Psychological Medicine, 1997, **27**, 161–166.

The Brief Social Phobia Scale: a psychometric evaluation

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SYNOPSIS The Brief Social Phobia Scale (BSPS) is an observer-rated scale designed to assess the characteristic symptoms of social phobia, using three subscales – fear, avoidance, and physiological arousal – which may be combined into a total score. Each of 18 BSPS items is anchored to a 5-point rating scale. Psychometric evaluation of the BSPS in a sample of 275 social-phobia patients yielded a high level of reliability and validity. Test–retest reliability was excellent, as was internal consistency. The fear and avoidance subscales demonstrated highly significant correlations with remaining item totals; however, the physiological subscale did not. The BSPS also demonstrated significant relationships with other established scales that assess anxiety and disability, and it proved sensitive to treatment effects in a trial of a 5-HT_3 antagonist and placebo. Factor analysis yielded six meaningful factors. We conclude that the BSPS provides a reliable, valid, and sensitive measure for the evaluation of social phobia.

INTRODUCTION

There has been a rapid growth of interest in social phobia, a disorder with a 14% lifetime prevalence (Kessler *et al.* 1994). A variety of self-rating scales are now available to assess symptom severity in social phobia (Watson & Friend, 1969; Marks & Mathews, 1979; Turner *et al.* 1989), but only one interview-based scale is available and widely used. This scale, the Liebowitz Social Anxiety Scale (LSAS), is a 48-item inventory that is sensitive to differences between active and placebo treatments in social phobia (Davidson *et al.* 1993*a*). To date, however, no psychometric properties of the scale have been published.

We have developed a shorter, 18-item, observer-based rating of social phobia, the Brief Social Phobia Scale (BSPS), in which an interviewer asks the subject about different domains of social anxiety (Davidson *et al.* 1991). The BSPS consists of three subscales: fear, avoidance and physiological arousal. Each subscale is made up of several symptoms characteristic of social phobia, which may change with severity of illness. Fear and avoidance are both included, as some individuals with social phobia, especially those with more discrete, performance-related anxiety, may not avoid feared situations. Inclusion of both dimensions also affords the opportunity to track differential effects of treatment. The physiological items are included because blushing, palpitations, tremor, and sweating can all serve as presenting features of the disorder and/or be the ostensible reason for treatment.

Preliminary analysis of the BSPS reflected high inter-rater reliability, as well as test–retest reliability, internal consistency, and construct validity, based on a small sample of social-phobia subjects (Davidson *et al.* 1991). We also demonstrated that different-occasion interviews on the same day yielded high inter-rater agreement (Davidson *et al.* 1994), that the scale was sensitive to drug–placebo differences (Davidson *et al.* 1994) and that it correlated with a biological marker (Davidson *et al.* 1993*b*).

The present paper further addresses the psychometric properties of the BSPS, based

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upon a much larger subject pool drawn from a placebo-controlled pharmacotherapy study. We examined test–retest reliability, internal consistency, convergent validity, sensitivity to treatment effects, predictive validity and factorial composition of the scale.

METHOD

Materials presented in this report are drawn from an intent-to-treat sample of 275 social phobics (216 males, 59 females; $39{\cdot}78 \pm 11{\cdot}07$ years) participating in a large, multicentre, double-blind clinical trial of the 5-HT_3 antagonist, ondansetron, and placebo (de Veaugh-Geiss & Bell, 1994). Subjects meeting criteria for social phobia on the SCID (Spitzer *et al.* 1990) and scoring 20 or more on the BSPS during the initial screening interview were included for study. In addition to screening, subjects were assessed at a baseline visit 1 week following screening and then bi-weekly for 5 treatment visits. At week 10, study medication was discontinued and subjects were assessed at week 12, i.e. 2 weeks after discontinuation.

Other scales used in this study included the Liebowitz Social Anxiety Scale (LSAS) (Liebowitz, 1987), Fear of Negative Evaluation (FNE) (Watson & Friend, 1969), Hamilton Anxiety Scale (HAM-A) (Hamilton, 1969), Sheehan Disability Inventory (SDI) (Sheehan, 1986), and Clinical Global Impressions (CGI) Severity and Improvement scales (Guy, 1976). The first two scales assess the behavioural and cognitive aspects of social anxiety. The HAM-A provides a more general assessment of anxiety symptoms and can be grouped into psychic- and somatic-anxiety factors. The SDI assesses disability related to psychiatric disorder in three domains: work, social life and family life/home responsibilities. The CGI is a global rating of symptom severity and treatment-related response as evaluated by clinician.

