspecting the adjusted standardized residuals, to locate significant deviations from the overall sample frequency. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS(tm) Version 7.5, for Windows 95(tm)).

Results

Frequency of SCI-PAS item endorsement

Nine of the 114 items were endorsed rarely (less than 10%) These included F.5 (admission to hospital to be reassured), F.12 (take a walking stick or umbrella to be reassured), F.13 (take the dog to be reassured), F.14 (wear a hat), F.17 (wear sunglasses even in a dark environment), G.4 (sensitivity to substances), I.1 (sensitivity to family problems, overworking etc.), I.10 (difficulty stopping psychotherapy), I.12 (marked difficulty losing a pet). All others were endorsed by at least 10% of the subjects. In the overall sample, females endorsed a significantly higher mean number of items within each domain (Table 2), except for substance sensitivity. However, no differences were found between genders among panic disorder patients. Female university students had significantly higher mean scores in the typical and atypical panic symptoms domains, the typical agoraphobic symptoms domain, the other phobias domain and the

Table 1: Demographic characteristics in the overall sample in the diagnostic groups

	Total sample (n = 422)	Students (n = 141)	Post-MI (n = 29)	PD (n = 142)	Hypertension (n = 111)
Mean age	39.6(±16.8)	24.8(±3.8)	59.8(±9.5)	37.5(±12.6)	55.7(±13.5)
Gender	%/n	%/n	%/n	%/n	%/n
Male	38.1(160)	31.9(45)	72.4(21)	29.6(42)	48.6(54)
Female	61.9(262)	68.1(96)	27.6(8)	70.4(100)	51.4(57)

Table 2: Mean number of items endorsed by gender and age in the nine domains

Domains	*M*	*F*	*t*	18–30	31–60	<60
Typical panic symptoms (13 items)	4.86 ± 4.27	6.54 ± 4.31	–3.89***	5.05 ± 4.26	7 ± 4.42	5.15 ± 3.86
Atypical panic symptoms (13 items)	3.06 ± 3.05	4.09 ± 3.24	–3.26***	3.21 ± 3.21	4.47 ± 3.23	2.93 ± 2.64
Anxious expectation (5 items)	1.71 ± 1.85	2.11 ± 1.88	–2.13*	1.61 ± 1.84	2.55 ± 1.90	1.31 ± 1.43
Typical agoraphobia (11 items)	2.68 ± 2.94	3.67 ± 3.16	–3.23***	2.64 ± 2.87	4.09 ± 3.35	2.88 ± 2.53
Other phobias (28 items)	5.65 ± 5.12	6.70 ± 5.25	–2.03*	4.82 ± 4.90	7.99 ± 5.31	5.74 ± 4.40
Reassurance sensitivity (23 items)	4.27 ± 4.24	5.18 ± 4.09	–2.18*	4.13 ± 3.99	5.94 ± 4.40	3.67 ± 3.12
Substance sensitivity (4 items)	0.52 ± 0.77	0.58 ± 0.79	–0.88, ns	0.50 ± 0.75	0.68 ± 0.83	0.36 ± 0.66
Stress sensitivity (2 items)	0.75 ± 0.73	1.02 ± 0.72	–3.67***	0.92 ± 0.73	1.01 ± 0.75	0.62 ± 0.64
Separation sensitivity (14 items)	2.77 ± 2.64	3.37 ± 2.77	–2.21*	3.09 ± 2.68	3.55 ± 2.87	2.16 ± 2.22

*p < 0.05, **p < 0.01, ***p < 0.001

stress sensitivity domain than the males. Female hypertensives had higher scores on typical panic and agoraphobic symptom domains. Contrary to this pattern, male post-myocardial infarction patients had higher mean scores in the other phobias domain.

In the overall sample, the mean number of items endorsed in the SCI-PAS displayed a quadratic relationship with age in the overall sample, with a peak in the middle-age group (from 31 to 60) (Table 2). However, when the sample was stratified by diagnostic groups, this relationship was found only among panic disorder patients and only on four domains (atypical panic symptoms, anxious expectation, typical agoraphobia, and stress sensitivity).

Inter-rater reliability

Inter-rater reliability of the presence/absence of the SCI-PAS domains was assessed in the five university centres: Napoli, Milano, Brescia, Sassari and Torino. At each of these sites, the SCI-PAS interview was administered to the same patient three to ten days apart, by two different raters.

Kappa values were high for almost all domains, ranging from 0.94 for atypical panic symptoms to 0.73 for typical agoraphobia. The 'other phobias' domain showed a lower level of agreement (Kappa = 0.46) (Table 3).