Except where indicated, all analyses were conducted using screening-visit data. Test–retest reliability and convergent validity were assessed using Pearson product-moment correlations. Internal consistency was evaluated using Cronbach's α and by correlating each of the subscales with remaining subscale combinations. Treatment sensitivity was examined using a general linear models (GLM) analysis of variance (ANOVA), with CGI responder status (responder/non-responder) as a grouping variable and time (baseline and endpoint medication week) as a repeated measure. Drug effects were evaluated using a two-way ANOVA, with an interaction term, performed on change scores from baseline (treatment group and centre entered as main effects). The adjusted mean and standard error of the adjusted mean were computed for each assessment. Predictive validity was assessed by regressing baseline BSPS score against endpoint CGI Improvement rating. An exploratory factor analysis was used to evaluate factorial validity.

RESULTS

Test–retest reliability

Test–retest reliability was evaluated by comparing scores at screening with those at baseline. These assessments were separated by a 1-week, single-blind, placebo run-in. As there was an intervention (placebo run-in) between the administration of the scale on the two visits, only patients scoring 4 (unchanged) on the CGI Improvement scale were included in the analyses ($N = 136$) in order to remove placebo responders. The Pearson correlation coefficient between test and retest scores was 0·91 for the BSPS total score ($P < 0{\cdot}0001$). Correlations for the individual subscale were $r = 0{\cdot}87$ for fear, $r = 0{\cdot}90$ for avoidance, and $r = 0{\cdot}77$ for physiological arousal (all P values $< 0{\cdot}0001$).

Internal consistency

Evaluation of internal consistency using Cronbach's α yielded a coefficient of 0·81. Individual item-subtotal correlations ranged from 0·79 to 0·82. Cronbach's α calculated for the individual subscales was 0·70 for the fear subscale, 0·78 for the avoidance subscale and 0·60 for physiological arousal. Individual-item coefficients ranged from 0·65 to 0·72 for fear, 0·73 to 0·77 for avoidance and 0·46 to 0·58 for physiological arousal.

Evaluation of relationships between subscale scores and the addition of the remaining two subscales revealed Pearson correlations of 0·68 ($P < 0{\cdot}0001$), 0·64 ($P < 0{\cdot}0001$) and 0·05 (NS) for the fear, avoidance, and physiological subscales, respectively. The correlation between the fear and avoidance subscales was 0·79

Table 1. *Mean, S.D. and rating frequency percentage for each item of the Brief Social Phobia Scale* (N = 275)

Item	Mean	(S.D.)	Rating 0 %	1 %	2 %	3 %	4 %
Fear							
1 Speaking in public	3·11	(0·81)	1·1	1·5	16·7	46·9	33·8
2 Talking to people in authority	2·15	(1·03)	9·1	12·7	38·2	33·8	6·2
3 Talking to strangers	1·77	(1·11)	16·7	20·7	36·4	21·5	4·7
4 Being embarrassed or humiliated	2·93	(0·89)	1·5	4·0	22·9	43·6	28·0
5 Being criticized	2·55	(1·06)	4·4	12·4	25·8	39·3	18·2
6 Social gatherings	2·47	(1·08)	6·9	8·7	31·3	36·7	16·4
7 Doing something while being watched	2·19	(1·15)	10·9	14·5	30·2	33·5	10·9
Avoidance							
1 Speaking in public	3·05	(0·99)	2·5	4·4	17·5	36·4	39·3
2 Talking to people in authority	2·08	(1·23)	16·7	11·6	28·0	34·2	9·5
3 Talking to strangers	1·88	(1·27)	20·4	17·8	24·0	29·1	8·7
4 Being embarrassed or humiliated	3·02	(0·98)	2·9	4·7	14·9	42·2	35·3
5 Being criticized	2·60	(1·19)	6·9	12·4	19·3	36·4	25·1
6 Social gatherings	2·42	(1·16)	10·2	10·2	20·7	45·1	13·8
7 Doing something while being watched	2·11	(1·26)	16·4	14·9	20·7	37·5	10·5
Physiological							
8 Blushing	1·87	(1·22)	17·8	18·9	30·2	24·4	8·7
9 Palpitations	1·84	(1·20)	18·5	17·8	32·4	24·0	7·3
10 Tremor	1·64	(1·23)	23·3	23·3	26·2	20·4	6·9
11 Sweating	1·93	(1·21)	17·1	17·8	28·4	28·7	8·0

($P < 0{\cdot}0001$); the correlation between physiological arousal and each of the other subscales was 0·05 (NS).

Item frequencies

Frequency percentages for ratings of each BSPS item are presented in Table 1. The least endorsed fear item was still present for 83% of subjects and at least moderate intensity (a rating of 2 or greater) characterized at least 63% of subjects for each item. Similar findings were observed for the avoidance subscale, with at least 80% positive for any particular item and 62% of ratings characterized by at least moderate intensity.

The physiological items were less frequently observed. However, the least endorsed item, trembling, was still identified for 77% of subjects, with at least 54% of ratings marked by moderate to extreme intensity.

Score range

Total BSPS scores ranged from 20, which was the minimum score required for inclusion, to 68, which is 4 points less than the maximum possible total. For the individual subscales, scores ranged from 5 to 28 on the fear subscale (median = 17), 2 to 28 on the avoidance subscale (median = 18) and 0 to 16 on the physiological subscale (median = 7). The means for each of the subscales were $17{\cdot}16 \pm 4{\cdot}30$ for fear, $17{\cdot}17 \pm 5{\cdot}30$ for avoidance, and $7{\cdot}28 \pm 3{\cdot}26$ for physiological arousal. The average total score was $41{\cdot}61 \pm 9{\cdot}81$ (median = 42).

Convergent validity

To assess convergent validity, the BSPS was examined in comparison with the LSAS, FNE, and HAM-A. The correlation between total scores for the BSPS and LSAS (both assessed at baseline) was highly significant ($r = 0{\cdot}70$, $P < 0{\cdot}0001$). The fear ($r = 0{\cdot}71$) and avoidance ($r = 0{\cdot}72$) subscales correlated significantly with the LSAS total score ($P < 0{\cdot}0001$); however, the physiological subscale did not ($r = 0{\cdot}04$, NS). The correlation between the fear subscale of the BSPS and the anxiety subscale of the LSAS was 0·70, while the correlation between the avoidance subscale of the BSPS and the avoidance subscale of the LSAS was 0·73 (both P values $< 0{\cdot}0001$). The correlation between the BSPS physiological subscale and both subscales of the LSAS was 0·04 (NS). Similarly, the BSPS total score ($r =$ 0·45), fear subscale ($r = 0{\cdot}51$) and avoidance

https://doi.org/10.1017/S0033291796004217 Published online by Cambridge University Press

Table 2. *Intent-to-treat analysis comparing ondansetron* versus *placebo in social phobia: change in total score relative to baseline* (*adjusted mean* ± *S.E.*)

Scale	Ondansetron ($N = 136$)	Placebo ($N = 139$)	P
Brief Social Phobia Scale	11·43 ± 1·04	8·49 ± 1·04	0·04
Liebowitz Social Anxiety Scale	12·75 ± 2·03	8·27 ± 2·00	0·11
Hamilton Anxiety Scale	0·43 ± 0·48	0·40 ± 0·48	0·97
Sheehan Disability Scale*	0·44 ± 0·08	0·17 ± 0·08	0·02

* $N = 128$ and 133 for drug and placebo, respectively.

Table 3. *Unrotated factor structure of the Brief Social Phobia Scale* ($F = fear$, $A = avoidance$): *final communality estimate* = 12·89 (N = 275)

Item	Factor … / Eigenvalue …	I 5·00	II 2·31	III 1·66	IV 1·56	V 1·28	VI 1·07
1F	Speaking in public	0·30	0·35	−0·21	0·60	0·09	−0·23
2F	Talking to people in authority	0·63	0·10	−0·12	0·40	−0·36	0·27
3F	Talking to strangers	0·64	−0·29	0·16	0·09	0·16	0·41
4F	Being embarrassed or humiliated	0·57	0·08	−0·32	−0·46	0·05	0·15
5F	Being criticized	0·68	−0·02	−0·39	−0·32	−0·10	0·09
6F	Social gatherings	0·64	−0·17	0·29	0·10	0·50	−0·01
7F	Doing something while being watched	0·49	0·21	0·62	−0·15	−0·36	−0·19
1A	Speaking in public	0·45	0·32	−0·29	0·49	0·01	−0·36
2A	Talking to people in authority	0·67	−0·10	−0·12	0·38	−0·36	0·17
3A	Talking to strangers	0·72	−0·25	0·16	0·05	0·09	0·22
4A	Being embarrassed or humiliated	0·56	0·09	−0·40	−0·37	0·10	−0·25
5A	Being criticized	0·70	−0·03	−0·29	−0·34	−0·06	−0·26
6A	Social gatherings	0·63	−0·11	−0·30	0·05	0·51	−0·15
7A	Doing something while being watched	0·52	0·18	0·57	−0·18	−0·36	−0·35
8	Blushing	0·05	0·69	−0·05	−0·05	−0·23	0·25
9	Palpitations	−0·02	0·72	0·01	−0·06	0·24	0·20
10	Tremor	0·09	0·69	0·01	0·06	0·28	−0·02
11	Sweating	0·14	0·57	0·25	−0·13	0·02	0·36