Internal consistency

We first evaluated internal consistency for the overall study group for each domain separately. The Kuder-Richardson coefficient for each domain is listed in Table 4. The high alphas demonstrate that most domains have a high degree of consistency when the scale is used in this way. Only for substance sensitivity did the alpha indicate that items in this scale are not highly intercorrelated. No alpha was computed for the domain of stress sensitivity because this domain has only two items.

Alpha coefficients were also calculated separately for the different subject groups. For the most part, these values were also in the acceptable to good range. The one exception is the low alpha for anxious expectation in the panic disorder group. Examination of this domain in panic disorder revealed that all patients had high scores on this domain, probably accounting for the low item intercorrelations.

Table 3: Inter-rater reliability of the nine domains

Domains	K value
A. Typical panic symptoms (13 items)	0.90683
B. Atypical panic symptoms (13 items)	0.94624
C. Anxious expectation (5 items)	0.86364
D. Typical agoraphobia (11 items)	0.73451
E. Other phobias (28 items)	0.46701
F. Reassurance sensitivity (23 items)	0.80000
G. Substance sensitivity (4 items)	0.78469
H. Stress sensitivity (2 items)	0.81013
I. Separation sensitivity (14 items)	0.81250

Discriminant validity

Table 5 shows the mean frequency of endorsement of item in each domain by each group. Panic disorder patients endorsed a significantly higher number of items than the three control groups ($F = 167.9$, $df = 3418$, $p < 0.001$). In addition, hypertensive patients endorsed a significantly higher number of items than students, and scored higher on typical panic symptoms, other phobias, and reassurance sensitivity.

Acceptability

The SCI-PAS required, on average, 25 minutes to administer. Tables 6 and 7 show the results of rater and patient ratings of usefulness of the interview. High levels of acceptability of this assessment by both clinicians and patients were reported. In the raters' self-report questionnaire, all 18 raters agreed on the clinical utility of the spectrum concept and 83% regarded the SCI-PAS as 'moderately' to 'very' useful for understanding signs and symptoms of the panic-agoraphobic spectrum. Similarly, subjects who completed the patient's self-report questionnaire reported learning more about their own symptomatology and 45% of patients felt 'moderately' to 'highly' reassured after the SCI-PAS administration.

Table 4: SCI-PAS internal consistency for each domain (Kuder-Richardson coefficient)

Domains	Overall sample (n = 422)	Students (n = 141)	Post-MI (n = 29)	Panic disorder (n = 141)	Hypertension (n = 111)
Typical panic symptoms (13 items)	0.89	0.81	0.81	0.84	0.65
Atypical panic symptoms (13 items)	0.81	0.75	0.68	0.71	0.71
Anxious expectation (5 items)	0.75	0.55	0.47	0.28	0.60
Typical agoraphobia (11 items)	0.85	0.62	0.63	0.79	0.75
Other phobias (28 items)	0.85	0.83	0.77	0.80	0.68
Reassurance sensitivity (23 items)	0.84	0.81	0.60	0.81	0.66
Substance sensitivity (4 items)	0.44	nc	nc	nc	0.44
Stress sensitivity (2 items)	nc*	nc	nc	nc	nc
Separation sensitivity (14 items)	0.76	0.84	0.75	0.63	0.53

*For the stress sensitivity domain the coefficient was not computed because this analysis requires at least three items.

Table 5: Mean number of items endorsed by PD patients and controls in the nine domains

Domains	(1) Panic disorder patients	(2) Students	(3) Hypertension	(4) Post-MI	F(3,418) and significant pairwise comparisons
Typical panic symptoms (13 items)	10.18 ± 2.55	3.07 ± 3.04	4.48 ± 3.66	4.10 ± 3.39	140.30***(1>2,3,4; 3>2)
Atypical panic symptoms (13 items)	6.32 ± 2.94	2.04 ± 2.39	6.32 ± 2.94	2.86 ± 2.45	72.56***(1>2,3,4)
Anxious expectation (5 items)	4.00 ± 0.98	0.74 ± 1.16	1.10 ± 1.39	1.28 ± 1.33	212.66***(1>2,3,4)
Typical agoraphobia (11 items)	6.20±2.68	1.42±1.73	2.17±2.41	2.52±2.38	115.48***(1>2,3,4)
Other phobias (28 items)	10.75 ± 4.43	2.79 ± 3.29	5.42 ± 4.43	4.93 ± 3.61	95.79***(1>2,3,4; 3>2)
Reassurance sensitivity (23 items)	8.58 ± 3.43	2.43 ± 2.70	3.65 ± 3.59	2.76 ± 2.26	101.27***(1>2,3,4; 3>2)
Substances sensitivity (4 items)	0.90 ± 0.92	0.38 ± 0.65	0.37 ± 0.55	0.41 ± 0.78	15.82***(1>2,3,4)
Stress sensitivity (2 items)	1.31 ± 0.67	0.78 ± 0.69	0.67 ± 0.70	0.52 ± 0.57	25.55***(1>2,3,4)
Separation sensitivity (14 items)	4.70 ± 2.71	2.49 ± 2.47	2.29 ± 2.40	2.14 ± 2.10	27.02***(1>2,3,4)