subscale ($r = 0·43$) correlated significantly with the FNE ($P < 0·0001$), whereas the physiological subscale did not ($r = -0·03$, NS).

Correlations were significant between the baseline HAM-A total and BSPS total score ($r = 0·34$, $P < 0·0001$), fear subscale ($r = 0·34$, $P < 0·0001$), avoidance subscale ($r = 0·23$, $P < 0·0001$) and physiological subscale ($r = 0·20$, $P < 0·001$). The psychic–anxiety factor likewise correlated significantly with the BSPS total score ($r = 0·30$, $P < 0·0001$), fear subscale ($r = 0·28$, $P < 0·0001$), avoidance subscale ($r = 0·15$, $P < 0·05$) and physiological subscale ($r = 0·28$, $P < 0·0001$). The somatic-anxiety factor correlated significantly with the BSPS total score ($r = 0·32$, $P < 0·0001$), fear subscale ($r = 0·33$, $P < 0·0001$) and avoidance subscale ($r = 0·25$, $P < 0·0001$) but did not relate to the physiological subscale ($r = 0·11$, NS).

Correlations between the baseline SDI work scale and BSPS total score, fear, avoidance and physiological subscales were 0·26 ($P < 0·0001$), 0·26 ($P < 0·0001$), 0·22 ($P < 0·0002$) and 0·09 (NS), respectively. For the SDI social-life scale, correlations with the BSPS total score, fear, avoidance and physiological subscales were 0·49 ($P < 0·0001$), 0·54 ($P < 0·0001$), 0·55 ($P < 0·0001$) and −0·09 (NS), respectively. For the SDI family-life/home-responsibilities scale, correlations with the BSPS total score, fear, avoidance and physiological subscales were 0·30 ($P < 0·0001$), 0·35 ($P < 0·0001$), 0·33 ($P < 0·0001$) and −0·08 (NS), respectively.

Sensitivity to treatment effects and predictive validity

Responders (CGI Improvement = 1 or 2) exhibited mean baseline and endpoint (week 10) scores of 43·03 ± 9·21 and 22·08 ± 11·77, respectively, whereas non-responder (CGI = 3 or 4) yielded baseline and endpoint scores of 40·51 ± 9·51 and 31·89 ± 11·47. A repeated-

https://doi.org/10.1017/S0033291796004217 Published online by Cambridge University Press

measures GLM analysis revealed a significant interaction between responder status and time ($P < 0{\cdot}0001$). This interaction derived from non-significant differences at baseline ($P < 0{\cdot}10$) coupled with significant differences at endpoint ($P < 0{\cdot}0001$). A regression model examining CGI outcome as a function of baseline BSPS score yielded a regression coefficient of 0·0, indicating no predictive relationship.

Change scores for BSPS, LSAS, HAM-A, and SDI totals were compared between ondansetron and placebo (Table 2). Statistically significant differences were found in favour of ondansetron for the BSPS ($P < 0{\cdot}05$) and SDI ($P < 0{\cdot}05$) but not for the LSAS or HAM-A. The BSPS fear subscale was associated with the largest drug–placebo differences, with mean changes of $4{\cdot}66 \pm 0{\cdot}43$ and $3{\cdot}00 \pm 0{\cdot}43$, respectively ($P < 0{\cdot}01$). Change on the avoidance subscale for drug ($4{\cdot}61 \pm 0{\cdot}50$) *versus* placebo ($3{\cdot}57 \pm 0{\cdot}50$) was not significantly different, neither was it significant for the physiological subscale (drug $2{\cdot}15 \pm 0{\cdot}29$, placebo $1{\cdot}92 \pm 0{\cdot}28$).