***$p < 0.001$

Table 6: SCI-PAS questionnaire for the raters (n = 18)

	Not at all	A little	Moderately	Highly
Did you find the PAS model useful?	–	–	44.5 (8)	55.5 (10)
Did you find the SCI-PAS useful for understanding the PA spectrum?	–	11.1 (2)	22.2 (4)	66.7 (12)
Did the SCI-PAS help you to better understand the patients?	–	16.7 (3)	50(9)	33.3 (6)
Do you think patients felt better understood by the doctor through the SCI-PAS administration?	–	44.4 (8)	44.4 (8)	11.2 (2)
Did you find it difficult to use SCI-PAS?	88.9% (16)	11.1% (2)	–	–

Table 7: SCI-PAS questionnaire for the patients (n = 422)

	Not at all	A little	Moderately	Highly
Do you think the SCI-PAS questions were meaningful?	0.6 (3)	5.4 (23)	32.3 (136)	61.7 (260)
Did you find it difficult or distressing to answer the SCI-PAS questions?	73.7 (311)	15.8 (67)	8.7 (37)	1.8 (7)
Did you feel reassured after the interview?	24.2 (102)	20.6 (87)	32.6(138)	22.6 (95)
Did the SCI-PAS help yourself to better understand your problems?	27.8 (117)	23.8 (100)	32.9 (139)	15.5 (66)
Did the SCI-PAS help the doctor to better understand your problems?	14.2 (60)	16.4 (69)	41.9 (177)	27.5 (116)

Discussion

The primary aims of this study were to examine psychometric properties of the SCI-PAS with respect to internal consistency, to document its ability to discriminate patients from control groups, and to test inter-rater reliability. We further sought to introduce the panic-agoraphobic spectrum model and the structured interview to a large group of psychiatrists and to obtain feedback from them and from their patients.

We learned that the SCI-PAS shows acceptable to good internal consistency for most domains, as reflected by the Kuder-Richardson coefficients (Table 4) and by the intercorrelations among the nine domains (Table 8). Only 'substance sensitivity', 'stress sensitivity' and 'separation sensitivity' showed a slightly lower level of correlation. As expected, the correlations between 'typical panic symptoms', 'atypical panic symptoms' and 'anxious expectation' were consistently higher than with the other domains, reflecting the core symptoms and features of panic disorder. In spite of the fact that atypical symptoms are not included among DSM-IV criteria, correlation of these symptoms with more typical panic symptoms is high and should provide clinically revealing information.

As expected, scores on SCI-PAS were significantly higher in panic patients than in the group of student controls and a group of patients with cardiovascular diseases. Good inter-rater reliability indicates that the instrument may be used with confidence in different settings and by different raters, given that raters receive appropriate training. We further found that both the spectrum model and the structured clinical interview were well accepted by psychiatrists and patients involved in the study. Both groups found the interview useful in understanding the patient and not difficult to administer. We conclude that the SCI-PAS represents an assessment strategy that has good psychometric properties, high potential usefulness, and reasonable ease of administration.

Data gathered from the administration of the SCI-PAS support the hypothesis that the spectrum approach to panic disorder may allow a more careful and broader evaluation of a patient's psychopathology and may enhance the clinician-patient relationship.

Table 8: Correlation between SCI-PAS domains

	DOM A	DOM B	DOM C	DOM D	DOM E	DOM F	DOM G	DOM H	DOM I
DOM A	1.000								
DOM B	0.819	1.000							
DOM C	0.813	0.747	1.000						
DOM D	0.704	0.708	0.679	1.000					
DOM E	0.717	0.710	0.719	0.700	1.000				
DOM F	0.714	0.701	0.723	0.705	0.762	1.000			
DOM G	0.357	0.394	0.348	0.301	0.417	0.436	1.000		
DOM H	0.498	0.430	0.492	0.376	0.396	0.450	0.309	1.000	
DOM I	0.480	0.537	0.502	0.451	0.519	0.547	0.321	0.358	1.000

Domain A Typical panic symptoms.
Domain B Atypical panic symptoms.
Domain C Anxious expectation.
Domain D Typical agoraphobia.
Domain E Other phobias.
Domain F Reassurance sensitivity.
Domain G Substance sensitivity.
Domain H Stress sensitivity.
Domain I Separation sensitivity.

Future studies are need to evaluate whether or not the SCI-PAS is useful for monitoring the course of illness, sub-typing of patients for clinical, biological and genetic research, improving treatment selection, and developing strategies for outcome measurement.

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