Factor analysis

Unrotated factor analysis yielded six factors, with eigenvalues ranging from 5·001 to 1·072. The resulting factor structure is provided in Table 3. Although the three BSPS subscales did not factor independently, factors were groupable into the following on the basis of item content: factor I reflected general avoidance and fear, with all of the fear and avoidance items at levels greater than 0·3, and most loading between 0·5 and 0·7; factor II consisted of the physiological items: blushing, palpitations, tremor and sweating; factors III, IV, and V loaded primarily on one item each for both fear and avoidance (doing something while being watched, public speaking and social gatherings, respectively); and factor VI loaded highest on fear of talking to strangers.

DISCUSSION

Results of the present analyses are consistent with our prior reports reflecting sound psychometric properties of the BSPS (Davidson *et al.* 1991, 1993*b*, 1994). Test–retest reliability was high and the scale demonstrated a good range of scores over its theoretical distribution. In analyses of internal consistency, the fear and avoidance subscales demonstrated strong homogeneity. While results for the physiological subscale were not robust as for the other subscales, inclusion of the physiological items is nevertheless useful, as it is often the presence of one or another physiological symptom that induces a patient to seek treatment or causes him/her distress. There may also be differences between subtypes of social phobia with respect to autonomic reactivity (Levin *et al.* 1989). These symptoms may be more prevalent among performance-subtype social phobics, who did not feature prominently in our sample.

Statistically significant correlations between the BSPS and other scales of social anxiety, the LSAS and FNE, may be taken as supportive validating data. The BSPS also exhibited significant correlations with the HAM-A total score, as well as with each of its factors. The lower level of correlation probably reflects the fact that the HAM-A is not specifically reflective of social anxiety as much as the two general factors of psychic and somatic anxiety. The significant correlations with the SDI indicate that the BSPS relates positively to the disability associated with social phobia. While the BSPS total, fear, and avoidance scores consistently demonstrated significant correlations with the above scales, the physiological subscale did not. Therefore, it appears that these physiological symptoms, which do emerge as a strong and separate factor, show a degree of independence from the fear and avoidance elements of social phobia. Such symptoms are also less sensitive as indicators of drug–placebo differences (Davidson *et al.* 1993*a*). It remains an open question whether this differential sensitivity to treatment effects denotes a problem with the rating of these items in the scale (e.g. floor effects) or, instead, reflects a lesser impact of active pharmacotherapy on psychophysiological aspects of generalized social phobia, as opposed to cognitive and avoidant symptoms. One possible adjustment, which could therefore be made in the use of the scale, would be to count the total score and the profile as giving useful information about the presentation of social phobia at initial assessment, whereas the fear and avoidance items alone might be used to evaluate treatment efficacy.

Results also demonstrated sensitivity of the BSPS to differences in response to a 5-HT_3

antagonist *versus* placebo in an experimental drug trial. These results were similar to a previous study using clonazepam and placebo (Davidson *et al*. 1993*a*) and support use of the BSPS in drug *versus* placebo studies of social phobia.

Factor analysis produced six factors, which were remarkably similar to those identified by Dixon *et al*. (1957) in their analysis of the patterns of social anxiety. Factor I, the strongest factor, reflected generalized symptoms of social phobia, loading with both fear and avoidance items. This was similar to Dixon *et al*.'s 'general social anxiety' factor, which was also the strongest in their analysis. Factor II predominantly identified the physiological symptoms. This was similar to Dixon *et al*.'s 'fear of loss of control, especially bodily control' factor. Factor III identified anxiety and avoidance related to performing actions while being watched. Again, this was similar to one of Dixon *et al*.'s factors, 'fear of exhibitionism'. Factor IV related to fear and avoidance of speaking in public; factor V loaded on fear and avoidance of social gatherings and factor VI loaded highest on fear of talking to strangers.

Conclusion and future directions

Overall, the BSPS evidenced solid psychometric properties. Further analyses are needed to identify the utility of the physiological subscale. Also, more detailed exploration of the fear and avoidance subscales is required to isolate their unique contribution, as the two were highly correlated and tended to load together on factor analysis. Further evaluation of the scale's sensitivity to treatment effects will need to be performed.

In Davidson *et al*. (1994) and in the present study, the fear subscale was sensitive to clonazepam *versus* placebo differences and ondansetron *versus* placebo differences, while the avoidance subscale was sensitive to clonazepam *versus* placebo differences but not to ondansetron *versus* placebo. Although the LSAS also reflected a reduction in social anxiety for ondansetron compared with placebo, this effect was not statistically significant. The more general rating of anxiety by the HAM-A also failed to detect significant differences between treatments and may reflect unsuitability of this scale for social phobia. Thus, in a head-to-head comparison with another social-phobia scale and a general, non-social-anxiety-focused scale, the BSPS gave a good account of itself.

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